

SHRIMATI INDIRA GANDHI COLLEGE

(Nationally Accredited at 'A' Grade (3rd Cycle) By NAAC)

Tiruchirappalli – 2.

QUESTION BANK

FOR MBA

2017-2018



DEPARTMENT OF MANAGEMENT STUDIES

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M.BA. DEGREE EXAMINTION , NOVEMBR 2015**Business Administration****MANAGEMENT ACCOUNTING****SECTIONA-(5*5=25)****Answer ALL questions.**

a) What are the role of management accounting in planning ,controlling and decision making in a firm?

Or

b) Journalize the following transaction in the Books of Balan 2013:

RS

Dec.1 Balan commenced business with a capital of

1,00,000

3	Bought GOODS FOR CASH	60,000
4	Sold GOODS FOR CASH	50,000
5	Deposited in iob	40,000
6	Bought goods from Ravi	30,000
7	Bought furniture for cash	4,000
8	Sold goods to Nathan	40,000
9	Paid cash to seenu	10,000

2.a) Briefly explain the different branches of accounting.

Or

b) Following are the edger balance of sri Rao.you are asked to prepare trial balance as on 31.12.2012

RS

Opening stock	10,000
Salaries	5,000
Bills payable	5,000
	12,000
Cash in hand	4,000
Bank over draft	15,000
Debtors	18,000
Cash at bank	80,000
Sales	1,000
Wages	2,500
Prepaid insurance	8,000
Depreciation on plant	60,000
Capital	
Creditors	10,000
Loan from Krishna	25,000
Discount allowed	700
Accrued interest payable	5,000
Purchases	30,000
Reserve for bad debts	1,200
Trade expenses	500
Outstanding salaries	2000
Plant and machineries	90,000
Outstanding interest on over draft	500

3.a) How do you classify costs according to controllability ? Explain.

Or

b) What is administration over heads? Also explain the various methods of controlling them.

4. a) Distinguish between allocation and apportionment of overheads.

Or

b) What is cvp? Explain.

5. a) Mention the objectives of budgetary control.

Or

b) Enumerate the limitations of standard costing.

SECTIONB-(5*10=50)

6.a) Elucidate the various accounting concepts in detail.

Or

b) prepare profit and loss account for the year ending on 31.3.14

	RS
Gross profit	25,000
Salaries	5,600
Insurance	200
Discount allowed	400
Discount received	300
Commission earned	100
Advertisement	450
Taxes	150
Travelling expenses	500
Stationery	75
Rent	650
Interest on loan	225
Repairs	125
Office expenses	55
General expenses	875
Postage	175
Printing charge	375

7.a) Bring out the nature and limitations of financial statements

Or

b) From the following trial balance prepare trading, profit and loss a/c for the year ended 31.12.12 and a balance sheet as on that date:

Trial balance			
	RS		RS
Purchases	11,870	capital	8,000
Debtors	7,580	bad debts recovered	250
Return inwards	450	creditors	1,250
Bank deposit	2,750	Return out wards	3501
Rent	360	Bank overdraft	1570
Salaries	850	sales	14,690
Cash	210	bills payable	1,350
Stock	2,450		
Drawings	600		
	27,460		27460

Adjustments:

- 1) the closing stock on 31.12.12 was RS4,200
- 2) Write off RS80 as bad debts and create a reserve for bad debts at 5% on sundry debtors.
- 3) Three months rent is outstanding.

8. a) Explain the usual bases adopted for apportionment of overheads by convention.

Or

b) Assuming that the cost structure and selling prices remain the same in period I and 2 find out:

- 1) profit volume ratio
- 2) fixed cost
- 3) break even point for sales
- 4) profit when sales are RS1,00,00

5) Margin of safety at a profit of RS15,00 and

6) variable cost in period 2

Period	sales RS	profit RS
1	1,20,000	9,000
2	1,40,000	13,000

9.a) A manufacturer presents the following details about the various expenses incurred by him

	RS
Raw materials consumed	70,000
Carriage inwards	2000
Factory rent	2400
Baddebts	440
Printing and stationery	620
Legal expenses	350
Carriage outwards	1,540
Indirect material	560
Power	4600
Depreciation of furniture	160
Postage expenses	465
Repairs of plant and machinery	1200
Salesmen expenses	3400
Advertising	500
Direct wages	85000
General manger salary	36000
Factory manager salary	18000
Depreciation on plant and machinery	1,240
Audit fees	350

Classify the above expenses under the various elements of cost showing separately the total expenditure under each element.

Or

b)	standard	actual
NO.of workers	10	
Working hours p.m	200	180
Output in units	5000	4800
Average wages per worker p.m	2000	1,900

Calculate labour variances.

10.a) the expenses for budgeted production 1000 units in factory are furnished below

	Per unit
Material	70
Labour	25
Variable overheads	20
Fixed overheads (rs1,00,000)	10
Variable expenses (direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20%fixed)	7
Administration expenses	5
Total cost per unit	155

Prepare a budget for production of:

- I. 8,000 units
- II. 6,000 units
- III. Indicate cost per unit at both the levels.

Assume that administration expenses are fixed for all levels of production.

Or

b) Bring out the advantage and limitation of marginal costing.

(For candidates admitted from 2016-2017 onwards)

M.B.A. Degree Examination, November 2016

Business Administration

MANAGEMENT ACCOUNTING

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. Explain the objectives of accounting.
2. What are subsidiary books?
3. Give three principles of cost accounting.
4. Write the significance of elements of cost.
5. What is classification of overheads based on element wise?
6. Write the features of apportionments of overhead.
7. Define marginal cost.
8. What is margin of safety? How it can be increased?
9. Define budget. Give its four essentials.
10. Explain the characteristics of cash budget.

SECTION-B (5×5=25)

Answer all questions.

- 11.a) briefly explain the significance of preparation of trial balance.

Or

- b) Distinguish between book- keeping and accounting.

12. a) Give the names of five cost centers in an organization.

Or

- b) Write short note on

- i. Fixed cost
- ii. Variable cost
- iii. Semi variable cost with suitable example.

13. a) What is meant by classification of over heads and why should it be all emptied?

Or

- b) Are high overhead cost an indication of inefficiency?

14. a) How will you ascertain the absorption cost? Give a proforma for the same.

Or

- b) Is the marginal costing helping in decision making? Discuss.

15. a) Differentiate between flexible budget and fixed budget.

Or

b) What do you mean by production budget? Explain the characteristics of production budget.

SECTION-C (3×10=30)

Answer Three Questions.

16. Describe what formalities to be observe for getting the

- a. Incorporation certificate and
- b. Commencement certificate.

17. Discuss the role of cost accounting in the manufacturing concern.

18. What are “factory overheads”? Describe clearly their characteristics from the view point of overhead accounting.

19. What is a key factor? How does this factor affect the decision about the profitability of a product?

20. Discuss briefly the objectives and limitations of budgetary control

1.a) Differentiate between accounting concepts and principles.

Or

b) State the role of management accounting.

2.a) Write the format of balance sheet of joint stock companies

Or

b) State the attributes of constructing profit and loss accounts.

3.a) What are indirect costs

Or

b) What are the assumptions underlying the financial statements?

4.a) What do you understand by overhead?

Or

b) State how to compute machine hour rate of overhead?

5.a) What are the essentials of a successful budgetary control?

Or

b) What do you mean by margin and safety?

6.(a) Agreement of trail balance does not necessarily mean that accounts are correct comment.

or

b)What are the various elements of cost?

7.a)Discuss the features and determination of cost accounting?

Or

b)Explain the different methods of classification of overheads.

(For candidates admitted from 2008-2009)

M.B.A DEGREE EXAMINATION, APRIL-2012

Business Administration

MANAGEMENT CONCEPTS

Time: Three hours

Maximum mark: 75

PART A (5X5=25)

Answer all questions

1. (a) Mention the characteristics of MNCs.
Or
(b) What are the contributions of Fredrik Winslow Taylor?
2. (a) Explain the steps involved in decision making.
Or
(b) Discuss the pitfalls in the goal setting process.
3. (a) Differentiate “boundryless organization” from “virtual organization”
Or
(b) What are the factors that affect choice of delegation level?
4. (a) How and why forecasting is considered important in HR activities.
Or
(b) In what way intrinsic rewards enhance employee productivity.
5. (a) Mention the significance and the process of financial control.
Or
(b) What are the salient features of feed forward control process?

PART B (5X10=50)

Answer all questions

6. (a) “Rapid environmental shifts cause fundamental transformations which are reflected in the transition to a new work place” elaborate.

Or

(b) Briefly state whether scientific management benefit the management more than the workers.

7. (a) Describe different level of plans and their importance in managerial activity.

Or

(b) “A plan cannot be said to exist unless a decision is made” elaborate.

8. (a) Discuss the reasons for failure of decentralization. How to overcome them?

Or

(b) Why and how centralized organization to deliver optimality of performance for majority of the firms?

9. (a) Discuss the role of specialists in human resource and their contribution organizational effectiveness.

Or

(b) Critically examine the content and process theories of work management and their implications on employee productivity.

10. (a) Explain the various types of control process in an organization.

Or

(b) How and why competitive advantage decide about the survival of a company.

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2013

Business Administration

MANAGEMENT CONCEPT

Time: Three hours

PART A (5X5=25)

Answer all questions

1. (a) Explain the nature of management in the insurance sector.

Or

- (b) How is management classified on the basis of functional aspects?

2. (a) Planning is determination in advance - Discuss.

Or

- (b) Explain the suitability of unstructured decisions at different levels.

3. (a) How are staff functions useful in an organization?

Or

- (b) Discuss the merits of committee form of organization.

4. (a) Directing is a demanding function in management - Explain.

Or

- (b) Recruitment is the initial screening of the total supply of prospective human resources - Elucidate.

5. (a) Controlling is a tool of planning - Critically examine.

Or

- (b) Explain the importance of benchmarking.

PART B (5X10=50)

Answer all questions

6. (a) How does the contribution of Peter F. Drucker differ from that of Henry Fayol?

Or

- (b) Explain the modern functions of management in the context of globalization.

7. (a) Suggest the measures to make the planning process effective in an organization.

Or

- (b) Explain the various techniques of decision making. What types of decisions are business executives generally called upon to make?

8. (a) Proper delegation requires a clear understanding of duties, authority or obligation - Explain.

Or

(b) What are the factors that determine optimum span of control?

9. (a) What do you mean by recruitment and selection? Outline a suitable selection process for an IT company?

Or

(b) Explain the various managerial activities based on the principles of directing.

10. (a) What are the steps in BPR?

Or

(b) Explain the importance of integrated approach to controlling.

S.NO:1163

P8MBA1

(For candidates admitted from 2008-2009 onwards)

M.B.A.DEGREE EXAMINATION, NOVEMBER, 2011

Business Administration

MANAGEMENT CONCEPTS

Time: Three hours

Maximum: 75 marks

PART-A (5X5=25)

Answer all questions

1.(a) How social environment affect the organization?

Or

(b) Elaborate the major contributions of Rensis Likert.

2.(a) Briefly discuss the facets essential to master the art of decision making.

Or

(b) State the essential features of effective planning.

3.(a) Distinguish between authority and responsibility.

Or

(b) What type of structure a manager can choose if he/she is to organize a multi project NGO?

4.(a) What are the advantages of free form and project management structure?

Or

(b) How non-monetary rewards motivate people in on organization?

5.(a) What are the sources of conflict?

Or

(b) What are the steps involved in business process reengineering?

PART B (5X10=50)

Answer all questions

6.(a) Managerial skills differ across the organizational hierarchy. How are how not?

Or

(b) Examine on the evolution of management and the current status.

7.(a) How and why managers strategically plan?

Or

(b) Explain the various methods of decision making with special reference to decision making with special reference to decision tree model.

8.(a) “Structure leads to strategy. Planning results in organizing.” Elaborate.

Or

(b) Explain the barriers to effective communication. How to overcome such barriers?

9.(a) Examine the factors in the managerial control process. Which one is considered to be significant among all the types?

Or

(b) Discuss the reasons that make leadership necessary for an organization? What are the alternative methods available to leadership in the modern organizations.

10.(a) Explain the purpose of organization control. Why it is important?

Or

(b) Discuss the conflict resolution models and their implication on interpersonal effectiveness.

S.NO:5504

P8MBA1

(For candidades admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2012

Business Administration

MANAGEMENT CONCEPTS

Time :Three hours

Maximum:75 marks

PART-A(5X5=25)

Answer all questions

1.(a) Management is what manager does - Explain.

Or

(b) “Administration is concerned with thinking function, while management is concerned with doing function” - State your opinion.

2. (a) Planning fills the gap between where we are and what we are going to achieve - Analyse.

Or

(b) How will you distinguish strategy from policy?

3.(a) What is the relevance of delegation of authority to span of control?

Or

(b) Explain the role of informal organization in the accomplishment of organizational goal.

4. (a) Why do companies prefer internal source for recruitment?

Or

(b) What are the benefits that can be derived from a well organized training programme?

5.(a) State the functions of controlling.

Or

(b) Directing involves the understanding of human behaviour - Elucidate.

PART B (5X10=50)

Answer all questions

6.(a) What factors determine the number of levels of management?

Or

(b) Taylor and Fayol are the undisputed pioneers of modern management - Explain.

7.(a) Explain the planning process.

Or

(b) How is the decision making process evolved?

8.(a) Do the principles of organization permit its development in Three phases such as 'grow', 'mature' and 'decline'? Examine.

Or

(b) State the factors that determine centralization or decentralization in an organization.

9.(a) Promotion is change within the organization to a higher position that requires advanced skills - Elucidate.

Or

(b) What are the principles that a manager should follow while directing their subordinates?

10.(a) Explain the important devices of control.

Or

(b) What is TQM? What are the key factors that are responsible for success of TQM in an organization?

(For candidates admitted from 2008-2009 onward)

M.B.A DEGREE EXAMINATION, NOVEMBER 2013

Business Administration

MANAGEMENT CONCEPT

Time: Three hours

Maximum: 75 marks

PATR A

Answer all questions

1. (a) What are the functions of top level management?
Or
(b) Explain the relevance of management to hotel industry?
2. (a) What is the need for planning in an organization?
Or
(b) Explain the relationship between planning and decision making.
3. (a) Authority is not absolute. Do you agree?
Or
(b) What do you understand by informal organization?
4. (a) Is it possible to achieve the goals of organization in the absence of direction?
Or
(b) What are the significant activities performed in staffing?
5. (a) What does bench marking signify in management?
Or
(b) What are the areas in which BPR is required?

PART B

Answer all questions

6. (a) Management is universal in nature - Explain.
Or
(b) Explain the contribution of F.W.Taylor to the management.
7. (a) What do you mean by strategies? Explain its role in the management.
Or
(b) Explain the steps in decision making.
8. (a) What are the advantages and disadvantages of centralisation?
Or
(b) Bring out the strengths and weaknesses of committee form of organization.
9. (a) What are the basic requirements of directing?
Or
(b) Explain different techniques of control.
10. (a) How would you carry out reengineering in business process?
Or
(b) What are the basic principles of TQM?

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2014

Business Administration

MANAGEMENT CONCEPTS

Time: Three hours

Maximum: 75 marks

PART-A (5X5=25)

Answer all questions

1.(a) Highlight the importance of management in the modern world?

Or

(b) Discuss about the nature and purpose of international business.

2.(a) Emphasise the importance of planning what should be done to overcome its limitations?

Or

(b) Explain the methods used to planning and how to make planning more effective?

3.(a) Explain the span of control briefly.

Or

(b) Explain the principles of effective delegation.

4.(a) Write about the system approach to human resources management.

Or

(b) What are the barriers to communication? Explain it briefly.

5.(a) Discuss the Three basic types of control that can be used in organization.

Or

(b) What are the impediments in the implementation of total quality management?

Suggest measures to overcome such impediments.

PART B (5X10=50)

Answer all questions

6. (a) “Management is a combination of science, arts and profession”. Explain fully.

Or

(b) In an essay, describe how managers are affected by the global economic environment. Name some of the major global environmental factors that affect management, and explain why each is important.

7.(a) Define the following types of plans in detail:

- i. Strategic plans
- ii. Operational plans
- iii. Long-term plans
- iv. Short-term plan
- v. Specific plans
- vi. Directional plans
- vii. Single-use plans
- viii. Standing plans

Or

(b) List and discuss the steps in the decision-making process.

8. (a) What is departmentation? Explain any four types of departmentation with illustrations.

Or

(b) Describe the positive and negative aspects of an informal organization. What should a manager do to harmonise informal organization with formal organization.

9. (a) You have been asked to organise the recruitment and selection of the office staff of a new branch office. Indicate the possible sources of manpower supply. How can the relative merits of alternative sources of man power supply be measured objectively?

Or

(b) In an essay, discuss the unique problems faced in trying to motivate professional employees, minimum-wage employees. Include a discussion of various methods that can be implemented to motivate three types of employees.

10. (a) Highlight the importance of different devices of control.

Or

(b) Discuss the boundary control systems and interactive control systems?

S.NO: 6335

P8MBA1

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2015

Business Administration

MANAGEMENT CONCEPTS

Time: Three hours

Maximum: 75 marks

PART-A (5X5=25)

Answer all questions

1. (a) Explain the objectives of social service organization.

Or

- (b) Describe the various styles of management.

2. (a) Elucidate the importance of budgeting.

Or

- (b) Describe the various types of planning.

3. (a) What is delegation of authority? What its limitations.

Or

- (b) Explain briefly the significance of informal organization.

4. (a) Describe the general principles of directing.

Or

- (b) Explain the key requisites for staffing.

5. (a) Explain the significance of devices of control.

Or

- (b) Elucidate the techniques of quality management.

PART B (5X10=50)

Answer all questions

6. (a) Distinguish between management and administration.

Or

- (b) Explain the nature and functions of management.

7. (a) How do you carry out planning as a manager of a MNC company?

Or

- (b) Describe the steps involved in decision making.

8. (a) What do you know about centralisation of authority? Bring out its merits and demerits.

Or

- (b) Explain the role of functional authority.

9. (a) Explain the importance of human implication management in an organization.

Or

- (b) What is bench marking? Describe the significance of bench marking.

10. (a) What is integrated control? Enumerate its merits and demerits.

Or

- (b) Explain the various production control techniques with a specimen report.

(For candidates admitted from 2016-2017 onwards)

M.B.A. Degree Examination, November 2016

Business Administration

MANAGEMENT CONCEPTS

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. Define management.
2. What do you mean by organization?
3. Write the objectives of planning.
4. Define budget.
5. What is span of control?
6. Write the need of forming a committee.
7. List the techniques of staffing.
8. What is delegation of authority?
9. Define process of control.
10. What is total quality management?

SECTION-B (5×5=25)

Answer all questions.

11. a) Discuss nature and scope of management.
Or
b) Give a brief account on the relevance of management to hospitals.
12. a) Write a short note on importance of planning.
Or
b) How can you make effective plans?
13. a) Elaborate the structure of an organization.
Or
b) Difference between centralization and decentralization.
14. a) Write the importance of staffing.
a. Or
b) What are the advantages of delegation?
15. a) Explain the steps in control process.
Or
b) Write a short note on business process reengineering.

SECTION-C (3×10=30)

Answer Three Questions.

16. Explain in detail about the functions of management.
17. Describe briefly about the methods of strategic planning.
18. Discuss the principles and theories of organization.
19. Explain the importance and techniques of directing.
20. Write in detail about the practices involved in benchmarking.

M.B.A DEGREE EXAMINATION (April 2012)

Business Administration

MANAGERIAL COMMUNICATION

PART-A

1. (a) Explain the importance of communication in Business?
(or)
(b) What are the features to be incorporated in a sales promotion letter?
2. (a) Write short note on Exhibits and appendices.
(or)
(b) Explain the categories of nonverbal Communication.
3. (a) What are different procedure to prepare Agenda and Minutes of Meetings?
(or)
(b) Explain the methodology meant for organizing a seminar.
4. (a) Explain the importance of Telephonic conversation.
(or)
(b) Discuss various structure of report with suitable example.
5. (a) Explain the importance of a business letter.
(or)
(b) What is communication? How is it classified?

PART-B

6. (a) Describe various types of internal communication in an organization.
(or)
(b) Make out an enquiry about the terms and conditions concerning the supply of computer system.
7. (a) Explain the long and short report with suitable examples.
(or)
(b) Discuss the norms to be adhered while incorporating exhibits in a report?
8. (a) Make out an agenda and minutes of the Annual General Meeting of the component Graphics Limited.
(or)
(b) What are the differences between one way and two way communication?

9. (a) What is body language? How this can be improved?
(or)

(b) What are the principles of effective? - Explain.

10. (a) When the personality of an individual considered being total?
(or)

(b) Explain the layout of a business letter with an example.

(November 2011)

PART-A

1. (a) State the relative merits of different types of communication.
(or)
(b) Explain the media meant for communication.
2. (a) What are all the features to be incorporated in a sales promotion letter?
(or)
(b) Make out an enquiry about the terms and conditions concerning the supply of computer system.
3. (a) Distinguish between formal and informal reports.
(or)
(b) What norms are to be adhered while incorporating exhibits in a report?
4. (a) What is body language? How this can be improved?
(or)
(b) Give examples for audio-visual aids. State their role in sales promotion.
5. (a) Explain the methodology meant for organising a seminar.
(or)
(b) What are negotiation skills? Suggest measures to improve such skills.

PART-B

6. (a) Suggest measures to overcome the barriers to communication.
(or)
(b) Explain the principles of effective communication.
7. (a) Give the format of a business letter and explain its essential norms.
(or)
(b) Write a series of collection letter, three in number, by highlighting the overdue amount for the last 3 months/6 months/one year.
8. (a) Make out a report to focus the technical feasibility of processing green tea in Mallapuram district of Kerala.
(or)
(b) Give the format of a research report on 'Leadership Failures: Causes and Remedies'.
9. (a) When the personality of an individual is considered to be total?
(or)
(b) "Present day learners pursuing management education are well informed than their teachers". Make out bar pie diagrams focusing the above finding.
10. (a) Make out an agenda and minutes of the Annual General Meeting of the computer Graphics Limited.
(or)
(b) Draft a speech to be delivered while inaugurating the Management Association at the Indian Institute of Management, Tiruchirapalli.

(November 2012)

PART-A

1. (a) Define the term communication. Explain its significance.
(or)
(b) Discuss the different types of communication.
2. (a) What are the functions of business letter?
(or)
(b) How business letters are classified?
3. (a) What do you mean by written communication? Explain its merits and demerits.
(or)
(b) What are the functions of a sales letter?
4. (a) What is verbal communication? Explain its characteristics.
(or)
(b) What do you mean by dyadic communication? Explain.
5. (a) Write short notes on: Agenda, Minutes.
(or)
(b) What is group Discussion? What are its benefits?

PART-B

6. (a) Discuss the principles of effective communication.
(or)
(b) What are the barriers to communication? Explain.
7. (a) Write an enquiry letter requesting for the price quotation of a product which you would like to purchase.
(or)
(b) Discuss the objectives of a sales letter.
8. (a) What is a report? What are the characteristics of a good report?
(or)
(b) Write a detailed note on the structure of report.
9. (a) What are the merits and demerits of the oral communication?
(or)
(b) How to make audio visual communication effective?
10. (a) What is a statutory meeting? Give the specimen of the statutory meeting.
(or)
(b) What are the Points to be noted while writing the minutes?

November 2013

PART-A

1. (a) What are the elements of communication?
(or)
(b) State the different types of communication.
2. (a) List out the kinds of business letters.
(or)
(b) State the various physical aspects of a business letter.
3. (a) What are the characteristics of a good report?
(or)
(b) Bring out the essential elements of a report.
4. (a) What are the types of non-verbal communication?
(or)
(b) What are the uses of charts and diagrams?
5. (a) Who can sign the minutes?
(or)
(b) What is meant by loose leaf minutes?

PART-B

1. (a) Bring out the various objectives of communication.
(or)
(b) Explain the barriers of communication.
2. (a) Enumerate the various functions of business letter.
(or)
(b) Discuss the qualities of a good business letter.
3. (a) Discuss the various steps involved in preparing a report.
(or)
(b) Explain the different classification of reports.
4. (a) Enumerate the importance of face-to-face communication.
(or)
(b) Explain the different types of tables.
5. (a) Explain the legal provisions regulating minutes.
(or)
(b) Explain the various kinds of company meetings.

November-2014

PART-A

1. (a) Explain the different forms of face to face communication?
(or)
(b) Explain the uses of written communication in internal communication?
2. (a) What are the two major forms of letter style? Explain them with illustration?
(or)
(b) Explain the various sources of information?
3. (a) Discuss on what basis the reports are classified?
(or)
(b) How will you prepare a report? discuss the various steps involved in preparing a report?
4. (a) What are the principles of non-verbal communication?
(or)
(b) Bring down the uses of charts?
5. (a) What are the types of discussion groups?
(or)
(b) What are the uses of minutes?
6. (a) What are the principles of communication? Discuss
(or)
(b) Discuss the kinds of communication in a detailed manner.
7. (a) Briefly explain the various components of a business letter?
(or)
(b) Explain the various letter styles followed by the business firm?
8. (a) Discuss about the form of market report?
(or)
(b) Enumerate the various parts of a report along with the contents in a detailed manner?
9. (a) Explain the importance of telephonic conversation?
(or)
(b) Discuss the characteristics of dyadic communication?
(or)
10. (a) What are the various kinds of meetings? Discuss the duties of the secretary in such meetings.
(or)
(b) Enumerate the legal provisions regarding the notice of the meetings.

November-2015

PART-A

1. (a) Explain the nature and scope of communication?
(or)
(b) Briefly explain the essential of effective communication?
2. (a) Why signature and designation is required in a business letter?
(or)
(b) Explain the objectives of communication?
3. (a) Explain the various steps involved in report writing?
(or)
(b) How do you write a research report.
4. (a) What do you mean by kinesics? Explain its importance?
(or)
(b) Describe features of face to face communication?
5. (a) What do you know about meeting? Explain the importance of meetings?
(or)
(b) Difference between conference and meetings?
6. (a) Explain the different types of communication in the business.
(or)
(b) Communication is the nerve centre of all business discuss.
7. (a) Elucidate the importance of sales promoting letters with suitable example.
(or)
(b) Discuss the difference norms of business letter.
8. (a) Explain the different types of reports.
(or)
(b) Describe the five Ws and one H of reports writing.
9. (a) Body language plays an important role communication? Discuss.
(or)
(b) How can you classify the non-verbal communication? Enumerate its strength and weakness.
10. (a) Explain the golden rules of meetings?
(or)
(b) How do you evaluate the oral presentation.

(For candidates admitted from 2016-2017 onwards)

M.B.A. Degree Examination, November 2016

Business Administration

MANAGERIAL COMMUNICATION

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. State the two objectives of communication.
2. What is mean by miscommunication?
3. What do you understand by letter of enquiry?
4. What is “curriculum vitae”?
5. Define visual communication.
6. State two visual aids used in communication.
7. Define report.
8. Identify the need for introductory information.
9. What is agenda?
10. Define group discussion.

SECTION-B (5×5=25)

Answer all questions.

11.a) Explain the different media of communication. Discuss their pros and cons.

Or

b) Identify the principles of effective communication.

12. a) Bring out the essentials of a good business letter.

Or

b) What are the important contents of application letters?

13. a) How can one use the body language as an effective communication? Discuss.

Or

b) State the importance of listening.

14. a) Examine the factors involved in a problem of writing the reports.

b) Explain the role and content of the appendix and bibliography of a report.

15. a) What are the procedures to be followed while conducting meeting?

Or

b) Draft the minutes of the meeting of the board of directors of “XYZ” company ltd.

SECTION-C (3×10=30)

Answer Three Questions.

16. Explain the various barriers to communication. How to overcome them.

17. “Complaints are not routine letters. The writer has to write them with special care and skill”. Do you agree with this view? Justify your answer.

18. Describe the nature and role of non verbal communication.

19. Prepare a structural coherence plan for a long and formal report.

20. Discuss how personal aspects and audience analysis contribute to formal presentations.

MBA DEGREE EXAMINATION

NOVEMBER-2010

MANAGERIAL ECONOMICS

P16MBA4

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1. State and explain the law of diminishing marginal utility

(or)

What are the advantages of managerial economics?

2. Write a note on “giffen paradox”

(or)

What is meant by demand for produces good? Derived demand?

3. What is called non-price competition?

(or)

What is meant by monopolistic competition?

4. Discuss briefly 2persons non-zero sum games

(or)

Write short notes on:

Price leadership

Product differentiation

5. What is GDP and how it is calculated

(or)

What are the social responsibilities of a public sector company?

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. What role does the managerial economic play in business?

(OR)

Explain the incremental concept and state its importance?

7. Explain the concept of production function. Why is it useful in the analysis of firm's behaviors?

(OR)

Distinguish between micro economics and macroeconomics?

8. Discuss the different bases for classifying and oligopoly situation?

(OR)

Explain the law of equi marginal utility. How does it explain the consumer equilibrium?

9. How is break even analysis useful and important for a firm in making business decisions?

What are its limitations?

(OR)

What is meant by elasticity of supply? How is it measured?

10. Discuss the objectives and policies of public sectors in India.

(OR)

Why should government involve itself in the market economy?

MBA DEGREE EXAMINATION

NOVEMBER-2011

MANAGERIAL ECONOMICS

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1. Explain the growth of GDP

(OR)

Define credit policy. What are its essential characteristics?

2. what are the macro economic problems

(OR)

Explain the computable general equilibrium

3. what are the basis elements of game theory

(OR)

Define market equilibrium

4. Explain the theory of firm behavior with a suitable e.g.

(OR)

Write a note on marginal cost

5. Write a note on utility functions

(OR)

Discuss demand functions with suitable examples

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. What is meant by economic development? Explain the steps involved in Indian economic development

(OR)

Explain the financial sector reform in India and various role of central bank

7. Explain the nature and scope of macro economics

(OR)

Explain the measures of micro foundation of Keynesian models

8. what are the various components of industry demand in India

(OR)

Describe price leadership model? With e.g.

9. State the various degrees of price discrimination

(OR)

Explain the types of elasticity of demand with suitable e.g.

10. What are the factors involved in factor demand and output supply functions

(OR)

Describe briefly cost oriented and competition oriented pricing techniques

MBA DEGREE EXAMINATION

NOVEMBER-2013

MANAGERIAL ECONOMICS

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1. D/B normal goods and inferior goods

(OR)

Explain the expected utility with an example

2. Explain the features of Iso-quants

(OR)

Factors determine consumer behavior

3. What is meant by price discrimination?

(OR)

D/B short run and long run costs

4. Why is liquidity preferred?

(OR)

What are the evils of monopoly?

5. What is economic profit? How does it differ from accounting profit?

(OR)

Explain different types of strategy in game theory

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. Illustrate the law of diminishing marginal utility?

(OR)

Explain income elasticity of demand with an example

7. Suggest a macroeconomics model in India in context of globalization.

(OR)

Explain the scope of general equilibrium model

8. How are price and output determined under monopoly?

(OR)

How will you measure elasticity of supply?

9. Explain the important features of industrial policy?

(OR)

What is the need for foreign direct investment in a developing country?

10. Discuss the objective of monetary policy of India.

(OR)

Explain the role of central bank in improving the economic development of India

MBA DEGREE EXAMINATION

NOVEMBER-2014

MANAGERIAL ECONOMICS

P16MBA4

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1. What are the methods of utility maximization

(OR)

Explain Slutsky equation

2. Explain the concept of returns to scale

(OR)

D/B perfectly elastic and perfectly inelastic demands

3. Discuss the characteristics of oligopoly

(OR)

What are the basic elements of game theory?

4. Discuss the various liquidity preferences

(OR)

What are the macro economic problems?

5. Explain the role of central bank in Indian economic development

(OR)

Suggest measures to prevent industrial sickness

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. Make a comparison between compensated and ordinary demand function?

(OR)

Discuss various measures of risk aversion

7. Discuss different theories of firm

(OR)

How is the long run average cost curve derived from short run average cost curve?

8. Describe price leadership model?

(OR)

How are market classified? Discuss various criteria for such classification

9. Comment on the present macroeconomic scene of India

(OR)

Discuss various general equilibrium models?

10. Explain the procedure for industrial central and licensing.

(OR)

Discuss various financial sector reforms

M.B.A. Degree Examination, November 2016

Business Administration

MANAGERIAL ECONOMICS

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. Define consumer demand.
2. What is an inferior good?
3. Define isoquants.
4. Write about the marginal costs.
5. What is market equilibrium?
6. Define oligopoly.
7. What is macro economics?
8. Write about the liquidity preference.
9. What is per capita income?
10. What is industrial sickness?

SECTION-B (5×5=25)

Answer all questions.

11. a) Write briefly about the consumer preference and utility function.

Or

- b) Distinguish normal and inferior goods.

12. a) Elucidate briefly about the conditional factor demands.

Or

- b) Write briefly about the short run and long run cost.

13. a) write in detail about the long run equilibrium.

Or

- b) Briefly write about the basic elements of game theory.

14. a) Write about the micro economic foundations of consumption.

Or

b) Write a brief note about the investment function.

15. a) Describe the growth of GDP in India.

Or

b) Write a brief note about the FDI with example.

SECTION-C (3×10=30)

Answer Three Questions.

16. 'Managerial economics is a part of normative economics. It is pragmatic and conceptual in nature' - discuss.

17. Explain the utility analysis for understanding consumer behavior and demand.

18. "The behavior of costs is determined by several factors" Elucidate the statement.

19. Explain the concept of GDP. Present your views on the usefulness of the concept as an economic measure of the well being of any nation.

20. Discuss in detail the role of central bank in Indian economic development.

MBA - DEGREE EXAMINATION - APRIL- 2010 - P8MBA3
MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

- 1(a) A manufacturer produces two types of products A and B. Each A requires 4 man hours and 6 machine hours, while each B requires 5 man hours and 3 machine hours. The available man hours and machine hours are 450 a week and 600 a week respectively. Per unit profit on A is Rs.5 whereas on B is Rs.7. Formulate the above problem into an L.P.P.**

Solution:

Let x_1 = No of product A, x_2 = No of product B

	Man hours	Machine hours	Profit (Rs)
A	4	6	5
B	5	3	7
Available hrs	450	600	

Objective function is given by

$$\max Z = 5x_1 + 7x_2$$

Subject to the constraint

$$4x_1 + 5x_2 \leq 450$$

$$6x_1 + 3x_2 \leq 600$$

Non -negative restriction is

$$x_1, x_2 \geq 0$$

(OR)

- 1(b) Explain Addition Theorem with an example.**

Solution:

Addition Theorem of Probability:

If 'A' and 'B' be any two events, then the probability of occurrence of at least one of the events 'A' and 'B' is given by: $p(A \cup B) = p(A) + p(B) - p(A \cap B)$

Solution:

From set theory, we have:

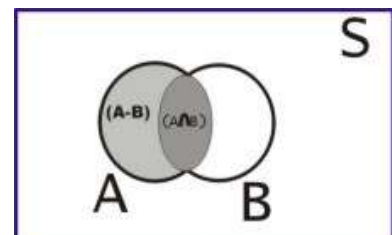
$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

Dividing both sides by $n(S)$

$$\frac{n(A \cup B)}{n(S)} = \frac{n(A)}{n(S)} + \frac{n(B)}{n(S)} - \frac{n(A \cap B)}{n(S)}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

(Ex) Two cards are drawn at random. Find the probability that both the cards are of red color or they are queen.



Solution:

Let S = Sample – space.

A = the event that the two cards drawn are red.

B = the event that the two cards drawn are queen.

$A \cap B$ = the event that the two cards drawn are queen of red color

$$n(S) = 52C_2, n(A) = 26C_2, n(B) = 4C_2, n(A \cap B) = 2C_2,$$

$$p(A) = \frac{n(A)}{n(s)} = \frac{26C_2}{52C_2}, p(B) = \frac{n(B)}{n(s)} = \frac{4C_2}{52C_2}, p(A \cap B) = \frac{n(A \cap B)}{n(s)} = \frac{2C_2}{52C_2}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B) = \frac{26C_2}{52C_2} + \frac{4C_2}{52C_2} - \frac{2C_2}{52C_2} = \frac{26C_2 + 4C_2 - 2C_2}{52C_2}$$

$$p(A \cup B) = \frac{13(25) + 6 - 1}{26(51)} = \frac{55}{221}$$

2(a) A factory produces two types of lamps A and B. In an experiment relating to their life, the following results were obtained. Compare the variability of the life of two lamps:

Life in hours	A	B
500-700	5	4
700-900	11	30
900-1100	26	12
1100-1300	10	8
1300-1500	8	6

Solution:

C.I	A	B	x	d	fd	d ²	f d ²	fd	f d ²
500-700	5	4	600	-2	-10	4	20	-8	16
700-900	11	30	800	-1	-11	1	11	-30	30
900-1100	26	12	1000	0	0	0	0	0	0
1100-1300	10	8	1200	1	10	1	10	8	8
1300-1500	8	6	1400	2	16	4	32	12	32
	60	60			5		73	-18	78

$$C = 200 \quad A = 1000$$

LAMP A:

$$\bar{x} = A + \frac{\sum fd}{N} \times C$$

$$\bar{x} = 1000 + \frac{5}{60} \times 200$$

$$\bar{x} = 1016.667$$

$$\sigma = C \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$$\sigma = 200 \sqrt{\frac{73}{60} - \left(\frac{5}{60}\right)^2}$$

$$\sigma = 241.94$$

$$\text{Coefficient of variation} = \frac{\sigma}{\bar{x}} \times 100$$

$$= \frac{241.94}{1016.667} \times 100$$

$$\text{C.V.} = 23.79$$

LAMP B:

$$\bar{x} = B + \frac{\sum fd}{N} \times c$$

$$\bar{x} = 1000 - \frac{18}{60} \times 200$$

$$\bar{x} = 940$$

$$\sigma = C \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$$\sigma = 200 \sqrt{\frac{78}{60} - \left(\frac{-18}{60}\right)^2}$$

$$\sigma = 200 \sqrt{1.3 - 0.09}$$

$$\sigma = 220$$

$$\text{Coefficient of variation} = \frac{\sigma}{\bar{x}} \times 100; \text{C.V.} = 23.4042$$

(OR)

2(b) For a group of 10 items, $\sum x = 452$, $\sum x^2 = 24270$, Mode=43.7 . Find the Coefficient of Skewness

Solution:

$$\text{Mean } E(x) = \frac{\sum x}{n} = 45.2, \quad E(x^2) = \frac{\sum x^2}{n} = 2427$$

$$\text{Variance} = E(x^2) - (E(x))^2 = 383.96$$

$$\text{S.D} = 19.595 \quad \text{skewness} = \frac{\text{mean} - \text{mode}}{\text{S.D}}, \quad \text{skewness} = 0.0765$$

3(a) Following are the data about the buying rabbits found in two markets:

	Mean Expenses (Rs)	Standard deviation (Rs)	Sample Size
Market A	250	40	400
Market B	220	55	400

Do you think that there is a significant difference in the expenses spent in the two markets?

Solution:

$$\bar{x}_1 = 250, \bar{x}_2 = 220$$

$$\sigma_1 = 40, \sigma_2 = 55$$

$$n_1 = 400, n_2 = 400$$

$$S.E(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} = 3.4003676$$

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{S.E. \bar{x}_1 - \bar{x}_2} = 8.8225$$

(OR)

- 3(b) A random sample of 400 flowers stems has an average of 10 cm. Can this be regarded as a sample from a large population with a mean of 10.2 cm and a Standard deviation of 2.25 cm?**

Solution:

Given that,

$$n = 400, \bar{x} = 10, \mu = 10.2, \sigma = 2.25$$

$$z = \frac{\bar{x} - \mu}{\sigma / n} = \frac{10 - 10.2}{2.25 / \sqrt{400}} = \frac{-0.2}{0.1125} = -1.7778$$

- 4(a) A Sample of 10 students is selected and their marks secured in Maths and Statistics are found are found to be :**

	1	2	3	4	5	6	7	8	9	10
Maths	52	53	42	60	45	41	37	38	25	27
Statistics	65	68	43	38	77	48	35	30	25	50

Calculate the Spearman's rank correlation.

Solution:

X	Y	R ₁	R ₂	d = R ₁ - R ₂	d ²
52	65	3	3	0	0
53	68	2	2	0	0
42	43	5	6	1	1
60	38	1	7	6	36
45	77	4	1	1	1
41	48	6	5	8	64
37	35	8	8	0	0
38	30	7	9	2	4
25	25	10	10	0	0
27	50	9	4	5	25
					76

$$\gamma = 1 - \frac{6 \sum d^2}{n(n^2 - 1)} = 1 - \frac{6 \times 76}{10(100 - 1)} = 1 - 0.4606 = 0.5393$$

$$\gamma = 0.5393$$

(OR)

4(b) Given the following data, calculate the expected value of X when Y = 75

Solution:

$$\bar{x} = 36, \bar{y} = 85, \sigma_x = 11, \sigma_y = 8, r = 0.66$$

Regression equation of y on x:

$$y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x})$$

$$x = 0.9075y - 41.1375 \quad (1)$$

put $y = 75$ in (1), we get

$$x = 26.925$$

5(a) If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$

Find the value of $2A+3B$, $A.-B$

Solution: Given that,

$$A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$$

To find $2A+3B$:

$$2A = 2 \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} = \begin{bmatrix} 0 & 4 & 6 \\ 4 & 2 & 8 \end{bmatrix}$$

$$3B = 3 \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix} = \begin{bmatrix} 21 & 18 & 9 \\ 3 & 12 & 15 \end{bmatrix}$$

$$2A+3B = \begin{bmatrix} 21 & 22 & 15 \\ 7 & 14 & 23 \end{bmatrix}$$

To find A-B:

$$A - B = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} - \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$$

$$A - B = \begin{bmatrix} -7 & -4 & 0 \\ 1 & -3 & -1 \end{bmatrix}$$

(OR)

5(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ **and** $B = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}$

Find the value of AB and BA.

Solution: Given that, $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}$

To find AB:

$$AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 7 \\ 13 & 17 \end{bmatrix}$$

To find BA:

$$BA = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 10 & 16 \end{bmatrix}$$

SECTION-B-(5X10=50)

6(a) Solve the following using Gauss Jordan method.

$$x_1 + 2x_2 + x_3 = 6$$

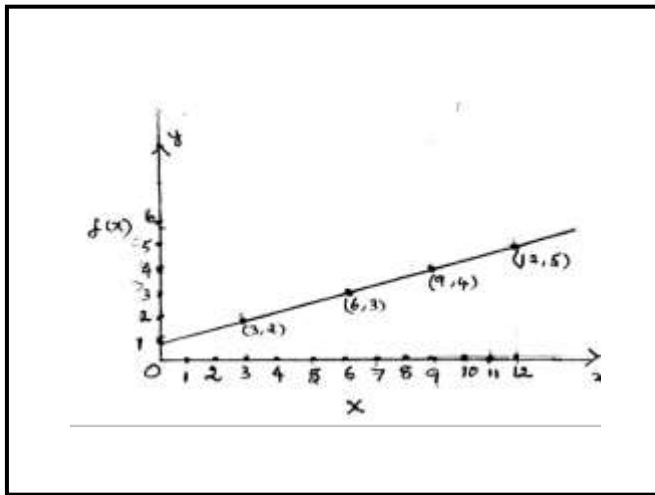
$$2x_1 + 3x_2 + 4x_3 = 12$$

$$3x_1 + x_2 + 2x_3 = 7$$

Solution:

The augmented matrix is given by

$$C \sim \begin{pmatrix} 1 & 2 & 1 & 6 \\ 2 & 3 & 4 & 12 \\ 3 & 1 & 2 & 7 \end{pmatrix}$$
$$\sim \begin{pmatrix} 1 & 2 & 1 & 6 \\ 0 & -1 & 2 & 0 \\ 0 & -5 & -1 & -11 \end{pmatrix} \begin{array}{l} R_1 \rightarrow R_2 - R_1 \\ R_3 \rightarrow R_3 - 3R_1 \end{array}$$
$$\sim \begin{pmatrix} 1 & 0 & 5 & 6 \\ 0 & -1 & 2 & 0 \\ 0 & 0 & -11 & -11 \end{pmatrix} \begin{array}{l} R_3 \rightarrow R_3 - 5R_2 \\ R_1 \rightarrow R_1 + 2R_2 \end{array}$$



$$\sim \begin{pmatrix} 11 & 0 & 0 & 11 \\ 0 & -11 & 0 & -22 \\ 0 & 0 & -11 & -11 \end{pmatrix}$$

$$R_3 \rightarrow R_3 + 5R_2$$

$$R_1 \rightarrow R_1 + 2R_2$$

$$\begin{pmatrix} 11 & 0 & 0 \\ 0 & -11 & 0 \\ 0 & 0 & -11 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 11 \\ -22 \\ -11 \end{pmatrix}$$

$$11x_1 = 11 \Rightarrow x_1 = 1$$

$$-11x_2 = -22 \Rightarrow x_2 = 2$$

$$-11x_3 = -11 \Rightarrow x_3 = 1$$

$$x_1 = 1, x_2 = 2, x_3 = 1$$

(OR)

6(b) Let $A = \{3, 6, 9, 12\}$, $B = \{1, 2, 3, 4, 5, 6\}$ and $f : A \rightarrow B$ is defined by

$$f(x) = \frac{1}{3}x + 1$$

Represent f as

- an arrow diagram
- a set of ordered pairs
- a table
- a graph

Solution: Given $A = \{3, 6, 9, 12\}$, $B = \{1, 2, 3, 4, 5, 6\}$, $f : A \rightarrow B$ such that

$$f(x) = \frac{1}{3}x + 1$$

Consider $x \in \{3, 6, 9, 12\}$, then

$$f(3) = \frac{1}{3}(3) + 1 = 2, f(6) = \frac{1}{3}(6) + 1 = 3$$

$$f(9) = \frac{1}{3}(9) + 1 = 4, f(12) = \frac{1}{3}(12) + 1 = 5$$

(i) **Arrow diagram:**

$$f(3) \rightarrow 2, f(6) \rightarrow 3, f(9) \rightarrow 4, f(12) \rightarrow 5$$

(ii) **A set of ordered pairs:**

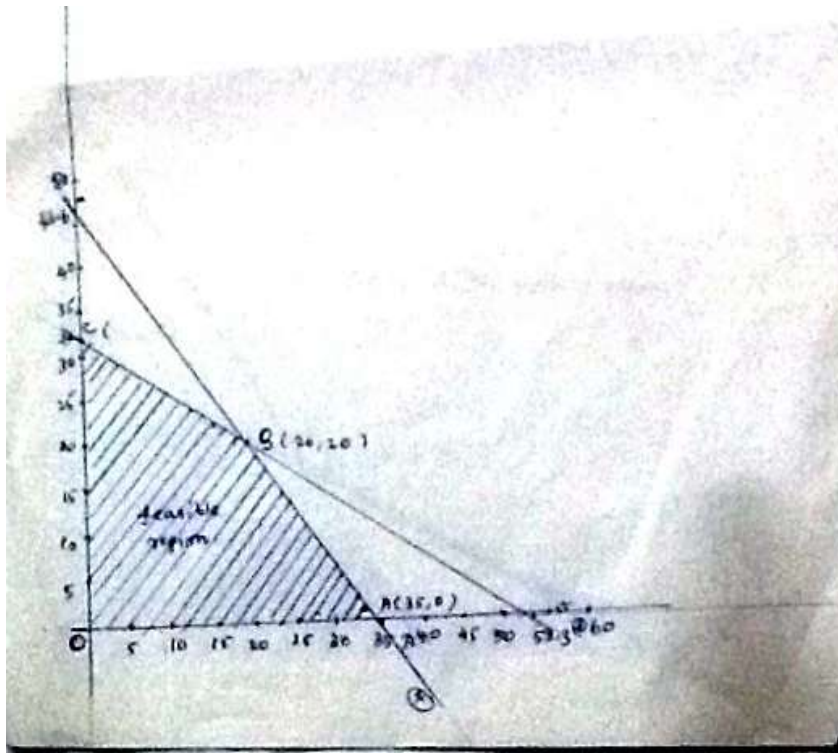
$$\{(3, 2), (6, 3), (9, 4), (12, 5)\}$$

(iii) **Table:**

x	3	6	9	12
f(x)	2	3	4	5

(iv) **Graph:** The graph is a straight line

(a)



Solve the LPP by Graphical method:

$$\text{Maximize } z = 5x_1 + 4x_2$$

Subject to

$$3x_1 + 5x_2 \leq 160 \quad (1)$$

$$4x_1 + 3x_2 \leq 140 \quad (2)$$

$$x_1, x_2 \geq 0$$

Solution:

$$\text{Consider } 3x_1 + 5x_2 \leq 160$$

$$\text{Now let } 3x_1 + 5x_2 = 160$$

$$3x_1 + 5x_2 = 160 \quad (3)$$

$$x_1 = 0 \Rightarrow x_2 = 32, \text{ The point is } (0, 32)$$

$$x_2 = 0 \Rightarrow x_1 = \frac{160}{3}, \text{ The point is } \left(\frac{160}{3}, 0\right)$$

Consider

$$4x_1 + 3x_2 \leq 140$$

$$4x_1 + 3x_2 = 140 \quad (4)$$

$$x_1 = 0 \Rightarrow x_2 = 46.6, \text{ The point is } (0, 46.6)$$

$$x_2 = 0 \Rightarrow x_1 = 35, \text{ The point is } (35, 0)$$

$$\begin{aligned}(3)*4 + (4)*3 &\Rightarrow 12x_1 + 20x_2 = 640 \\ 12x_1 + 9x_2 &= 420 \\ \Rightarrow x_2 = 20, x_1 &= 20\end{aligned}$$

We get the point B is $(20, 20)$

$$\text{Max } z = 5x_1 + 4x_2$$

$$o(0,0) \Rightarrow z = 0, A(0,32) \Rightarrow z = 128$$

$$B(20,20) = z = 180, C(35,0) \Rightarrow z = 175$$

The solution is

$$\text{Max } z = 180, \text{ at } x_1 = 20, x_2 = 20$$

(OR)

7(b) The management of XYZ Ltd, is faced with the problem of choosing one of the two products for manufacturing .The probability matrix after market research for the two products is as follows

Product	Nature of Market		
	Good	Fair	Poor
A	0.75	0.15	0.10
B	0.60	0.30	0.10

The profits at different levels of market are as follows:

Product	Profit (in Rs)		
	Good	Fair	Poor
A	35000	15000	5000
B	50000	20000	3000

Calculate the expected value to choose the profitable product

Solution:

	Pby-A (1)	pro-A (2)	Pby-B (3)	Pro- B (4)	Con-A 1x2	Con-B 3x4
Good	0.75	35000	0.60	50000	26250	30000
Fair	0.15	15000	0.30	20000	2250	6000
Poor	0.10	5000	0.10	3000	500	300
				EMV	29000	36300

Since the EMV (Expected Monetary Value) of B is higher than A, B should be chosen

8(a) A Company knows on the basis of past experience that 3% of its bulbs are found to be defective. Find out the probability of 0, 1, 2, 3, 4 and 5 defectives in a sample of 100 bulbs.

Solutions:

Let x represents the number of defective bulbs selected

Then the possible values of x are 0, 1, 2, 3, 4 and 5

p = the probability of defective bulbs

Defective Bulbs = 3% = 0.03

Probability of non defective bulbs = 1 - 0.03 = 0.97

sample size = 100

For Binomial Distribution, the Probability density function is

$$p(x) = {}^n C_x p^x q^{n-x}$$

$$p(x) = {}^{100} C_x (0.03)^x (0.97)^{100-x}$$

(i) Probability of 0 defective bulb:

$$p(x=0) = {}^{100} C_0 (0.03)^0 (0.97)^{100} = (0.97)^{100}$$

(ii) Probability of 1 defective bulb:

$$p(x=1) = {}^{100} C_1 (0.03)^1 (0.97)^{100-1} = 100(0.03)(0.97)^{99}$$

(iii) Probability of 2 defective bulbs:

$$p(x=2) = {}^{100} C_2 (0.03)^2 (0.97)^{98}$$

(iv) Probability of 3 defective bulbs:

$$p(x=3) = {}^{100} C_3 (0.03)^3 (0.97)^{97}$$

(v) Probability of 4 defective bulbs:

$$p(x=4) = {}^{100} C_4 (0.03)^4 (0.97)^{96}$$

(v) Probability of 5 defective bulbs:

$$p(x=5) = {}^{100} C_5 (0.03)^5 (0.97)^{95}$$

(OR)

8 (b) From the following, calculate Karl Pearson's coefficient of Skewness

Class Interval:	130-134	135-139	140-144	145-149	150-154	155-159	160-164
Frequency:	3	12	21	28	19	12	5

Solutions:

X	mid	f	d	fd	d ²	fd ²
129.5-134.5	132	3	-5	-45	225	675
134.5-139.5	137	12	-10	-120	100	1200
139.5-144.5	142	21	-5	-105	25	525
144.5-149.5	147	28	0	0	0	0
149.5-154.5	152	19	5	95	25	475
154.5-159.5	157	12	10	120	100	1200
159.5-164.5	162	5	5	75	25	1125
		100		20		5200

$$\text{Mean} = \bar{x} = A + \frac{\sum fd}{N}, A = 147, \bar{x} = 147 + \frac{20}{100} = 147.2$$

$$S.D = \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2} = \sqrt{\frac{5200}{100} - \left(\frac{20}{100}\right)^2} = 7.20833$$

Mode lies in 144.5-149.5 group which contains the maximum frequency

$$\text{Mode} = L_1 + \frac{f_1 f_2}{2 f_1 - f_0 - f_3} = 144.5 + \frac{28 \times 21}{2 \times 28 - 21 - 19} = 181.25$$

Pearson's coefficient of Skewness:

$$\text{skewness} = \frac{\text{mean} - \text{mode}}{S.D} = \frac{147.2 - 181.25}{7.20833} = -4.72370$$

9(a) Explain different types of sampling methods with their suitability

Solution:

Repeat-Nov-2009

(OR)

9(b) There machines A, B and C are used to produce a certain kind of fabrics. The following are the weekly outputs of such machines

A	20	21	23	16	20
B	18	20	17	15	25
C	25	28	22	28	32

Test whether the performance of three machines differ.

Solutions:

Let us take the hypothesis that the performance of three machines does not differ significantly.

Applying F-test,

$$\bar{X} = \frac{100}{5} + \frac{95}{5} + \frac{135}{5} = \frac{20+19+27}{3} + \frac{66}{3} = 22$$

Variance between Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
4	9	25
4	9	25
4	9	25
4	9	25
4	9	25
20	45	125

Sum of squares between Samples = 20+45+125 = 190

Variance within Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
0	1	4
1	1	1
4	4	25

16	16	1
0	36	25
26	58	56

Sum of squares within Samples = 26+58+56 = 140

Analysis of variances Table

Source of Variation	Sum of squares	Degree of freedom	Mean square
Between Samples	190	2	95
Within Samples	140	12	11.67
Total	330	14	

$$F = \frac{95}{11.67} = 8.14$$

For $V_1 = 2$, $V_2 = 12$, $F_{0.05} = 3.88$
 $8.14 > 3.88$

The calculated value > tabulated value

Hence the hypothesis is rejected

Hence the performance of three machines differ significantly.

10(a) The following data gives the test scores and the sales made by the sales man during a certain period Calculate the coefficient of correlation:

Test scores: 14 19 24 21 26 22 15 20 19
Sales: 31 36 48 37 50 45 33 41 39

Solution:

X	Y	$x = X - \bar{X}$	$y = Y - \bar{Y}$	x^2	y^2	xy
14	31	-6	-9	36	81	54
19	36	-1	-4	1	16	4
24	48	4	8	16	64	32
21	37	1	-3	1	9	-3
26	50	6	10	36	100	60
22	45	2	5	4	25	10
15	33	-5	-7	25	49	35
20	41	0	1	0	1	0
19	39	-1	-1	1	1	1
$\sum X = 180$	$\sum Y = 360$			$\sum x^2 =$	$\sum y^2 = 346$	$\sum xy = 19$

$$N = 9, \bar{x} = \frac{\sum X}{N} = 20, \bar{y} = \frac{\sum Y}{N} = 40$$

$$r = \frac{\sum xy}{\sqrt{\sum x^2 - \sum y^2}} = 0.95$$

(OR)

10(b) Find out the two regression equations from the following and estimate the value of Y

when the value of X is 65:

X:	57	58	59	59	60	61	62	64
Y:	77	78	75	78	82	82	79	81

Solution:

X	Y	$x = X - \bar{X}$	$y = Y - \bar{Y}$	x^2	y^2	xy
57	77	-3	-2	9	4	6
58	78	-2	-1	4	1	2
59	75	-1	-4	1	16	4
59	78	-1	-1	1	1	1
60	82	0	3	0	9	0
61	82	1	3	1	9	3
62	79	2	0	4	0	0
64	81	4	2	16	4	8
$\sum X = 480$	$\sum Y = 632$			$\sum x^2 = 36$	$\sum y^2 = 44$	$\sum xy = 24$

$$\bar{x} = \frac{\sum x}{N} = \frac{480}{8} = 60, \bar{y} = \frac{\sum y}{N} = \frac{632}{8} = 79$$

$$r \frac{\sigma_x}{\sigma_y} = \frac{\sum xy}{\sum y^2} = 0.55, r \frac{\sigma_y}{\sigma_x} = \frac{\sum xy}{\sum x^2} = 0.67$$

Regression equation x on y:

$$x - \bar{x} = r \frac{\sigma_x}{\sigma_y} (y - \bar{y}), x - 60 = 0.55(y - 79)$$

$$x - 60 = 0.55y - 43.45, x = 0.55y + 16.55$$

Regression equation y on x:

$$y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x}), y - 79 = 0.67(x - 60)$$

$$y = 0.67x + 38.8$$

$$\text{when } x=65, y = 0.67(65) + 38.8, y = 82.35$$

MBA - Degree Examination – Apr – 2012 - P8MBA3

Mathematics and Statistics

(With Answers)

SECTION – A (5 X 5 = 25)

1(a) If $f(x) = \frac{3x+2}{3x-2}$

then prove that $\frac{f(x)+1}{f(x)-1} = \frac{3x}{2}$

Solution:

Given $f(x) = \frac{3x+2}{3x-2}$

$$\frac{f(x)+1}{f(x)-1} = \frac{\frac{3x+2}{3x-2} + 1}{\frac{3x+2}{3x-2} - 1} = \frac{3x+2+3x-2}{3x-2-3x+2} = \frac{3x}{2}$$

(OR)

1. (b) Find the maximum or minimum value of $2x^3 - 9x^2 + 12x + 6$

Solution: Let

$$f(x) = 2x^3 - 9x^2 + 12x + 6$$

$$f'(x) = 6x^2 - 18x + 12$$

$$f'(x) = 6(x^2 - 3x + 2)$$

$$f'(x) = 6(x-2)(x-1) = 0$$

$$(x-2)(x-1) = 0$$

$$x = 2, x = 1$$

$$f''(x) = 12x - 18$$

$$\text{When } x = 1, \text{ then } f''(x) = 12 - 18 = -6 < 0$$

$x = 1$ is a maxima

Maximum value at $x = 1$

$$y = 2x^3 - 9x^2 + 12x + 6$$

$$y = 2(1)^3 - 9(1)^2 + 12(1) + 6$$

$$y = 11$$

$$\text{When } x = 2, \text{ then } f''(x) = 24 - 18 = 6 > 0$$

$x = 2$ is a **minima, Minimum value** at $x = 2$

$$y = 2x^3 - 9x^2 + 12x + 6$$

$$= 2(8) - 9(4) + 24 + 6$$

$$= 16 - 36 + 24 + 6$$

$$y = 10$$

$x=1$ is a **maxima**

Maximum value = $y = 11$

$x=2$ is a **minima**

Minimum value = $y = 10$

2(a) Solve the following L.P.P graphically

Minimize $z = 7y_1 + 8y_2$

subject to

$$3y_1 + y_2 \geq 8$$

$$y_1 + 3y_2 \geq 11$$

$$y_1, y_2 \geq 0$$

Solution:

Consider $3y_1 + y_2 \geq 8$

(0, 0) is not included in the feasible region

Take, $3y_1 + y_2 = 8$

(1)

When $y_1 = 0, y_2 = 8$, The pt is (0, 8)

When $y_2 = 0, y_1 = \frac{8}{3}$, The pt is $(\frac{8}{3}, 0)$

Consider, $y_1 + 3y_2 \geq 11$

(0, 0) is not included in the feasible region

Let, $y_1 + 3y_2 = 11$

(2)

When $y_1 = 0, y_2 = \frac{11}{3}$, The pt is $(0, \frac{11}{3})$

When $y_2 = 0, y_1 = 11$, The pt is (11, 0)

Solving (1) and (2)

$$3y_1 + y_2 = 8$$

$$y_1 + 3y_2 = 11$$

3(1)-(3) gives

$$9y_1 + 3y_2 = 24$$

$$y_1 + 3y_2 = 11$$

$$8y_1 = 13 \Rightarrow y_1 = \frac{13}{8}$$

Substituting in (2)

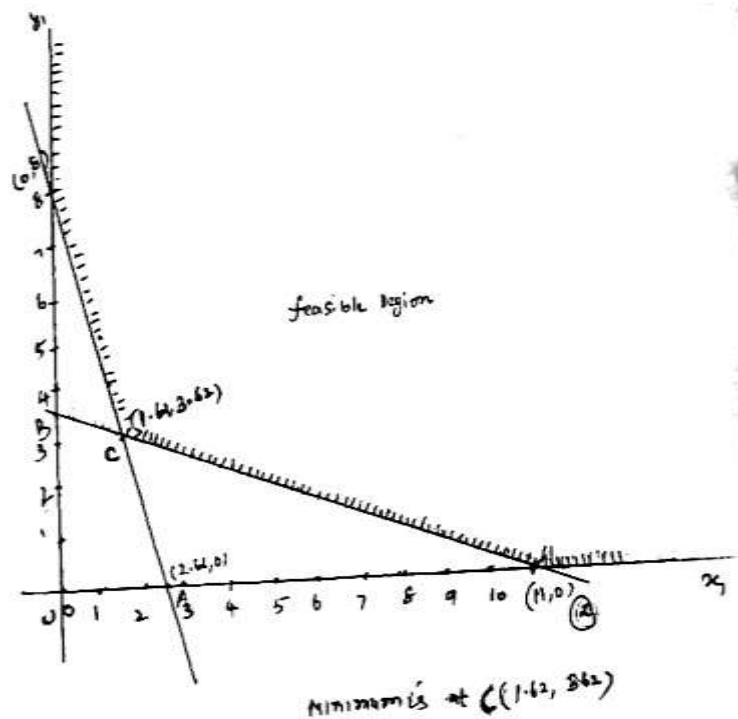
$$\frac{13}{8} + 3y_2 = 11$$

$$3y_2 = 11 - \frac{13}{8} = \frac{88-13}{8}$$

$$y_2 = \frac{75}{8 \times 3} = \frac{25}{8}$$

The intersecting pt is $C(\frac{13}{8}, \frac{25}{8}) = C(1.62, 3.62)$

2(a) Graph



①

To find minimum point:

$$\text{Min } z = 7y_1 + 8y_2$$

The point D(11,0)

$$z = 7(11) + 8(0) = 77$$

The point E(0,8)

$$z = 7(0) + 8(8) = 64$$

The point C $\left(\frac{13}{8}, \frac{25}{8}\right)$

$$z = 7y_1 + 8y_2 = 7\left(\frac{13}{8}\right) + 8\left(\frac{25}{8}\right) = 36.375$$

Min z is obtained at $C\left(\frac{13}{8}, \frac{25}{8}\right) = C(1.62, 3.62)$

where $y_1 = \frac{13}{8}$, $y_2 = \frac{25}{8}$; $\text{Min } z = 36.375$

:

(OR)

2 (b) Show that

$$\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(ab+bc+ca)$$

Solution:

$$\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = \begin{vmatrix} 0 & 0 & 1 \\ a^2 - b^2 & b^2 - c^2 & c^2 \\ a^3 - b^3 & b^3 - c^3 & c^3 \end{vmatrix} \quad \begin{array}{l} c_1 \rightarrow c_1 - c_2 \\ c_2 \rightarrow c_2 - c_3 \end{array}$$

$$\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c) \begin{vmatrix} 0 & 0 & 1 \\ a+b & b+c & c^2 \\ (a^2+ab+b^2) & b^2+bc+c^2 & c^3 \end{vmatrix}$$

$$= (a-b)(b-c)[(a+b)(b^2+bc+c^2) - (b+c)(a^2+ab+b^2)]$$

$$\{ \because (a^2-b^2) = (a+b)(a-b), (a^3-b^3) = (a-b)(a^2+ab+b^2) \}$$

$$= (a-b)(b-c)[(ab^2+abc+ac^2+b^3+b^2c+bc^2-ba^2-ab^2-b^3-ca^2-abc-cb^2)]$$

$$= (a-b)(b-c)[ac^2+bc^2-ba^2-ca^2]$$

$$= (a-b)(b-c)(c-a)(ab+bc+ca)$$

Hence the result.

3. (a) Find out the model height of 15 candidates:

Sl.No:	1	2	3	4	5	6	7	8	9
Heights (in inches):	40	45	50	60	55	60	75	60	40
Sl.No:	10	11	12	13	14	15			
Heights (in inches):	60	45	40	55	60	55			

Solution:

Calculation of mode:

From the given data we have the following table:

Size of the item:	40	45	50	55	60	75
No. of times it occurs:	3	2	1	3	5	1

Since 60 occurs the maximum no. of times (i.e.) 5, **the modal marks are 60**

(OR)

3(b) Eight coins are thrown simultaneously. Find the probability of getting at least 6 heads.

Solution:

Probability of at least 6 heads:

$$\begin{aligned} \text{Probability of 6 heads} &= {}^8C_6 \left(\frac{1}{2}\right)^8 \\ &= 0.1094 \end{aligned}$$

$$\begin{aligned}\text{Probability of 7 heads or more than 7 heads} &= 8c_7\left(\frac{1}{2}\right)^8 + 8c_8\left(\frac{1}{2}\right)^8 \\ &= 0.0352 \\ \text{Probability of at least 6 heads} &= 0.1094 + 0.0352 \\ &= 0.1446\end{aligned}$$

4. (a) Explain the features of simple random sampling method.

The features of simple random sampling method:

It is a technique in which the sample is so drawn that each and every unit in the population has an equal and independent chance of being included in the sample. Several methods have been adopted for random selection of the sample. They are:

(i) Lottery method:

This is the most popular and simplest method. In this method, all the items of the universe are numbered on separate slips of paper of same size, shape and colour. They are folded and mixed up in a drum or container. A blindfold selection is made. The required number of slips are selected for the desired sample size. The selection of items thus depends on chance.

For Example: If we want to select 5 students out of 50 students, then we must write the names of all the 50 students on slips of the same size and mix them; then we make a blindfold selection of 5 students. This method is also called unrestricted random sampling, because units are selected from the population without any restriction.

This method is mostly used in lottery draws. If the universe is infinite this method is inapplicable. There is a lot of possibility of personal prejudice if the size and shape of the slips are not identical.

(ii) Table random numbers:

As the lottery method cannot be used, when the population is infinite, the alternative method is that of using the table of random number. There are several standard tables of random number. But, the credit for this technique goes to prof. L.H.C, Tippett (1927). The random number table (taken from the British census report). Consists of 10,400 four – figured numbers giving in all $10,400 \times 4 = 41,600$. There are various other random number.

They are Fisher and Yates (1938) Comprising of 15,000 digits arranged in twos, Kendall and B.B.Smith (1939) Consisting of 1, 00,000 digits grouped in 25,000 sets of 4 digits random numbers R and Corporation (1955) consisting of 2, 00,000 random numbers of 5 digits each etc.

(OR)

4. (b) What do you mean by standard error? What are its uses in statistical analysis?

Standard Error:

If we select a number of independent random samples of a definite size from a given population and calculate some statistics, like mean, standard deviation etc, from each sample, we shall get a series of values of these statistics. These values obtained

from the different samples can be put in the form of a frequency distribution. If we calculate the mean of the sampling distribution it could be deemed to be the mean of the universe. Similarly the standard deviation of the sampling distribution would be called the Standard Error

If 10 samples have been taken from a universe and if $x_1, x_2, x_3, \dots, x_n$ represent their mean values, then the mean of these mean values would be close to the mean of the universe and the standard deviation of these values would be close to the standard deviation of the universe. The standard deviation of the sampling distribution of mean values would be called the standard error. The formula for this is σ / r

Utility :

(1) It is a useful instrument in testing the hypothesis. We may test the hypothesis at 5% level of significance, which means, if the difference between observed and expected mean is more than 1.96 S.E., the hypothesis is not accepted and one has to go in for the alternative hypothesis. The level of significance can be 1%. Generally, the hypothesis is accepted if the difference is less than 3 S.E.; 5% level is popular.

(2) Reliability of a sample can be known.

(3) The value of the parameters can be determined along with limits.

5. (a) **You are given that $r = 0.85$, $n=14$. Test the hypothesis $H_0 = P = 0$ against**

$$H_0 = P \neq 0$$

Solution:

Null hypothesis: There is no significant difference between correlations $r = 0.85$

Here $n = 14$, which is less than 30 (small sampling)

$$t = \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2} = \frac{0.85}{\sqrt{1-0.85^2}} \times \sqrt{14-2} = \frac{0.85}{\sqrt{1-0.725}} \times \sqrt{12} = 10.610$$

$$t = 10.61$$

$$\text{Degree of freedom} = n - 2 = 14 - 2 = 12$$

(a) At 5% level of significance, when Degree of freedom = 12, the table value is 1.782.

Calculated value = 10.61

Here calculated value is more than the table value. The hypothesis is rejected.

Hence there is a significant difference between the correlations.

(OR)

5. (b) **What is meant by regression? Why there should be two lines of regression for each bivariate distribution?**

Solution:

According to Blair, "Regression is the measure of the average relationship between two or more variable in terms of the original units of the data".

There are always two lines of regression for each bivariate distribution.

1. **y on x:**

$$y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x})$$

2. **x on y:**

$$x - \bar{x} = r \frac{\sigma_x}{\sigma_y} (y - \bar{y})$$

These two regression equations are not reversible or interchangeable because of the simple reason that the basis and assumptions for deriving these equations are quite different. The regression equation y on x is obtained on minimizing the sum of squares of the errors parallel to the y axis while the regression equation x on y is obtained on minimizing the sum of squares of the errors parallel to the x axis.

In the case of perfect correlation both the regression lines coincide. Hence in general we always have two lines of regression except in the particular case of perfect correlation

SECTION – A (5 X 5 = 25)

6. (a) The cost function $C(x)$ is given by

$$C(x) = \begin{cases} 0.5x + 17,000; & 0 \leq x \leq 10,000 \\ 5x + 22,000; & 10,000 \leq x \leq 20,000 \end{cases}$$

Discuss the continuity of $C(x)$ at $x = 10,000$

Solution: condition for Continuity:

$$\lim_{x \rightarrow x_0} f(x) = f(x_0)$$

When $x = 10000$,

$$C(x) = 0.5x + 17,000;$$

Consider the left hand side of (1)

$$\lim_{x \rightarrow x_0} f(x) = \lim_{x \rightarrow 10000} f(x_0) = 0.5(10000) + 17000 = 5000 + 17000 = 22000$$

$$\lim_{x \rightarrow 10000} f(x_0) = 22000 \quad (1)$$

Consider the right hand side of (1)

$$x = x_0 = 10000, f(10000) = 0.5(10000) + 17000 = 22000$$

$$\lim_{x \rightarrow 10000} f(x) = 22000 \quad (2)$$

Consider the right limit

$$\lim_{x \rightarrow x_0} f(x) = \lim_{x \rightarrow 10000} f(x_0) = 5(10000) + 22000 = 50000 + 22000 = 72000$$

$$\lim_{x \rightarrow x+10000} f(x) = 72000 \quad (3)$$

Comparing (1), (2), (3)

We have

$$22000 \neq 72000$$

$$\lim_{x \rightarrow x_0-10000} f(x) = \lim_{x \rightarrow 10000} f(x) \neq \lim_{x \rightarrow x+10000} f(x)$$

Hence $C(x)$ is not continuous at $x = 10,000$

(OR)

$$6. (b) . \text{ Given } A = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix}, C = \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix},$$

Show that

$$(i) A(B+C) = AB + AC$$

$$(ii) (A+B)C = AC + BC$$

Solution:

(i) To prove $(i) A(B+C) = AB + AC$

$$\begin{aligned} A(B+C) &= \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 5 & -5 & 4 \\ 11 & 8 & -5 \\ 7 & -13 & 11 \end{bmatrix} \\ &= \begin{bmatrix} 40+11-14 & -40+8+26 & 32-5-22 \\ -45+99+63 & 45+72-117 & -36-45+99 \\ 30-33+63 & -30-24-117 & 24+15+99 \end{bmatrix} \\ A(B+C) &= \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix} \end{aligned}$$

$$AB = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix} + \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix}$$

(i) To prove $(ii) (A+B)C = AC + BC$

$$A+B = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} + \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix}$$

$$(A+B)C = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 6 & -60 & 36 \end{bmatrix}$$

$$BC = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} -8 & -19 & 12 \\ 56 & 13 & -13 \\ -26 & -71 & 40 \end{bmatrix}$$

$$AC + BC = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

Hence (ii) $(A+B)C = AC + BC$

7(a) Solve the following problem:

Minimize $f = 9x + 12y_1 + 15z$

Subject to

$$2x + 2y + z \geq 10$$

$$2x + 3y + z \geq 12$$

$$x + y + 5z \geq 14$$

$$x, y, z > 0$$

Solution: Three variables problems cannot be done by Graphical method

This problem is out of syllabus (simplex method)

(OR)

7(b) A company is manufacturing two products A and B involving three departments. The processing time, profit earned per unit and the total capacity of the departments is given in the following table:

	Machining	Fabrication	Assembly	Profit
	1 hour	5 hours	3 hours	8000
	2 hours	4 hours	1 hour	10000
Total available:	72 hours	1800 hours	900 hour	

Determine the profit mix to maximize profit.

Solution:

X_1 = number of units (products) in A

X_2 = number of units (products) in B

The objective is to maximum the profit

$$\text{Max } z = 8000x_1 + 10000x_2$$

$$\text{Machining constraint } x_1 + 2x_2 \leq 720$$

$$\text{Fabrication constraint } 5x_1 + 4x_2 \geq 1800$$

$$\text{Assembly constraint } 3x_1 + x_2 \leq 900$$

8(a) A Collar manufacturer is considering the production of a new style of collars to attract young men.

The following statistics of neck circumstances are available based on measurements on a typical group:

Mid value: 12.5 13.0 13.5 14.0 14.5 15.0 15.5 16.0 16.5

No.of students: 4 19 30 63 66 29 18 1 1
NO QUESTION

(OR)

- 8(b) The following table gives the number of days in a 50 day period during which automobile accidents occurred in a certain part of a city. Fit a Poisson distribution to the data.

No.of accidents: 0 1 2 3 4
No.of days: 19 18 8 4 1

Solution:

The probability density function of a Poisson distribution is given by

$$f(x) = \frac{e^{-\lambda} \lambda^x}{x!}$$

Fitting a Poisson distribution

No.of.accidents	No.of.day	fx
0	19	0
1	18	18
2	8	16
3	4	12
4	1	4
	N=50	50

$$\bar{x} = \frac{\sum fx}{N} = \frac{50}{50} = 1 = \lambda = m, \quad e^{-1} = 0.3679, N = 50, m = 1$$

$$NP(0) = N e^{-m} = 18.395 = 50 \times 0.3679 = 18.395$$

$$NP(1) = NP(0) = 18.395$$

$$NP(2) = NP(1) \times \frac{m}{2} = 9.1975$$

$$NP(3) = NP(2) \times \frac{m}{3} = 3.0658$$

$$NP(4) = NP(3) \times \frac{m}{4} = 0.7665$$

9. (a) It has been experienced that companies producing toilet soaps spends 30% of their net profits on advertisements. This percentage in the case of companies producing detergents is 40%. A random sample of 49 companies producing toilet soaps and of 64 companies producing detergents showed the proportion of net profit spend advertisement as 25% and 45% respectively. Find the probability of drawing two samples with a difference in the two samples proportions larger than what it is observed

Solution:

The amount by Toilet Soaps Company = 30%=0.3 (i.e.), $C_1 = 0.3$

The amount by detergent Soaps Company = 40%=0.4 (i.e.), $C_2 = 0.4$

Population proportion for toilet soaps =0.25 (i.e.), $P = 0.3, Q_1 = 1 - P_1 = 0.7$

Population Proportion for detergent soaps = 0.45 (i.e.), $P_2 = 0.4, Q_2 = 1 - Q_1 = 0.6$

Test statistic (for observed values) for population:

$$z = \frac{|p_1 - p_2|}{\sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}} = \frac{|0.3 - 0.4|}{\sqrt{\frac{0.3 \times 0.7}{49} + \frac{0.4 \times 0.6}{64}}} = 0.232 < 1.96 (z_{0.05})$$

$$p(z < 1.1) = 0.8643$$

Number of companies in the sample producing toilet soaps = 49 (i.e.), $n_1 = 49$

Number of companies in the sample producing detergent soaps = 64 (i.e.), $n_2 = 64$

Sample proportion for toilet soaps = 0.25 (i.e.), $p_1 = 0.25, q_1 = 1 - p_1 = 0.75$

Sample proportion for detergent soaps = 0.45 (i.e.), $p_2 = 0.45, q_2 = 1 - q_1 = 0.55$

Test statistic for samples:

$$z = \frac{|p_1 - p_2|}{\sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}} = \frac{|0.25 - 0.45|}{\sqrt{\frac{0.25 \times 0.75}{49} + \frac{0.45 \times 0.55}{64}}} = 1.1 < 1.96 (z_{0.05})$$

$$p(z < 0.232) = 0.5916$$

$$p(\text{no significant difference}) = 0.8643$$

$$p(\text{no significant difference in observed data}) = 1 - 0.8643 = 0.1357$$

$$p(\text{significant difference larger than observed}) =$$

$$p(\text{significant difference from expected data}) = 1 - 0.5910 = 0.4090$$

(OR)

9 (b) The daily wages (in rupees) of workers in two cities are as follows:

	Size of the sample(n)	S.D. of wages(S)
City A	16	25
City B	13	32

Test at 5% the equality of variance of the wage distribution in the two cities.

(Tabulated value of F for (12, 15) at 5% level of significance is 2.48)

Solution:

Null hypothesis: There is no significant difference in the variance of the wage distribution of the workers in the two cities.

$$n_1 = 16, n_2 = 13$$

$$S_1^2 = \frac{\sum (X - \bar{X})^2}{n_1 - 1} = \frac{25}{16 - 1} = \frac{5}{3}$$

$$S_2^2 = \frac{\sum (X - \bar{X})^2}{n_2 - 1} = \frac{32}{13 - 1} = \frac{8}{3}$$

$$F = \frac{\text{largest estimate}}{\text{smallest estimate}} = \frac{\frac{8}{3}}{\frac{5}{3}} = \frac{8}{5} = 1.6$$

Calculated value = 1.6

Table value (given) = 2.48

Calculated value < Table value

The hypothesis is accepted. Hence there is no significant difference in the variance of the wage distribution of the workers in the two cities.

10(a) Calculate the coefficient of correlation(r):

	Age in years					
Marks	18	19	20	21	22	Total
20-25		3	2	-	-	5
15-20		-	5	4	-	9
10-15		-	-	7	10	17
5-10		-	-	-	3	5
0-5		-	-	-	3	4
Total		3	7	11	16	40

Solution:

	X		18	19	20	21	22				
Y	M	$X = 20$ $(Y - 12.5)/5$	-2	-1	0	1	2	f	fdy	fdy^2	$fdxdy$
0-5	2.5	-2		-	-	-6	-4				
						3	1	4	-8	16	-10
5-10	7.5	-1	-	-	-	-3	-4				
						3	2	5	-5	5	-7
10-15	12.5	0			0	10					
					7	10		17	0	0	0
15-20	17.5	1		-5	0						
				5	4			9	9	9	5
20-25	22.5	2	-12	-4							
			3	2				5	10	20	-16
		f	3	7	11	16	3	N=40	$\sum dy = 6$	$\sum fdy^2 = 50$	$\sum fdxdy = -38$
		fdx	-6	-7	0	16	6	$\sum dx = 9$			
		fdx^2	12	7	0	16	12	$\sum fdx^2 =$			

							47
	$fdxdy$	-12	-9	0	-9	-8	$\sum fdxdy = -38$

$$\sum fdy = 6, \sum fdy^2 = 50$$

$$N = 40$$

Coefficient of correlation:

$$r = \frac{\sum fdxdy - \frac{\sum fdx \sum fdy}{N}}{\sqrt{\sum fdx^2 - \left(\frac{\sum fdx}{N}\right)^2} \sqrt{\sum fdy^2 - \left(\frac{\sum fdy}{N}\right)^2}} = -0.0189$$

(OR)

10(b) Obtain the two regression coefficient and form equations of regression from the following data. Calculate the expected height of the son when the height of the father is 67.5 inches

x	65	66	67	67	68	69	71	73
y	67	68	64	68	72	70	69	70

Solution:

x-son	y-father	dx	dy	(dx) ²	dx dy	(dy) ²
65	67	-2	-1	4	2	1
66	68	-1	0	1	0	0
67	64	0	-4	0	0	16
67	68	0	0	0	0	0
68	72	1	4	1	4	16
69	70	2	2	4	4	4
71	69	4	1	16	4	1
73	70	6	2	36	12	4
546	548	10	4	62	26	42

Regression equation of y on x:

$$dx = x - 67, dy = y - 68$$

$$b_{yx} = \frac{N \sum dxdy - \sum dx \sum dy}{N \sum (dx)^2 - (\sum dx)^2}$$

$$b_{yx} = \frac{26(8) - 10(4)}{8(62) - 10^2} = \frac{208 - 40}{496 - 100} = 0.4242$$

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$y - 68 = 0.4242(x - 67)$$

$$y = 0.4242x + 39.5786$$

$$\text{when } x = 67.5, y = 68.2121$$

Regression equation of x on y:

$$dx = x - 67, dy = -y - 68$$

$$dx = x - 67, dy = y - 68$$

$$b_{xy} = \frac{N \sum dxdy - \sum dx \sum dy}{N \sum dy^2 - (\sum dy)^2};$$

$$b_{xy} = \frac{26(8) - 10(4)}{8(42) - 4^2} = \frac{168}{320} = 0.5250$$

$$x - \bar{x} = b_{xy}(y - \bar{y})$$

$$x - 67 = 0.5250(y - 68)$$

$$x = 0.5250y + 31.3$$

$$\text{when } x = 67.5, y = 67.7375$$

MBA - Degree Examination – APRIL-2014 - P8MBA3

Mathematics and Statistics

(With Answers)

PART – A (5 X 5 = 25)

1a) It is suggested that a person must take at least 108 units of Vitamin A, 36 units of Vitamin B and 100 units of Vitamin C. There are two products available. Product X contains 36 units of Vitamin A, 3 units of Vitamin B and 20 units of Vitamin C. Product Y contains 6 units of Vitamin A, 12 units of Vitamin B and 10 units of Vitamin C. Product X costs Rs.20 per unit and Product Y costs Rs.40 per unit. How many units of product X and Y should be consumed in order to minimize the cost. Formulate the above problem into an L.P.P

Solutions:

The required amount of vitamins:

	Vitamin A (Units)	Vitamin B (Units)	Vitamin C (Units)	Cost (Rs)
Product X	36	3	20	20
Product Y	6	12	10	40

Total Requirement	108	36	100	

Mathematical formulation:

Find x_1, x_2 such that

$$\text{Min } z = 20x_1 + 40x_2$$

subject to

$$36x_1 + 6x_2 \leq 108$$

$$3x_1 + 12x_2 \leq 36$$

$$20x_1 + 10x_2 \leq 100$$

$$x_1, x_2 \geq 0$$

1b) A problem in business statistics is given to five students A, B, C, D and E. Their chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{6}$. What is the probability that the problem will be solved?

Solution:

$$\text{Probability that A fails to solve the problem is } 1 - \frac{1}{2} = \frac{1}{2}$$

$$\text{Probability that B fails to solve the problem is } 1 - \frac{1}{3} = \frac{2}{3}$$

$$\text{Probability that C fails to solve the problem is } 1 - \frac{1}{4} = \frac{3}{4}$$

$$\text{Probability that D fails to solve the problem is } 1 - \frac{1}{5} = \frac{4}{5}$$

$$\text{Probability that E fails to solve the problem is } 1 - \frac{1}{6} = \frac{5}{6}$$

Since the events are independent the probability that all the five students fail to solve the problem is

$$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} = \frac{1}{6}$$

The problem will be solved if anyone of them is able to solve it.

The probability that the problem will be solved = $1 - \frac{1}{6} = \frac{5}{6}$

2 (a) what are the managerial applications of functions?

The relationship between economic variables can be expressed as functions and their graphs are known as demand function, consumption function, and revenue function etc

Functions Related To Business

1. Demand Function

The demand function is one, which relates the demand (q) and price (p) of the product. It can be denoted as

$$q = \phi(p) \quad (1)$$

where ϕ is the demand function and p and q are positive

2. Cost function

The term cost refers to the amount spent on the product on x number of units. It is denoted by $C(x)$. Then $C(x)$ can be defined as

$$C(x) = \phi(x), x > 0$$

3. Total cost function

The Total cost function $TC(x)$ can be defined as the cost of producing

$$TC(x) = \text{fixed cost} + \text{variable cost} * x$$

(i) where fixed cost over had refers to the fixed amount spent by the manufacturer on land building premises machinery etc

(ii) Where cost refers to unit production cost due to raw material, labour, fuel and electricity etc

(iii) Where x is number of units to be manufactured, $x > 0$

4. Average Cost function

The Average Cost function is defined as the cost of producing one unit

$$AC(x) = \frac{TC(x)}{x}; x > 0, \text{ where } x \text{ is the number of units produced.}$$

5. Marginal Cost function

It defines the additional cost incurred for producing one more item. Mathematically

it refers $\frac{d}{dx}(TC(x))$ (or)

It means the rate of change in the total cost function with respect to a change in the number of units produced

6. Revenue function

It refers to the total cash inflow in the form of revenue by selling the products produced

It is denoted by $R(x)$. Then

$$R(x) = p * x; p, x > 0,$$

Where, p is the price per product and x , the number of units produced.

7. Profit function

It refers to the difference between the total cash inflow (revenue) and the cash outflow

(expenditure). It can be denoted as

$$P(x) = R(x) - TC(x); \quad x > 0,$$

Where, $R(x)$ denotes the revenue function and $TC(x)$ denotes the total cost function.

(OR)

2b) The profit (in lakhs) earned by 100 companies during 2012-13 are shown below:

Profit	0-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
(in lakhs):									
No.of	4	8	18	30	15	10	8	7	4

Companies:

Compute mean and standard deviation.

Solution:

Profit (in lakhs)	No.of Companies (f)	Mid value (m)	fm	m ²	f m ²
0-20	4	10	40	100	400
20-30	8	25	200	625	5000
30-40	18	35	630	1225	22050
40-50	30	45	1350	2025	60750
50-60	15	55	825	3025	45375
60-70	10	65	650	4225	42250
70-80	8	75	600	5625	45000
80-90	7	85	595	7225	50575
90-100	4	95	380	9025	36100
	$\sum f = 104$		$\sum fm = 5270$		$\sum fm^2 = 307500$

$$\text{Mean} = \bar{x} = \frac{\sum fm}{N} = \frac{5270}{104} = 50.673$$

$$\begin{aligned} \text{S.D} = \sigma &= \sqrt{\frac{\sum fm^2}{N} - \left(\frac{\sum fm}{N}\right)^2} \\ &= \sqrt{\frac{307500}{104} - (50.673)^2} \\ &= \sqrt{2956.730 - 2567.752} \\ &= \sqrt{388.978} \end{aligned}$$

$$\sigma = 19.722$$

3(a) State the advantages of histogram

Solution: The statistical data can be presented in the form of diagrams.

1. One of the most important and useful methods of presenting frequency distribution of continuous series of data is known as Histogram .
2. It is used for interpolating and extrapolating of a missing data
3. Mode and median can be evaluated
4. Estimation analysis can be made
5. A Histogram is two dimensional, that is, in a histogram both the length and breadth are important.
6. Usually in histograms, the class intervals are equal. Even if the class intervals are not equal, we can construct histograms with areas of the bars proportional to the frequencies of the classes.(OR)

b) Find out if there is any significant difference in the intelligence of boys and girls.

Girls	Mean 84	Standard deviation 10	No. of samples 121
Boys	Mean 81	Standard deviation 12	No. of samples 81

Solution:

$$n_1 = 121, n_2 = 81,$$

$$\text{Given, } \sigma_1 = 10, \sigma_2 = 12,$$

$$\bar{x}_1 = 84, \bar{x}_2 = 81$$

Null hypothesis H_0 : $\mu_1 = \mu_2$

There is no significant different between the two means

Alternative hypothesis H_1 : $\mu_1 \neq \mu_2$

There is significant different between the two means

Level of significance = 5%

Test statistic:

$$|z_{cal}| = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$|z_{cal}| = \frac{84 - 81}{\sqrt{\frac{10^2}{121} + \frac{12^2}{81}}} = \frac{3}{\sqrt{0.8264 + 1.7777}}$$

$$= \frac{3}{\sqrt{2.6042}} = \frac{3}{1.614}$$

$$z_{cal} = 1.859$$

Critical value: 5% = 1.96

Inference: Since the calculated value is greater than the tabulated value at 5% level of significance, we reject the null hypothesis. That there is significant different between two means

4(a) Find the rank correlation coefficient of the following data

Score in English: 40 46 54 60 70 80 82 85 85 90 95

Score in Tamil: 45 45 50 43 40 75 55 72 65 42 70

Solution:

X	Y	X_i -rank	Y_i -rank	$d_i = X_i - Y_i$	d_i^2
40	45	11	7.5	3.5	12.25
46	45	10	7.5	2.5	6.25
54	50	9	6	3.0	9.0
60	43	8	9	-1.0	1.0
70	40	7	11	-4.0	16.0
80	75	6	1	5.0	25.0
82	55	5	5	0	0
85	72	3.5	2	1.5	2.25

85	65	3.5	4	-0.5	0.25
90	42	2	10	-8.0	64.0
95	70	1	3	-2.0	4.0
					$\sum d_i^2 = 140$

$$\rho = 1 - \left[\frac{6\sum d_i^2 + \frac{m(m^2-1)}{12} + \frac{m(m^2-1)}{12}}{n(n^2-1)} \right] = 1 - \left[\frac{6(140) + \frac{2(2^2-1)}{12} + \frac{2(2^2-1)}{12}}{11(11^2-1)} \right]$$

$$= 1 - \frac{840 + 0.5 + 0.5}{1320} = 1 - 0.637$$

$$\rho = 0.363$$

(OR)

(b) Explain clearly standard error and sampling distribution.

Standard Error:

If we select a number of independent random samples of a definite size from a give population and calculate some statistics, like mean, standard deviation etc.. from each sample, we shall get a series of values of these statistics. These values obtained from the different samples can be put in the form of a frequency distribution. If we calculate the mean of the sampling distribution it could be deemed to be the mean of the universe. Similarly the standard deviation of the sampling distribution would be called the Standard Error. If 10 samples have been taken from a universe and if $x_1, x_2, x_3, \dots, x_n$ represent their mean values, then the mean of these mean values would be close to the mean of the universe and the standard deviation of these values or the standard deviation of the sampling distribution of mean values would be called the standard error. The formula for this is σ / r

Sampling distribution:

Sampling is a method of selecting units for analysis such as households, consumers, companies etc from the respective population under statistical investigation

The theory of sampling is based on the principle of statistical regularity.

The group of individuals under study is called population.

A finite set of a population is called a sample and the number of units in a sample is called its sample size.

Sampling Distribution:

Consider all possible sample of size 'n' which can be drawn from a given population For each sample we can compute a statistic such as mean, standard deviation etc, which will vary from sample to sample. The aggregate of various values of the statistic under consideration may be grouped into a frequency distribution. This distribution is known as sampling distribution of the statistic. Thus the probability distribution of all the possible values that a sample statistic can take is called the sampling distribution of the statistic.

Sample mean and sample proportion based on a random sample are examples of sample statistic.

Sampling distribution of the mean from normal population

If $x_1, x_2, x_3, \dots, x_n$ are n independent random samples drawn from a normal population with mean m and standard deviation s , then the Sampling distribution $\bar{x}$ (mean) follows a normal distribution with mean m and standard deviation $\frac{\sigma}{\sqrt{n}}$.

Sampling distribution of proportions

Suppose that a population is infinite and that the probability of occurrence of an event, say success, is P . Let $Q=1-P$ denote the probability of failure. Consider all possible samples of size n drawn from this population. For each sample, determine the Proportion p of successes. If the sample size is n is large, the distribution of sampling

proportions p follow a normal distribution with mean $np = P$ and S.D $\sigma P = \sqrt{\frac{PQ}{n}}$

5 (a) Explain and illustrate Poisson distribution.

Solution: Poisson distribution is a Discrete probability distribution.

The probability that an event will occur exactly x times over a given span of time is

$$p(x) = \frac{e^{-\lambda} \lambda^x}{x!}; \quad x = 0, 1, 2, \dots, \infty$$

where λ is the parameter and must be a positive constant.

Example: Customer arrivals at a service point during a given period of time

Properties of Poisson distribution

1. It is a discrete probability distribution in which the random variable x assumes the values $x = 0, 1, 2, \dots, \infty$

2. Mean $= \lambda$, variance $= \lambda$, $S.D = \sigma = \sqrt{\lambda}$,

Skewness $= \frac{1}{\sqrt{\lambda}}$ and kurtosis $= \frac{1}{\lambda}$, where λ is the parameter of the distribution

3. If x and y be two independent Poisson variates with parameters λ_1 and λ_2 , then their sum $(x + y)$ is also a Poisson variate with parameters $(\lambda_1 + \lambda_2)$

Example: If 5% of the electric bulbs manufactured by a company are defective. Use Poisson distribution to find the probability that in a sample of 100 bulbs (i) none is defective (ii) 5 bulbs will be defective

Solution: Let p be the event of bulbs being defective.

Given, $p = 0.05 \Rightarrow q = 1 - p = 0.95$, $n = 100$, $\lambda = np = 5$

To find (i) $p(X = 0)$

By definition, $p(X = x) = \frac{e^{-\lambda} \lambda^x}{x!}$

$$p(X = 0) = \frac{e^{-5} 5^0}{0!} = 0.0067$$

$$p(X = 5) = \frac{e^{-5} 5^5}{5!} = 0.1755$$

The probability of none is defective is 0.0067 and exactly 5 bulbs are defective is 0.1755

(OR)

(b) Explain Multiplication theorem.

Repeat-N0v-2014

PART – B (5X10=50)

Answer ALL questions

6. (a) Solve the following LPP using graphical method:

$$\text{Maximize } z = 5x_1 + 7x_2$$

subject to

$$2x_1 + 4x_2 \leq 50$$

$$3x_1 + 2x_2 \leq 48$$

$$x_1, x_2 \geq 0$$

Solution:

Consider,

$$2x_1 + 4x_2 \leq 50$$

(0,0) lies in the feasible region

Now, Consider

$$2x_1 + 4x_2 = 50$$

(1)

Put $x_1 = 0$, $x_2 = 12.5$, The point is (0,12.5)

$x_2 = 0$, $x_1 = 25$, The point is (25,0)

$$3x_1 + 2x_2 \leq 48$$

(0,0) lies in the feasible region

Consider

$$3x_1 + 2x_2 = 48$$

(2)

Put,

$$x_1 = 0 \Rightarrow x_2 = 24$$

The point is (0,24)

$$x_2 = 0 \Rightarrow x_1 = 16$$

The point is (16,0)

OABC is the feasible region

To find B:

Consider

$$2x_1 + 4x_2 = 50$$

(1)

$$3x_1 + 2x_2 = 48$$

(2)

$$(1) - 2 \times (2) \Rightarrow x_1 = 11.5$$

Substituting the value of x_1

$$2x_1 + 4x_2 = 50$$

$$2(11.5) + 4x_2 = 50$$

$$x_2 = 6.75$$

We get the point B is 11.5, 6.75

To find Maximum:

$$z = 5x_1 + 7x_2$$

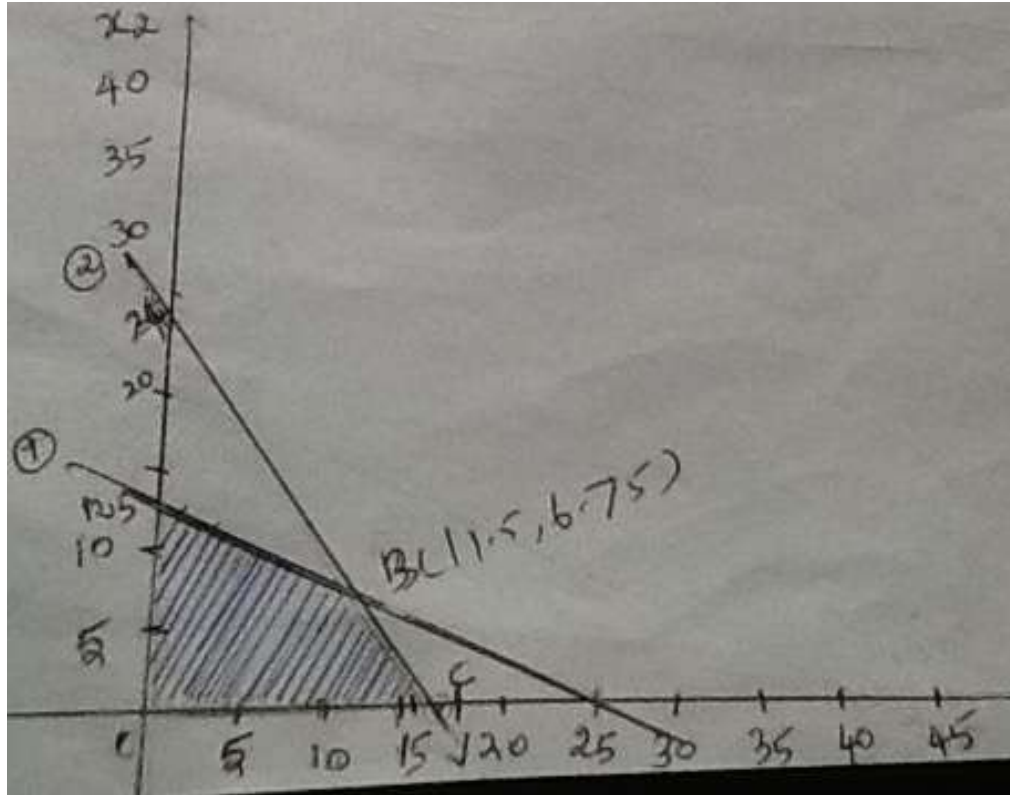
$$O(0,0) = 0$$

$$A(0,12.5) = 0 + 7(12.5) = 87.5$$

$$B(11.5, 6.75) = 5(11.5) + 7(6.75) = 57.5 + 47.25 = 104.75$$

$$C(16,0) = 5(16) + 7(0) = 80$$

The maximum is obtained at the point $B(11.5, 6.75)$



(OR)

(b)

$$5x + 3y = 65$$

$$2y - z = 11$$

$$3x + 4z = 57$$

Solve the above using Cramer's rule

Solution:

Writing the system in matrix form, we have

$$\begin{pmatrix} 5 & 3 & 0 \\ 0 & 2 & -1 \\ 3 & 0 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 65 \\ 11 \\ 57 \end{pmatrix}$$

$$\mathbf{AX} = \mathbf{B}$$

$$D = |A| = \begin{vmatrix} 5 & 3 & 0 \\ 0 & 2 & -1 \\ 3 & 0 & 4 \end{vmatrix} = 5(8 - 0) - 3(0 + 3) + 0 = 31 \neq 0$$

$$D_1 = \begin{vmatrix} 65 & 3 & 0 \\ 11 & 2 & -1 \\ 57 & 0 & 4 \end{vmatrix} = 65(8) - 3(44 + 57) = 217$$

$$D_1 = 217$$

$$D_2 = \begin{vmatrix} 5 & 65 & 0 \\ 0 & 11 & -1 \\ 3 & 57 & 4 \end{vmatrix} = 5(44 + 57) - 65(0 + 3) = 310$$

$$D_2 = 310$$

$$D_3 = \begin{vmatrix} 5 & 3 & 65 \\ 0 & 2 & 11 \\ 3 & 0 & 57 \end{vmatrix} = 5(114 - 0) - 3(0 - 3) + 65(-6)$$

$$D_3 = 279$$

Cramer's rule

$$x = \frac{D_1}{D} = \frac{217}{31} = 7, \quad y = \frac{D_2}{D} = \frac{310}{31} = 10, \quad z = \frac{D_3}{D} = \frac{279}{31} = 9$$

Hence the solution is $(x, y, z) = (7, 10, 9)$

7(a) Find inverse of the following:

$$\begin{pmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{pmatrix}$$

Solution:

$$\text{The inverse of } A = A^{-1} = \frac{\text{adj.}A}{|A|}$$

$$|A| = \begin{vmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{vmatrix} = (4 - 2) - 4(8 - 3) + 3(8 - 6) = 2 - 20 + 6 = -12$$

The Co-Factor Matrix of A

$$C = \begin{pmatrix} + \begin{vmatrix} 2 & 1 \\ 2 & 2 \end{vmatrix} & - \begin{vmatrix} 4 & 1 \\ 3 & 2 \end{vmatrix} & + \begin{vmatrix} 4 & 2 \\ 3 & 2 \end{vmatrix} \\ - \begin{vmatrix} 4 & 3 \\ 2 & 2 \end{vmatrix} & + \begin{vmatrix} 1 & 3 \\ 3 & 2 \end{vmatrix} & - \begin{vmatrix} 1 & 4 \\ 3 & 2 \end{vmatrix} \\ + \begin{vmatrix} 4 & 3 \\ 2 & 1 \end{vmatrix} & - \begin{vmatrix} 1 & 3 \\ 4 & 1 \end{vmatrix} & + \begin{vmatrix} 1 & 4 \\ 4 & 2 \end{vmatrix} \end{pmatrix} = \begin{pmatrix} -2 & -5 & 2 \\ -2 & -7 & 10 \\ -2 & -11 & -14 \end{pmatrix}$$

The adjoint of $A = C^{-1} = \begin{pmatrix} -2 & -2 & -2 \\ -5 & -7 & -11 \\ 2 & 10 & -14 \end{pmatrix}$

The inverse of A is

$$A^{-1} = \frac{-1}{12} \begin{pmatrix} -2 & -2 & -2 \\ -5 & -7 & -11 \\ 2 & 10 & -14 \end{pmatrix}, A^{-1} = \frac{1}{12} \begin{pmatrix} 2 & 2 & 2 \\ 5 & 7 & 11 \\ -2 & -10 & 14 \end{pmatrix}$$

(OR)

7. (b) Ten competitors in a beauty contest are ranked by three judges in the following orders:

JUDGE 1	1	5	4	8	9	6	10	7	3	2
JUDGE 2	4	8	7	6	5	9	10	3	2	1
JUDGE 3	6	7	8	1	5	10	9	2	3	4

Use rank correlation to discuss which pair of judges has the nearest approach to common taste in beauty

Solution: (Repeat-Nov-2014)

8(a) Calculate coefficient of skewness from the following

Marks above:	0	10	20	30	40	50	60	70	80
No. of students	150	140	100	80	80	70	30	14	0

Solution:

Marks	m.p m	No.of students f	$(m - 45) / 10$ d	fd	fd^2	c.f
0-10	5	10	-4	-40	160	10
10-20	15	40	-3	-120	360	50
20-30	25	20	-2	40	80	70
30-40	35	0	-1	0	0	70
40-50	45	10	0	0	0	80
50-60	55	40	+1	+40	40	120
60-70	65	16	+2	+32	64	136
70-80	75	14	+3	+42	126	150
		$N = 150$		$\sum fd = -86$	$\sum fd^2 = 830$	

$$\text{Coefficient of skewness} = \frac{\bar{x} - \text{mode}}{\sigma}$$

$$\bar{X} = A + \frac{\sum fd}{N} \times i = 45 - \frac{86}{150} \times 10 = 45 - 5.73 = 39.27$$

$$\sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2 \times i} = \sqrt{\frac{830}{150} - \left(\frac{-86}{150}\right)^2 \times 10}$$

$$\sigma = \sqrt{5.533 - .329} \times 10 = 2.281 \times 10 = 22.81$$

For finding out mode we have to prepare grouping table and analysis table.

Marks	(f) I	II	III	IV	V	VI
0-10	10					
		50				
10-20	40			70		
			60			
20-30	20				60	
		20				
30-40	0					30
			10			
40-50	10					
		50		50		
50-60	40				66	
			56			
60-70	16					70
		30				
70-80	14					

Col.No	10-20	20-30	50-60
I	1		1
II	1		1
III	1	1	
IV	1	1	
V			1
VI			1
Total	4	2	4

This is a binomial series and hence for calculating skewness, the following formula is used.

$$\text{Co. efficient of skewness} = \frac{3(\bar{x} - \text{median})}{\sigma}$$

Med = size of $\frac{N}{2} = 150 / 2 = 75^{\text{th}}$ item. It lies in the class 40 – 50

$$\text{Med} = L + \frac{\frac{N}{2} - c.f}{f} \times i = 40 + \frac{75 - 70}{10} \times 10 = 40 + 5 = 45$$

$$\text{Co. efficient of skewness} = \frac{3(39.27 - 45)}{22.81} = \frac{-17.19}{22.81} = -0.754$$

$$\text{Coefficient of Skewness} = -0.754$$

(OR)

(b) The following figures related to the number of units sold in five different areas by four salesmen: Is there a significant difference in the efficiency of these salesmen?

Area	Number of units			
	A	B	C	D
1	80	100	95	70
2	82	110	90	75
3	88	105	100	82
4	85	115	105	88
5	75	90	80	65

Solution: Let us take the hypothesis that there is no significant difference in the performance of the four salesmen. Applying the Analysis of Variance procedure

Area	Number of units			
	A	B	C	D
1	80	100	95	70
2	82	110	90	75
3	88	105	100	82
4	85	115	105	88
5	75	90	80	65
Total	410	520	470	380
$\bar{X}$	82	104	94	76

$$\bar{X} = \frac{82 + 104 + 94 + 76}{4} = 89$$

Variance Between samples

$(\bar{X}_1 - \bar{\bar{X}})^2$	$(\bar{X}_2 - \bar{\bar{X}})^2$	$(\bar{X}_3 - \bar{\bar{X}})^2$	$(\bar{X}_4 - \bar{\bar{X}})^2$
49	225	25	169
49	225	25	169
49	225	25	169
49	225	25	169
49	225	25	169
245	1125	125	845

Sum of squares between samples = $245+1125+125+845 = 2340$

Variance with samples

$(X_1 - \bar{X})^2$	$(X_2 - \bar{X})^2$	$(X_3 - \bar{X})^2$	$(X_4 - \bar{X})^2$
4	16	1	36
0	36	16	1
36	1	36	36
9	121	121	144
49	196	196	121
98	370	370	338

Sum of squares within samples = $98+370+370+338 = 1176$

Analysis of Variance Table

Source of variation	Sum of squares	Degree of freedom	Mean square
Between	2340	3	780
Within	1176	16	73.5
Total	3516		

$$F = \frac{\text{Variance Between samples}}{\text{Variance within samples}} = \frac{780}{73.5} = 10.61$$

For $v_1 = 3$ and $v_2 = 12$ $F_{0.05} = 3.24$

The calculated value of F is greater than the tabulated value. The hypothesis is rejected. Hence there is a significant difference in the performance of the four salesmen.

9 (a) From the following table, calculate the correlation co efficient by Karl Pearson's method:

X: 43 44 46 40 44 42 45 42 38 40 42 57
Y: 29 31 19 18 19 27 27 29 41 30 26 10

Solution:

x	y	dx dx=x-44	dy dy=y-26	dx ²	dy ²	dx dy
43	29	-1	3	1	9	-3
44	31	0	5	0	25	0
46	19	2	-7	4	49	-14
40	18	-4	-8	16	64	32
44	19	0	-7	0	49	0
42	27	-2	1	4	1	-2
45	27	1	1	1	1	1
42	29	-2	3	4	9	-6
38	41	-6	15	36	225	-90
40	30	-4	4	16	16	-16
42	26	-2	0	4	0	0
57	10	13	-16	169	256	-208
		-5	-6	255	704	-306

The correlation coefficient is given by

$$r = \frac{\sum dx dy - \frac{\sum dx \cdot \sum dy}{N}}{\sqrt{\sum dx^2 - \frac{(\sum dx)^2}{N}} \cdot \sqrt{\sum dy^2 - \frac{(\sum dy)^2}{N}}}$$

$$r = \frac{-306 - \frac{(-5)(-6)}{12}}{\sqrt{255 - \frac{(-5)^2}{12}} \sqrt{704 - \frac{(-6)^2}{12}}}$$

$$= \frac{-306 - 2.50}{\sqrt{255 - 2.08} \sqrt{704 - 3}} = \frac{-308.5}{\sqrt{252.92} \sqrt{701}}$$

$$r = \frac{-308.5}{421.05}$$

$$r = -0.733$$

(OR)

(b) From the data given below determine the line of trend and find the expected value for 2008

Year:	1998	1999	2000	2001	2002	2003	2004	2005	2006
Production:	110.2	143.3	143.3	134.5	138	55	74	129	150

(in tons)

Solution:

Year	Value	Deviation from	XY	X ²
------	-------	----------------	----	----------------

	(Y)	2002 (X)		
1998	110.2	-4	-440.8	16
1999	143.3	-3	-429.9	9
2000	143.3	-2	-286.6	4
2001	134.5	-1	-134.5	1
2002	138	0	0	0
2003	55	1	55	1
2004	74	2	148	4
2005	129	3	387	9
2006	150	4	600	16
$N=9$	$\sum Y = 1077.3$	$\sum X = 0$	$\sum XY = -101.8$	$\sum X^2 = 60$

$$\sum Y_c = a + bX, \text{ Since } \sum X = 0,$$

$$a = \frac{\sum Y}{N} = \frac{1077.3}{9} = 119.7, \quad b = \frac{\sum XY}{\sum X^2} = \frac{-101.8}{60} = -1.667$$

$$\sum Y_c = a + bX = 119.7 - 1.667X$$

Hence for 2008, $\sum X = 6$, $\sum Y_{2008} = 119.7 - 1.667(6) = 109.698$

(OR)

10(a) The following are the marks in statistics (X) and mathematics (Y) of ten students:

X	56	55	58	58	57	56	60	64	69	57
Y	68	67	67	70	65	68	70	66	68	66

Calculate the co efficient of correlation and estimate the marks in Mathematics of students who secure 62 marks in Statistics.

Solution:

x	y	x^2	y^2	xy
56	68	3136	4624	3808
55	67	3025	4489	3685
58	67	3364	4489	3886
58	70	3364	4900	4060
57	65	3249	4225	3705
56	68	3136	4624	3808
60	70	3600	4900	4200
64	66	4096	4356	4224
69	68	4761	4624	4692
57	66	3249	4356	3762
$\sum x = 590$	$\sum y = 675$	$\sum x^2 = 34980$	$\sum y^2 = 45587$	$\sum xy = 39830$

$$\bar{x} = \frac{\sum x}{n} = \frac{590}{10} = 59 \quad \bar{y} = \frac{\sum y}{n} = \frac{675}{10} = 67.5$$

$$r = \frac{\frac{1}{n} \sum xy - \bar{x} \bar{y}}{\sqrt{\frac{1}{n} \sum x^2 - \bar{x}^2} \sqrt{\frac{1}{n} \sum y^2 - \bar{y}^2}} = \frac{\frac{1}{10} (39830) - 59(67.5)}{\sqrt{\frac{1}{10} (34980) - (59)^2} \sqrt{\frac{1}{10} (45587) - (67.5)^2}}$$

$$r = \frac{.5}{\sqrt{17} \sqrt{2.45}} = \frac{.5}{6.454} = 0.076$$

$$b_{xy} = \frac{n \sum xy - \sum x \cdot \sum y}{n \sum y^2 - (\sum y)^2} = \frac{10(39830) - (590)(675)}{10(45587) - (675)^2} = \frac{398300 - 398250}{455870 - 455625} = \frac{50}{245} = 0.204$$

$$b_{yx} = \frac{n \sum xy - \sum x \cdot \sum y}{n \sum x^2 - (\sum x)^2} = \frac{10(39830) - (590)(675)}{10(34980) - (590)^2} = \frac{398300 - 398250}{349800 - 348100} = \frac{50}{1700} = 0.029$$

The regression equation of y on x:

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$y - 67.5 = 0.029(x - 59) = 0.029x - 1.711$$

$$y = 0.029x - 1.711 + 67.5$$

$$y = 0.029x + 65.789$$

When $x = 62$

$$y = 0.029(62) + 65.789 = 1.798 + 65.789 = 67.587$$

When the marks in Statistics is 62, the marks in Mathematics=67.59

(b) Explain the different types of sampling methods.

Solution: Repeat-April-2010

MBA - DEGREE EXAMINATION - NOV – 2009 - P8MBA3
MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

- 1(a) Find the maximum and minimum value of the function $\frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.**

Solution:

Let $f(x) = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.

$$f'(x) = 2x^2 + x - 6$$

Now,

$$f'(x) = \frac{df}{dx} = (x+2)(2x-3)$$

$$f'(x) = 0$$

$$(x+2)(2x-3) = 0$$

$$x = -2, \quad \frac{3}{2}$$

$$x = \frac{3}{2} \text{ is a minimum point.}$$

Also,

$$f''(x) = \frac{d^2f}{dx^2} = 4x + 1$$

$$x = -2, \quad f''(-2) = -7 < 0$$

$x = -2$ is a maximum point.

$$f''\left(\frac{3}{2}\right) = 7 > 0$$

To find the minimum value:

$$y = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8.$$

$$\text{when } x = \frac{3}{2}, \quad y = \frac{2}{3}\left(\frac{3}{2}\right)^3 + \frac{1}{2}\left(\frac{3}{2}\right)^2 - 6\left(\frac{3}{2}\right) + 8$$

$$y = \frac{2}{3}\left(\frac{27}{8}\right) + \frac{1}{2} \times \frac{9}{4} - 9 + 8 = \frac{9}{4} + \frac{9}{8} - 1 = \frac{18+9-8}{8} = \frac{19}{8}$$

$$y = \frac{19}{8}$$

$$\text{Minimum value} = \frac{19}{8}$$

To find the maximum value:

$$y = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8.$$

$$\text{when } x = -2, y = \frac{2}{3}(-2)^3 + \frac{1}{2}(-2)^2 - 6(-2) + 8$$

$$y = \frac{2}{3}(-8) + \frac{1}{2} \times 4 + 12 + 8 = 22 - \frac{16}{3} = \frac{66-16}{3} = \frac{50}{3}$$

$$\text{Maximum value} = \frac{50}{3}$$

(OR)

1(b) If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -1 & 2 \\ 3 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 & 4 \\ 6 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}$ find $A+B$

Solution:

$$A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -1 & 2 \\ 3 & 0 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 3 & 4 \\ 6 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}, A+B = \begin{bmatrix} 0 & 5 & 1 \\ 6 & 1 & 2 \\ 5 & 1 & 7 \end{bmatrix}$$

- 2(a) A factory manufactures two articles A and B. To manufacture the article A, a certain machine has to be worked for 1.5 hours and in addition a craftsman has to work for 2 hours. To manufacture the article B, the machine has to be worked for 2.5 hours and in addition the craftsman has to work for 1.5 hours. In a week the factory can avail of 80 hours of machine time and 70 hours of craftsman's time, a week respectively. The profit on each article A is Rs.5 and that on each article B is Rs.4. If all the articles produced can be sold away, find how many of each kind should be produced to earn the maximum profit per week. Formulate the above problem as L.P. problem.

Solution:

Let x_1 = No of articles in A, x_2 = No of articles in B

To objective is to determine the least number of articles to get the maximum profit

	Machine hours	Graft's man hours	Profit (Rs)
A	1.5	2	5
B	2.5	1.5	4
Available hrs	80	70	

Mathematical formulation of problem:-

Find x_1, x_2 such that

Maximum $z = 5x_1 + 4x_2$

Subject to constraint

$$1.5x_1 + 2.5x_2 \leq 80$$

$$2x_1 + 1.5x_2 \leq 70$$

(OR)

- 2(b) A box contains 3 red and 7 white balls. One ball is drawn at random and in its place a ball of the other color is put in the box. Now one ball is drawn at random from the box. Find the probability that it is red.

Solution:

The no. of red balls=3. The no. of white balls=7, Total=10balls

$$p(A_1) = \text{probability of getting a red ball in the I draw} = \frac{3}{10} = 0.3$$

$$p(A_1) = \text{probability of getting a white ball in the I draw} = \frac{7}{10} = 0.7$$

B = the event of getting a red ball in the II draw

$$p\left(\frac{B}{A_1}\right) = \text{probability of getting a red ball in the II draw,}$$

$$\text{when the I draw gives a red ball} = \frac{2}{10} = 0.2$$

Instead of a red ball, a white ball is placed. Then red = 2, white = 8, total = 10

$$p\left(\frac{B}{A_2}\right) = \text{probability of getting a red ball in the II draw,}$$

$$\text{when the I draw gives a white ball} = \frac{4}{10} = 0.4$$

Instead of a white ball, a red ball is placed. Then red = 4, white = 6, total = 10

Now the probability of getting a red ball at random = $0.3 \times 0.2 + 0.7 \times 0.4 = 0.34$

The required probability = 0.34

- 3(a) From the information given below, calculate Karl Pearson's coefficient of skewness and also Quartile coefficient of skewness

Measure	Place A	Place B
Mean	150	140
Median	142	155
S.D	30	55
Third Quartile	195	260
First Quartile	62	80

Solution:

To find Karl Pearson's coefficient of skewness:

$$\text{Skewness} = \frac{\text{mean} - \text{mode}}{S.D}$$

Place A: In the question mode is not given but can be ascertained in the following method:

$$\text{Mode} = 3\text{median} - 2\text{mean}$$

$$= 3(142) - 2(150)$$

$$\text{Mode} = 126$$

$$\text{Skewness} = \frac{150 - 126}{30} = 0.8$$

Place B:

Mode is not given. We have to find out.

$$\text{Mode} = 3\text{median} - 2\text{mean}$$

$$= 3(155) - 2(140)$$

Mode = 185

$$\text{Skewness} = \frac{140 - 185}{55} = -0.82$$

To find Quartile coefficient of skewness:

Third Quartile = Q_3

First Quartile = Q_1

$$\text{Quartile co. efficient of skewness} = \frac{Q_3 - Q_1 - 2\text{Median}}{Q_3 - Q_1}$$

Place A:

$$\text{Quartile co. efficient of skewness} = \frac{195 + 62 - 2(142)}{195 - 62} = -0.203$$

Place B:

$$\text{Quartile co. efficient of skewness} = \frac{260 + 80 - 2(155)}{260 - 80} = 0.1666$$

(OR)

- 3(b) Assuming that half of the population is vegetarian, so that the chance of an individual being a vegetarian is $\frac{1}{2}$ and assuming that 10 investigators can take the sample of 10 individuals to see whether they are vegetarians, how many investigators would you expect to report that three people or less were vegetarians?**

Solution:

Let p denotes the probability of an individual being a vegetarian and n denotes the no. of individuals.

N denotes the no. of investigators. Then,

$$p = \frac{1}{2}, q = 1 - p = \frac{1}{2}$$

$$n = 10, N = 100$$

No. of investigators getting three or less vegetarians (i.e.) 0,1,2,3 vegetarians

$$= 100 \left(\frac{1}{2} \right)^{10} + 100 \times 10c_1 \left(\frac{1}{2} \right)^1 \left(\frac{1}{2} \right)^9 + 100 \times 10c_2 \left(\frac{1}{2} \right)^2 \left(\frac{1}{2} \right)^8 + 100 \times 10c_3 \left(\frac{1}{2} \right)^3 \left(\frac{1}{2} \right)^7$$

$$= 100 \left(\frac{1}{2} \right)^{10} + 100 \times 10 \left(\frac{1}{2} \right)^{10} + 100 \times 45 \left(\frac{1}{2} \right)^{10} + 100 \times 120 \left(\frac{1}{2} \right)^{10}$$

$$= 100 \left(\frac{1}{2} \right)^{10} (1 + 10 + 45 + 120)$$

$$= 100 \times \frac{1}{1024} (176)$$

$$= 17(\text{approximately})$$

No. of investigators getting three or less vegetarians = 17(approximately)

- 4(a) what is a sample survey? What point should be kept in mind in the selection of a sample?**

Solution:

Sample survey:

Sample survey is a method of collecting data about the population.

Every government requires specific data and information about the population to make programs and policies that match the needs and requirements of the population.

Then a small group that is representative of the entire population is used. A representative sample, measures a small number of people who fit a particular category of people

However accurately a sample from a population may be generated, there will always be margin for error, whereas in case of Census, entire population is taken into account and as such it is most accurate.

Sampling is quick and inexpensive. If the next Census is far away, then sampling is the most

Convenient method of collecting data

How are samples selected?

1. A sample must be robust in its design and large enough to provide a reliable representation of the whole population.
2. Aspects to be considered when designing a sample include, the level of accuracy required, cost, and the timing. Sampling can be random or non-random.
3. In a random sample each unit in the population has a chance of being selected, and probability can be accurately determined.

(OR)

4(b) Define Hypothesis. What are the characteristic of a good Hypothesis?

Definition:

Hypothesis is an assumption which may or may not be true about a population parameter

Characteristics of a good hypothesis

- It should have elucidating power.
- It should strive to furnish an acceptable explanation of the phenomenon.
- It must be verifiable.
- It must be formulated in simple, understandable terms
- It should correspond with existing knowledge.
- IT should be clearly and concisely stated.
- Simple to understand.
- Portray a relationship with the problem being investigated.
- Limited in the scope and consistent with the problem being studied.

5(a) Calculate Karl Pearson's coefficient of correlation between age and playing habits from the data given below:

Age(x):	20	21	22	23	24	25
No. of players(y):	500	400	300	240	200	160

Regular players: 400 300 180 96 60 24

Solution:

Let $x = X$ denote age and Y denote playing habits. Here X is directly given. But Y is not given directly.

So we have to calculate the value of Y by using the formula:

$$Y = \frac{\text{regular players} \times 100}{\text{number of players}}$$

For example, for the age, $X = 20$ the corresponding playing habit,

$$Y = \frac{400 \times 100}{500} = 80 \quad \text{Similarly, the other values can be calculated.}$$

$$, \bar{X} = \frac{\sum X}{n} = \frac{135}{6} = 22.5, \quad \bar{Y} = \frac{\sum Y}{n} = \frac{300}{6} = 50$$

Age(X): 20 21 22 23 24 25

Playing habits (Y) : 80 75 60 40 30 15

Age X	$X - \bar{X} = X_d$	X_d^2	No.of. Students (y)	No. of regular players	Playing Habits (Y)	$Y - \bar{Y} = Y_d$	Y_d^2	$X_d Y_d$
20	-2.5	6.25	500	400	80	30	900	-75
21	-1.5	2.25	400	300	75	25	625	37.5
22	-0.5	0.25	300	180	60	10	100	-5
23	0.5	0.25	240	96	40	-10	100	-5
24	1.5	2.25	200	60	30	-20	400	-30
25	2.5	6.25	160	24	15	-35	1225	-87.5
135		17.5			300		3350	-240

$$\sum X = 135, \sum X_d^2 = 17.5, \sum Y = 300, \sum Y_d^2 = 3350, \sum X_d Y_d = -240$$

$$r = \frac{\sum X_d Y_d}{\sqrt{\sum X_d^2 \sum Y_d^2}} = \frac{-240}{\sqrt{17.5 \times 3350}} = -0.99$$

$$r = -0.99$$

Here we have inverse correlation between age and playing hobbies. When the age increases the

tendency to play decreases.

(OR)

5(b) Explain the difference between Correlation and Regression.

Solution:

Differences

	Correlation	Regression
1	Correlation is the relationship between 2 or more variance which vary in sympathy with the order in the same or the opposite direction.	Regression means going back and it is mathematical measure showing the average relationship between 2 variable.
2	It finds out the degree of relationship between 2 variables and not the cause and effect of the variable.	It indicates the cause and effect relationship between the variables and establisher a functional relationship.
3	It is used for testing and verifying the relation between 2 variables and gives limited information.	Besides Verification, it is used for the prediction of one value, in relationship to the other given value.
4	It has limited application because it is confined only to linear relationship between the variable.	It has wider application as it studies linear and non-linear relationship between the variable.
5	It is not very useful for further mathematical treatment.	It is widely used for further mathematical treatment.

SECTION-B-(5X10=50)

6(a) Solve the equations by using Cramer's rule:

$$2x - 3y + 4z = 5$$

$$x + 2y - 3z = 8$$

$$x - y - z = 1$$

Solution: Writing the system of equations in Matrix form as

(i.e.) $AX = B$, where

$$\begin{pmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{pmatrix}, X = \begin{pmatrix} x \\ y \\ z \end{pmatrix}, B = \begin{pmatrix} 5 \\ 8 \\ 1 \end{pmatrix}$$

To find A:

$$A = \begin{pmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{pmatrix}, |A| = D = \begin{vmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 2(-2-3) + 3(-1+3) + 4(-1-2)$$

$$D = -14 \neq 0$$

To find D_1, D_2, D_3 :

$$D_1 = \begin{vmatrix} 5 & -3 & 4 \\ 8 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 5(-2-3)+3(-8+3)+4(-8-2) = -80; D_1 = -80$$

$$D_2 = \begin{vmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 2(-8+3)+5(-1+3)+4(1-8) = -48; D_2 = -48$$

$$D_3 = \begin{vmatrix} 2 & -3 & 5 \\ 1 & 2 & 8 \\ 1 & -1 & 1 \end{vmatrix} = 2(2+8)+3(1-8)+5(-1-2) = -16; D_3 = -16$$

Applying Cramer's rule

$$x = \frac{D_1}{D} = \frac{-80}{-16} = 5, y = \frac{D_2}{D} = \frac{-48}{-16} = 3, z = \frac{D_3}{D} = \frac{-16}{-16} = 1$$

The solution is given by

$$x = 5, y = 3, z = 1$$

(OR)

6(b) Given $A = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix}, C = \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix},$

Show that

$$(i) A(B+C) = AB + AC$$

$$(ii) (A+B)C = AC + BC$$

Solution:

(i) To prove (i) $A(B+C) = AB + AC$

$$\begin{aligned} A(B+C) &= \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 5 & -5 & 4 \\ 11 & 8 & -5 \\ 7 & -13 & 11 \end{bmatrix} \\ &= \begin{bmatrix} 40+11-14 & -40+8+26 & 32-5-22 \\ -45+99+63 & 45+72-117 & -36-45+99 \\ 30-33+63 & -30-24-117 & 24+15+99 \end{bmatrix} \\ A(B+C) &= \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix} \\ AB &= \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix} \end{aligned}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix} + \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix}$$

(i) To prove (ii) $(A+B)C = AC + BC$

$$A + B = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} + \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix}$$

$$(A+B)C = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 6 & -60 & 36 \end{bmatrix}$$

$$BC = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} -8 & -19 & 12 \\ 56 & 13 & -13 \\ -26 & -71 & 40 \end{bmatrix}$$

$$AC + BC = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

Hence (ii) $(A+B)C = AC + BC$

7(a) Solve the following LPP by Graphical method:

$$\text{Max } z = 3x_1 + 2x_2$$

subject to

$$-2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

Solution:

Consider, $-2x_1 + x_2 \leq 1$

Now, Consider $-2x_1 + x_2 = 1$ (1)

Put, $x_1 = 0 \Rightarrow x_2 = 1$,

The pt is (0,1)

Put, $x_2 = 0 \Rightarrow x_1 = -\frac{1}{2}$,

The pt is $(-\frac{1}{2}, 0)$

Consider, $x_1 \leq 2$

Now, Consider, $x_1 = 2$ (2)

It is a line parallel to the x_2 axis

Consider $x_1 + x_2 \leq 3$

Consider $x_1 + x_2 = 3$ (3)

Put $x_1 = 0 \Rightarrow x_2 = 3$,

The pt is (0,3)

Put, $x_2 = 0 \Rightarrow x_1 = 3$, The pt is (3,0)

Feasible region is OABCD

To find B:

Consider (1) and (3)

$$-2x_1 + x_2 = 1 \quad (1)$$

$$x_1 + x_2 = 3 \quad (3)$$

$$(1) - (3) \Rightarrow -3x_1 = -2$$

$$x_1 = \frac{2}{3}, \text{ then } x_2 = \frac{7}{3}$$

We get the point B is $\left(\frac{2}{3}, \frac{7}{3}\right)$

To find C:

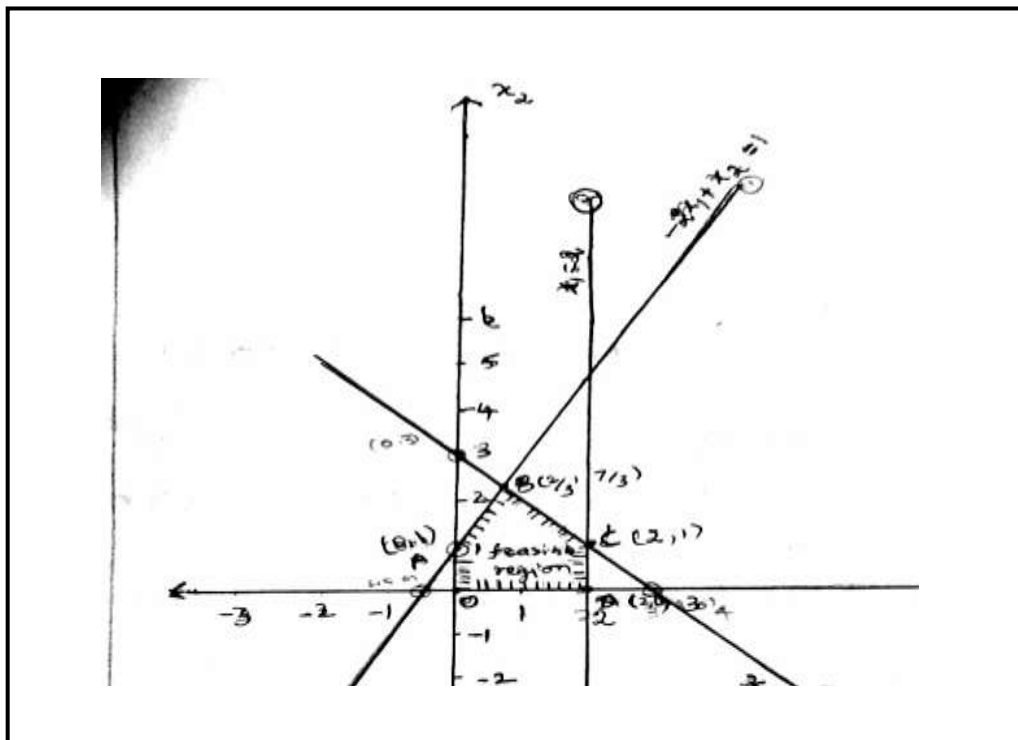
$$x_1 = 2$$

$$x_1 + x_2 = 3$$

$$\text{substituting, } x_2 = 1$$

We get the point C is 2, 1

To find the maximum point:-



$$\text{Max } z = 3x_1 + 2x_2$$

$$O(0,0) \Rightarrow z = 0$$

$$A(0,1) \Rightarrow z = 3(0) + 2(1) = 2$$

$$B\left(\frac{2}{3}, \frac{7}{3}\right) \Rightarrow z = 3\left(\frac{2}{3}\right) + 2\left(\frac{7}{3}\right) = 6.07$$

$$C(2,1) \Rightarrow z = 3(2) + 2(1) = 8$$

$$D(2,0) \Rightarrow z = 3(2) + 2(0) = 6$$

The solution is

$$\text{Max } z = 8 \text{ at } x_1 = 2, x_2 = 1$$

(OR)

- 7(b) Assume that a factory has two machines. Past records show that machine 1 produces 30% of the items of output and machine 2 produces 70% of the items. Further, 5% of the items produced by machine 1 were defective and only 1% of the items produced by machine 2 were defective. If the defective items are drawn at random, what is the probability that the defective item was produced by machine 2?

Solution:

A_1 : event of selecting an item produced by machine 1

A_2 : event of selecting an item produced by machine 2

$$p(A_1) = \frac{30}{100} = 0.3, p(A_2) = \frac{70}{100} = 0.7$$

B = the event of selecting a defective item either from machine 1 or machine 2

$p(\frac{B}{A_1})$ = probability of the event of selecting a defective item from machine 1

$$\text{and it is a defective one} = \frac{5}{100} = 0.05$$

$p(\frac{B}{A_2})$ = probability of the event of selecting a defective item from machine 2

$$\text{and it is a defective one} = \frac{1}{100} = 0.01$$

Event (1)	Prior probability (1)	Conditional Probability (1)	Joint Probability (1)	Revised probability (1)
A_1	0.3	0.05	0.015	$0.015/0.022=0.682$
A_2	0.7	0.01	0.007	$0.007/0.002=0.318$
			0.022	1

Probability of selecting an item produced by machine 1 or 2 = 0.022

8(a) The number of workers employed, the mean wages (in Rs.) per month and standard Deviation (in Rs.) in each section of a factory are given below. Calculate the mean wages and standard deviation of all the workers taken together

Section	No. of workers(n)	Mean wages($\bar{x}$)	S.D(σ)
A	50	1113	60
B	60	1120	70
C	90	1115	80

Solution:

Combined mean:

$$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2 + n_3\bar{x}_3}{n_1 + n_2 + n_3} = \frac{50 \times 1113 + 60 \times 1120 + 90 \times 1115}{50 + 60 + 90} = \frac{223200}{200} = 1116$$

Combined S.D:

$$\sigma^2 = \frac{1}{n_1 + n_2 + n_3} [n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2) + n_3(\sigma_3^2 + d_3^2)] \quad (1)$$

$$d_1 = \bar{x}_1 - \bar{x} = 1113 - 1116 = -3$$

$$d_2 = \bar{x}_2 - \bar{x} = 1120 - 1116 = 4$$

$$d_3 = \bar{x}_3 - \bar{x} = 1115 - 1116 = -1$$

Substituting in (1), we have

$$\sigma^2 = \frac{1}{50 + 60 + 90} [50(3600 + 9) + 60(4900 + 16) + 90(6400 + 1)]$$

$$\sigma^2 = \frac{1}{200} [180450 + 294960 + 576090] = \frac{1}{200} [1051500] = 5257.5$$

$$\sigma = 72.5 = 73$$

(OR)

- 8(b) In a certain examination the percentage of passes and distinction were 46 and 9 respectively. Estimate the average marks obtained by the candidates. The minimum pass and distinction marks being 40 and 75 respectively (Assume the distribution of marks to be normal) Also, determine what would have been the minimum qualifying marks for admission to a reexamination of the failed candidates, has it been desired that the best 25% of them should be given another opportunity to be examined? Also, determine what would have been the minimum

Solution:

Let $\bar{X}$ – Mean, σ – Standard Deviation of the normal distribution

The percentage of passes = 46

The percentage of distinction = 9

The percentage of failures = 45

The area of the right of the ordinate at $X = 40$ is 0.46

Hence the area between mean and $X = 40$ is 0.04

From the tables corresponding to 0.04, standard normal variate is 0.1

i) Let

$$z_1 = 0.1 = \frac{40 - \bar{X}}{\sigma} \Rightarrow 40 - \bar{X} = 0.1\sigma$$

$$z_2 = 0.1 = \frac{75 - \bar{X}}{\sigma} = 1.34 \Rightarrow 75 - \bar{X} = 1.34\sigma$$

subtracting, $(0.1 - 1.34) \sigma = -35$

$$\sigma = \frac{35}{1.24} = 28.23$$

substituting σ , we have

$$40 - \bar{X} = 0.1(28.23), \quad \bar{X} = 40 - 2.823 = 37.18 \text{ (or) } 37.2$$

The average obtained by the candidate = 37.2

(ii) Let us assume that X_1 is the minimum qualifying marks

for re-examination of the failed candidates

The area of the right of the ordinate at $X = 40$ is 0.46

The percentage of student's failing = 54

This is the area to the left of the ordinate at $X = 40$

We want that the best 25% of failed candidates should be given a chance to reappear

Suppose, this area is equal to the shaded area in the diagram

This area is 25% of 54 = $\frac{25}{100} \times 54 = 13.5\% = 0.135$

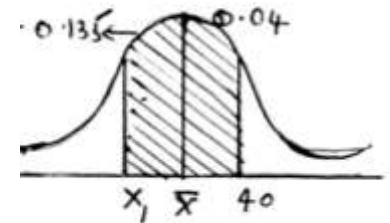
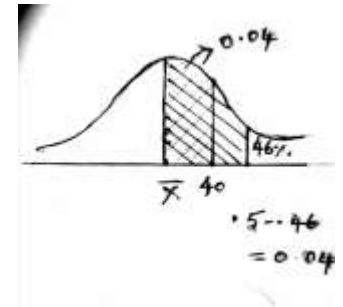
Area between mean and ordinate $X_1 = -(0.135 - 0.04) = -0.095$

Corresponding to this area standard normal variate from the table is equal to -0.0378

$$\frac{X_1 - \bar{X}}{\sigma} = -0.0378$$

$$X_1 = \bar{X} - \sigma(0.0378) = 37.2 - (0.0378 \times 28.23)$$

$$X_1 = 36.133 \text{ (or) } 36 \text{ (nearly)}$$



9(a) Explain the methods of sampling in detail.

Types of Sampling

We may consider different types of probability samples.

Different methods can be used. They generally can be grouped into one of two categories:

1. Probability samples
2. Non-probability samples.

Probability Samples:

The idea behind this type is random selection.

Each sample from the population of interest has a known probability of selection under a given sampling scheme.

There are four categories of probability samples described below.

1. Simple Random Sampling
2. Stratified Random Sampling
3. Systematic Sampling
4. Cluster Sampling

Simple Random Sampling

Simple random sampling refers to any sampling method that has the following properties.

- The population consists of N objects.
- The sample consists of n objects.
- If all possible samples of n objects are equally likely to occur, the sampling method is called simple random sampling.
- This is characterized by the fact that the probability of selection is the same for every case in the population.

There are many ways to obtain a simple random sample.

1. Lottery method:

- Each of the N population members is assigned a unique number.
- The numbers are placed in a bowl and thoroughly mixed.
- Then, a blind-folded researcher selects n numbers.
- Population members having the selected numbers are included in the sample.

2. Use of an unbiased die or coin:

- Suppose we have to choose between two alternatives.
- We can toss a coin and if head is obtained, one course of action should be followed and if tail is obtained, the alternative should be chosen.
- Similarly a die can be employed if there are six different alternatives

3. Use of Random number

- Random numbers are formed of random digits and arranged in the form of a table having a number of rows and columns.
- These tables are useful to select random samples.
- Samples obtained from such tables have been subjected to tests and their randomness is found to be highly probable
- To recap, though, that simple random sampling is a sampling procedure in which every element of the population has the same chance of being selected and every element in the sample is selected by chance.

2. Stratified Random Sampling:

- In this form of sampling, the population is first divided into two or more mutually exclusive segments based on some categories of variables of interest in the research.
- It is designed to organize the population into homogenous subsets before sampling, then drawing a random sample within each subset.
- With stratified random sampling the population of N units is divided into subpopulations of $N_1, N_2, \dots, N_L$ units respectively. These subpopulations, called *strata*, are non-overlapping and together they comprise the whole of the population
- When these have been determined, a sample is drawn from each, with a separate draw for each of the different strata.
- The sample sizes within the strata are denoted by respectively.
- If a SRS is taken within each stratum, then the whole sampling procedure is described as stratified random sampling.

3. Systematic random sampling.

- With systematic random sampling, we create a list of every member of the population.
- From the list, we randomly select the first sample element from the first k elements on the population list. Thereafter, we select every k th element on the list.

- This method is different from simple random sampling since every possible sample of n elements is not equally likely.

Creating such a sample includes three steps:

1. Divide number of cases in the population by the desired sample size. In this example, dividing 10,000 by 1,000 gives a value of 10.
2. Select a random number between one and the value attained in Step 1. In this example, we choose a number between 1 and 10 - say we pick 7.
3. Starting with case number chosen in Step 2, take every tenth record (7, 17, 27, etc.).

More generally, suppose that the N units in the population are ranked 1 to N in some order (e.g., alphabetic). To select a sample of n units, we take a unit at random, from the 1st k units and take every k -th unit thereafter.

Cluster sampling.

- With cluster sampling, every member of the population is assigned to one, and only one, group.
- Each group is called a cluster.
- A sample of clusters is chosen, using a probability method (often simple random sampling). Only individuals within sampled clusters are surveyed.
- Note the difference between cluster sampling and stratified sampling.
- With stratified sampling, the sample includes elements from each

Important things about cluster sampling:

1. Most large scale surveys are done using cluster sampling;
2. Clustering may be combined with stratification, typically by clustering within strata;
3. In general, for a given sample size n cluster samples are less accurate than the other types of sampling in the sense that the parameters you estimate will have greater variability than an SRS, stratified random or systematic sample.

Multistage sampling.

- Here the sampling procedure is carried out in several stages. The population is first divided into large groups known as first stage units, which again are divided into smaller groups, called second stage units.
- These second stage units are divided into third stage units and so on until the final stage units are reached
- With multistage sampling, we select a sample by using combinations of different sampling methods
- In Stage 1, we might use cluster sampling to choose clusters from a population. Then, in Stage 2, we might use simple random sampling to select a subset of elements from each chosen cluster for the final sample.

Non-probability Samples:

Some of the non-probability samples are:

1. Deliberate, purposive or judgments sampling
2. Quota sampling
3. Block or cluster sampling
4. Convenience sampling
5. Snowball sampling

1. Quota sampling:

With proportional quota sampling, the aim is to end up with a sample where the strata (groups) being studied (e.g., males vs. females students) are proportional to the population being studied. Quota sampling has some similarities to judgment sampling, in that the researcher decides on the quota that “best represents the population.”

Example:

If we were to examine the differences in male and female students, for example, the number of students from each group that we would include in the sample would be based on the proportion of male and female students amongst the 10,000 university students.

2. Convenience sampling:

Convenience samples are the most well-known type of non-probability sampling. Convenience sampling is simply sampling those around you, or those that you know you can reach. Polling a group of people that happen to be in a room would be a form of convenience sampling.

A convenience sample is simply one where the units that are selected for inclusion in the sample are the easiest to access.

Example:

Out of the 10,000 university students, if we were only interested in achieving a sample size of say 100 students, we may simply stand at one of the main entrances to campus, where it would be easy to invite the many students that pass by to take part in the research..

3. Purposive sampling

Purposive sampling, also known as judgmental, selective or subjective sampling, reflects a group of sampling techniques that rely on the judgement of the researcher, when it comes to selecting the units (e.g., people, cases/organisations, events, pieces of data) that are to be studied.

These purposive sampling techniques include maximum variation sampling, homogeneous sampling, typical case sampling, extreme (or deviant) case sampling, total population sampling and expert sampling.

Each of these purposive sampling techniques has a specific goal, focusing on certain types of units, all for different reasons.

The different purposive sampling techniques can either be used on their own or in combination with other purposive sampling techniques.

4. Self-selection sampling

Self-selection sampling is appropriate when we want to allow units or cases, whether individuals or organisations, to choose to take part in research on their own accord. The key component is that research subjects (or organisations) volunteer to take part in the research rather than being approached by the researcher directly.

5. Snowball sampling

Snowball sampling is particularly appropriate when the population you are interested in is hidden and/or hard-to-reach. These include populations such as drug addicts, homeless people, individuals with AIDS/HIV and so forth.

(OR)

9(b) The following table gives the yields of 15 sample plots under three varieties of seeds

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	32

You have to find out if the average yield of land under different variances shows significant differences.

Solutions:

Let us take the hypothesis that the average yield of land under different varieties of seed does not differ significantly.

Applying F-test,

$$\bar{X} = \frac{100}{5} + \frac{95}{5} + \frac{135}{5} = \frac{20+19+27}{3} + \frac{66}{3} = 22$$

Variance between Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
4	9	25
4	9	25
4	9	25
4	9	25
4	9	25
20	45	125

Sum of squares between Samples = 20+45+125 = 190

Variance within Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
0	1	4
1	1	1
4	4	25
16	16	1

0	36	25
26	58	56

Sum of squares within Samples = 26+58+56 = 140

Analysis of variances Table

Source of Variation	Sum of squares	Degree of freedom	Mean square
Between Samples	190	2	95
Within Samples	140	12	11.67
Total	330	14	

$$F = \frac{95}{11.67} = 8.14$$

For $V_1 = 2$, $V_2 = 12$, $F_{0.05} = 3.88$

$$8.14 > 3.88$$

The calculated value > tabulated value

Hence the hypothesis is rejected

The average yield of land under different varieties of seed differ significantly

10(a) Obtain regression equation of Y on X and estimate Y when X = 55 from the following:

X	40	50	38	60	65	50	35
Y	38	60	55	70	60	48	30

Solution:

$$\bar{X} = \frac{\sum X}{n} = \frac{338}{7} = 48.3 \text{ and } \bar{Y} = \frac{\sum Y}{n} = \frac{361}{7} = 51.6$$

X	$X - \bar{X} = x$	x^2	Y	$Y - \bar{Y} = y$	y^2	xy
40	-8.3	68.89	38	-13.6	184.96	112.88
50	1.7	2.89	60	8.4	70.56	14.28
38	-10.3	106.09	55	3.4	11.56	-35.02
60	11.7	136.89	70	18.4	338.56	215.28
65	16.7	278.89	60	8.4	70.56	140.28
50	1.7	2.89	48	-3.6	12.96	-6.12
35	13.3	176.89	30	-21.6	466.56	287.28
338		773.43	361			728.86

$$\sum xy = 728.86, \sum x^2 = 773.43$$

Regression equation of y on x

$$Y - \bar{Y} = r \frac{\sigma_x}{\sigma_y} (X - \bar{X}); \sum xy = 728.86, \sum x^2 = 773.43$$

$$Y - 51.6 = \frac{\sum XY}{\sum x^2} (X - \bar{X}); Y - 51.6 = \frac{728.86}{773.43} (X - 48.3)$$

$$Y - 51.6 = 0.942(X - 48.3)$$

$$Y = 0.942X - 45.4986 + 51.6$$

$$Y = 0.942X + 6.10$$

$$\text{When } X = 55, Y = 0.942(55) + 6.10 = 57.91$$

(OR)

10(b) Obtain the rank correlation coefficient between the variables x and y from the following pairs of observed values:

x	50	55	65	50	55	60	50	65	70	75
y	110	110	115	125	140	115	130	120	115	160

Solution:

First we have to assign ranks to the variables

X	Rank (X)	Y	Rank(Y)	D=X-Y	D²
50	9	110	9.5	-0.5	0.25
55	6.5	110	9.5	-3	9
65	3.5	115	7	-3.5	12.25
50	9	125	4	5	25
55	6.5	140	2	4.5	20.25
60	5	115	7	-2	4
50	9	130	3	6	36
65	3.5	120	5	-1.5	2.25
70	2	115	7	-5	25
75	1	160	1	0	0
					134

Here 50 is repeated 3 time in X and hence m = 3.

Also 65, 55 are repeated 2 times in X and hence m = 2.

Also 115 are repeated 3 time in Y and hence m = 3. Also 110 repeated 2 time in Y and hence m=2.

The formula for rank correlation is given by

$$\rho = 1 - 6 \frac{\sum D^2 + \frac{1}{12}(m^3 - m) + \frac{1}{12}(m^3 - m) + \dots}{N^3 - N}$$

where m = the number of items whose ranks are common

$$\rho = 1 - 6 \frac{[\sum 134 + \frac{1}{12}(2^3 - 2) + \frac{1}{12}(2^3 - 2) + \frac{1}{12}(3^3 - 3) + \frac{1}{12}(3^3 - 3) + \frac{1}{12}(2^3 - 2)]}{10^3 - 10}$$

$$\rho = 1 - 6 \frac{[134 + 0.5 + 0.5 + 2 + 2 + 0.5]}{10^3 - 10} = 1 - 0.845 = 0.1545$$

MBA - DEGREE EXAMINATION - NOV – 2010 - P8MBA3
MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

1(a) Find w, x, y, z if
$$\begin{bmatrix} -4 & w & 8 & 0 \\ 3 & 4 & x & 6 \end{bmatrix} = \begin{bmatrix} -4 & 6 & y & 0 \\ 3 & 4 & 2 & z \end{bmatrix}$$

Solution: Given

$$\begin{bmatrix} -4 & w & 8 & 0 \\ 3 & 4 & x & 6 \end{bmatrix} = \begin{bmatrix} -4 & 6 & y & 0 \\ 3 & 4 & 2 & z \end{bmatrix}$$

Comparing the corresponding elements, we have

$$w=6, y=8$$

$$x=2, z=6$$

(OR)

1(b) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} -7 & 2 & 8 \\ 3 & 4 & 5 \end{bmatrix}$ then find $A+B$

Solution:

$$A+B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} + \begin{bmatrix} -7 & 2 & 8 \\ 3 & 4 & 5 \end{bmatrix} = \begin{bmatrix} -6 & 4 & 11 \\ 7 & 9 & 11 \end{bmatrix}$$

2(a) What is Conditional probability? Explain with the help of examples.

Solution:

Definition:

The **conditional probability:**

If the two events A and B are dependent events, then the **conditional probability** of event B is the probability of B, when the event A has already occurred. This probability is written as

$P(B|A)$, (notation for the probability of B given A) and is given by

$$p(A|B) = \frac{p(A \cap B)}{p(B)}, \quad p(B|A) = \frac{p(A \cap B)}{p(A)}$$

Example:

In a card game, suppose a player needs to draw two cards of the same suit in order to win.

Of the 52 cards, there are 13 cards in each suit. Suppose first the player draws a heart. Now the player wishes to draw a second heart. Since one heart has already been chosen, there are now 12 hearts remaining in a deck of 51 cards. So the conditional probability $P(\text{second heart} | \text{First card a heart}) = 12/51$.

(OR)

2(b) Explain with an illustration the Baye's theorem of probability

Solution:

Baye's theorem:

Statement:

If $E_1, E_2, E_3, \dots, E_n$ are mutually disjoint events with $p(E_i) \neq 0, i = 1, 2, 3, \dots, n$, then for any arbitrary event $A \subseteq \bigcup_{i=1}^n E_i$, such that $p(A) > 0$, we have

$$p(E_i | A) = \frac{p(E_i)p(A | E_i)}{\sum_{i=1}^n p(E_i)p(A | E_i)}, \quad i=1, 2, 3, \dots, n$$

Proof: Since,

$$A \subseteq \bigcup_{i=1}^n E_i, \text{ We have}$$

$$A = A \cap \left(\bigcup_{i=1}^n E_i \right) = \bigcup_{i=1}^n (A \cap E_i)$$

$$p(A) = p\left[\bigcup_{i=1}^n (A \cap E_i) \right]$$

$$p(A) = \sum_{i=1}^n p(E_i \cap A) \quad (1)$$

$$\text{By definition, } p(A | E_i) = \frac{p(E_i \cap A)}{p(E_i)}$$

Then we have,

$$p(E_i \cap A) = p(E_i)p(A | E_i), \quad i=1, 2, \dots, n \quad (2)$$

Using (2) in (1)

$$p(A) = \sum_{i=1}^n [p(E_i)p(A | E_i)] \quad (3)$$

By definition

$$p(E_i | A) = \frac{p(E_i \cap A)}{p(A)}; \quad p(A) > 0, i = 1, 2, \dots, n \quad (4)$$

Using (2) and (3) in (4)

$$p(E_i | A) = \frac{p(E_i)p(A | E_i)}{\sum_{i=1}^n p(E_i)p(A | E_i)}, \quad i=1, 2, 3, \dots, n$$

Hence the theorem is proved

Illustration:

Assume that you are presented with three coins, two of them fair and the other a biased, which always lands heads. Let us randomly pick one of the three coins. The probability that it's the biased = $\frac{1}{3}$. This is the prior probability of the hypothesis

that the coin is biased. Now after picking the coin, we flip it three times and observe that it lands heads each time. Seeing this new evidence that our chosen coin has landed heads three times in a row, we want to know the revised posterior probability that it is the biased. The answer to this question, found using Baye's

theorem = $\frac{4}{5}$

Calculation:

$$p(\text{biased coin}) = \frac{1}{3}, p(\text{Fair coin}) = \frac{2}{3} \quad p(H | \text{Fair coin}) = \frac{1}{2}$$

$$p(HHH | \text{biased coin}) = 1 \times 1 \times 1 = 1,$$

$$p(HHH | \text{Fair coin}) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$$

$$p(\text{biased coin} | HHH)$$

$$= \frac{p(HHH | \text{biased coin})}{p(HHH | \text{biased coin}) \cdot p(\text{biased coin}) + p(HHH | \text{Fair coin}) \cdot p(\text{Fair coin})}$$

$$= \frac{1 \times \frac{1}{3}}{1 \times \frac{1}{3} + \frac{1}{8} \times \frac{2}{3}} = \frac{4}{5}$$

3(a) The following are the monthly salaries in rupees of 20 employees of a firm:

130 62 145 118 125 76 151 142 110 98
65 116 100 103 71 85 80 122 132 95

The firm gives bonus of Rs.10, 15, 20, 25 and 30 for individuals in the respective salary groups exceeding Rs.60 but not exceeding Rs.80, exceeding Rs.80 but not exceeding Rs.100 and 80 on up to Rs.140 but not exceeding Rs.160. Find the average bonus paid per employee.

Solution:

We have to convert the data into grouped frequency distribution with the help of tally-sheet to decide the amount of bonus

Salary	tally	F	x	fx
60-80	1111	5	10	50
81-100	1111	4	15	60
101-120	1111	4	20	80
121-140	1111	4	25	100
141-160	1111	3	30	90
		$\sum f = 20$		$\sum fx = 380$

$$\text{Average bonus paid per employee} = \frac{\sum fx}{\sum f} = 19 \quad \text{Hence, Average bonus} = \text{Rs.19}$$

(OR)

3(b) Calculate the semi-inter-quartile range and quartile coefficient from the following:

Age in years: 20 30 40 50 60 70 80
No. of members 3 61 132 153 140 51 3

Solution:

Age in year	No. of members	c.f
20	3	3
30	61	64
40	132	192
50	153	349

60	140	489
70	51	540
80	3	543

$$N = \sum f = 543$$

$$\text{I-quartile: } Q_1 = \frac{N+1}{4} = 136 \quad Q_1 = 40$$

[Q The cumulative frequency just greater than $\frac{N+1}{4}$ is 196 which corresponds to 40]

$$\text{III- quartile: } Q_3 = \frac{3(N+1)}{4} = 3(136) = 408 \quad Q_3 = 60$$

[Q The cumulative frequency just greater than $\frac{3(N+1)}{4}$ is 408 which corresponds to 60]

$$(i) \text{ Semi inter quartile range } Q_3 - Q_1 = 20$$

$$(ii) \text{ Quartile coefficient } \frac{Q_3 - Q_1}{Q_3 + Q_1} = \frac{60 - 40}{60 + 40} = 0.2$$

4 (a) Explain the terms: Random sampling, Stratified Random sampling, Purposive sampling.

Solution:

I. Simple Random Sampling

Simple random sampling refers to any sampling method that has the following properties.

- The population consists of N objects.
- The sample consists of n objects.
- If all possible samples of n objects are equally likely to occur, the sampling method is called simple random sampling.
- This is characterized by the fact that the probability of selection is the same for every case in the population.

There are many ways to obtain a simple random sample

- 1. Lottery method**
- 2. Use of an unbiased coin**
- 3. Use of random numbers**

1. Lottery method:

- Each of the N population members is assigned a unique number.
- The numbers are placed in a bowl and thoroughly mixed.
- Then, a blind-folded researcher selects n numbers.
- Population members having the selected numbers are included in the sample.

2. Use of an unbiased die or coin:

- Suppose we have to choose between two alternatives. We can toss a coin and if head is obtained, one course of action should be followed and if tail is obtained, the alternative should be chosen. Similarly a die can be employed if there are six different alternatives

3. Use of Random numbers

Random numbers are formed of random digits and arranged in the form of a table having a number of rows and columns. These tables are useful to select random samples.

Samples obtained from such tables have been subjected to tests and their randomness is found to be highly probable

II. Stratified Random sampling:

- In this form of sampling, the population is first divided into two or more mutually exclusive segments based on some categories of variables of interest in the research.
- It is designed to organize the population into homogenous subsets before sampling, then drawing a random sample within each subset.
- With stratified random sampling the population of N units is divided into subpopulations of $N_1, N_2, \dots, N_L$ units respectively. These subpopulations, called *strata*, are non-overlapping and together they comprise the whole of the population
- When these have been determined, a sample is drawn from each, with a separate draw for each of the different strata.
- The sample sizes within the strata are denoted by respectively.
- If a SRS is taken within each stratum, then the whole sampling procedure is described as stratified random sampling.

III. Purposive sampling:

- Purposive sampling, also known as **judgmental, selective** or **subjective sampling**, reflects a group of sampling techniques that rely on the **judgement** of the researcher, when it comes to selecting the units (e.g., people, cases/organisations, events, pieces of data) that are to be studied.
- These purposive sampling techniques include **maximum variation sampling**, homogeneous sampling, **and typical case sampling; extreme (or deviant) case sampling, total population sampling** and **expert sampling**.
- Each of these purposive sampling techniques has a specific goal, focusing on certain types of units, all for different reasons.
- The different purposive sampling techniques can either be used on their own or in combination with other purposive sampling techniques

(OR)

- 4 (b) In 600 throws of a six faced dice, odd points appeared 360 times. Would you say that the dice is fair at 5% level of significance?

Solution:

Let us take the hypothesis that the dice is fair.

In a fair dice we would expect 300 odd point in 600 throws.

$$S.E = \sqrt{npq}$$

$$n = 600, p = \frac{1}{2}, q = \frac{1}{2}, p+q=1, t = 360$$

$$S.E = \sqrt{600 \times \frac{1}{2} \times \frac{1}{2}} = \sqrt{150} = 12.247$$

$$S.E = 12.247$$

$$Z = \frac{\text{difference}}{S.E} = \frac{360 - 300}{12.247} = 4.89$$

$$Z = 4.89$$

Since the difference is more than 1.96 (tabulated value) at 5% level of significance, the hypothesis is rejected. Hence we cannot say that the dice is fair at 5% level of significance.

5(a) Calculate the coefficient of correlation from the following data

x:	12	9	8	10	11	13	7
y:	14	8	6	9	11	12	3

Solution:

x	y	x^2	y^2	xy
12	14	144	196	168
9	8	81	64	72
8	6	64	36	48
10	9	100	81	90
11	11	121	121	121
13	12	169	144	156
7	3	49	9	21
$\sum x = 70$	$\sum y = 63$	$\sum x^2 = 728$	$\sum y^2 = 651$	$\sum xy = 676$

$$\bar{x} = \frac{\sum x}{n} = 10, \bar{y} = \frac{\sum y}{n} = 9$$

$$r(x, y) = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y}$$

$$\text{cov}(x, y) = \frac{1}{n} \sum xy - \bar{x}\bar{y} = \frac{1}{7} (676) - 90 = 6.5714$$

$$\sigma_x = \sqrt{\frac{1}{n} \sum x^2 - \bar{x}^2} = \sqrt{\frac{728}{7} - 10^2} = \sqrt{104 - 100} = 2$$

$$\sigma_y = \sqrt{\frac{1}{n} \sum y^2 - \bar{y}^2} = \sqrt{\frac{651}{7} - 9^2} = \sqrt{93 - 81} = 3.4641$$

$$r(x, y) = \frac{\text{cov}(x, y)}{\sigma_x \sigma_y} = \frac{6.5714}{2(3.4641)} = 0.9485$$

The coefficient of correlation = 0.9485

(OR)

5(b) From the following data Calculate

(i) Correlation coefficient

(ii) Standard deviation of Y (ie) σ_y

$$b_{xy} = 0.85, b_{yx} = 0.89, \sigma_x = 3$$

Solution:

(i) Coefficient of correlation: $r = \sqrt{b_{xy} \times b_{yx}} = \sqrt{0.85(0.89)} = 0.87$

(ii) Standard deviation of Y:

$$b_{xy} = \frac{r\sigma_x}{\sigma_y} = \frac{0.87 \times 3}{\sigma_y} = 0.85$$

$$\sigma_y = \frac{0.87 \times 3}{0.85} = \frac{2.61}{0.85} = 3.07$$

SECTION-B (5X10=50)

6(a) If $A = \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix}$ then find the value of (i) B If $A + 2B = A^2$ (ii) $A^3 - 3A^2 + A$

Solution:

(i) To find B: Given $A + 2B = A^2$ Then

$$\begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} + 2B = \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} 24 & 8 \\ 16 & 8 \end{bmatrix}$$

$$2B = \begin{bmatrix} 24 & 8 \\ 16 & 8 \end{bmatrix} - \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} \Rightarrow 2B = \begin{bmatrix} 20 & 6 \\ 12 & 8 \end{bmatrix}$$

$$B = \begin{bmatrix} 10 & 3 \\ 6 & 4 \end{bmatrix}$$

(ii) To find $A^3 - 3A^2 + A$

$$A^3 - 3A^2 + A = \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix}^3 - 3 \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix}^2 + \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} 24 & 8 \\ 16 & 8 \end{bmatrix} \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix} - 3 \begin{bmatrix} 24 & 8 \\ 16 & 8 \end{bmatrix} + \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix}$$

$$A^3 - 3A^2 + A = \begin{bmatrix} 96+32 & 48+0 \\ 64+32 & 32+0 \end{bmatrix} - \begin{bmatrix} 72 & 24 \\ 48 & 24 \end{bmatrix} + \begin{bmatrix} 4 & 2 \\ 4 & 0 \end{bmatrix}$$

$$A^3 - 3A^2 + A = \begin{bmatrix} 60 & 26 \\ 52 & 8 \end{bmatrix}$$

(OR)

6(b) If the matrix A is given by $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$

Prove that it satisfies the relation $A^2 - 4A + 3I = 0$, where I stands for the unit matrix of order 2.

Solution:

To prove: $A^2 - 4A + 3I = 0$

$$A^2 = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 4+1 & -2-2 \\ -2-2 & 1+4 \end{bmatrix} = \begin{bmatrix} 5 & -4 \\ -4 & 5 \end{bmatrix}$$

$$4A = 4 \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 8 & -4 \\ -4 & 8 \end{bmatrix}, \quad I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$4A = \begin{bmatrix} 8 & -4 \\ -4 & 8 \end{bmatrix} \quad I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

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MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

- 1(a) Find the maximum and minimum value of the function $\frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.**

Solution:

Let $f(x) = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.

$$f'(x) = 2x^2 + x - 6$$

Now,

$$f'(x) = \frac{df}{dx} = (x+2)(2x-3)$$

$$f'(x) = 0$$

$$(x+2)(2x-3) = 0$$

$$x = -2, \quad \frac{3}{2}$$

$$x = \frac{3}{2} \text{ is a minimum point.}$$

Also,

$$f''(x) = \frac{d^2f}{dx^2} = 4x + 1$$

$$x = -2, \quad f''(-2) = -7 < 0$$

$x = -2$ is a maximum point.

$$f''\left(\frac{3}{2}\right) = 7 > 0$$

To find the minimum value:

$$y = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8.$$

$$\text{when } x = \frac{3}{2}, \quad y = \frac{2}{3}\left(\frac{3}{2}\right)^3 + \frac{1}{2}\left(\frac{3}{2}\right)^2 - 6\left(\frac{3}{2}\right) + 8$$

$$y = \frac{2}{3}\left(\frac{27}{8}\right) + \frac{1}{2} \times \frac{9}{4} - 9 + 8 = \frac{9}{4} + \frac{9}{8} - 1 = \frac{18+9-8}{8} = \frac{19}{8}$$

$$y = \frac{19}{8}$$

$$\text{Minimum value} = \frac{19}{8}$$

To find the maximum value:

$$y = \frac{2}{3}x^3 + \frac{1}{2}x^2 - 6x + 8.$$

$$\text{when } x = -2, y = \frac{2}{3}(-2)^3 + \frac{1}{2}(-2)^2 - 6(-2) + 8$$

$$y = \frac{2}{3}(-8) + \frac{1}{2} \times 4 + 12 + 8 = 22 - \frac{16}{3} = \frac{66-16}{3} = \frac{50}{3}$$

$$\text{Maximum value} = \frac{50}{3}$$

(OR)

1(b) If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -1 & 2 \\ 3 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 & 4 \\ 6 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}$ find $A+B$

Solution:

$$A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -1 & 2 \\ 3 & 0 & 4 \end{bmatrix}, B = \begin{bmatrix} -1 & 3 & 4 \\ 6 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}, A+B = \begin{bmatrix} 0 & 5 & 1 \\ 6 & 1 & 2 \\ 5 & 1 & 7 \end{bmatrix}$$

- 2(a)** A factory manufactures two articles A and B. To manufacture the article A, a certain machine has to be worked for 1.5 hours and in addition a craftsman has to work for 2 hours. To manufacture the article B, the machine has to be worked for 2.5 hours and in addition the craftsman has to work for 1.5 hours. In a week the factory can avail of 80 hours of machine time and 70 hours of craftsman's time, a week respectively. The profit on each article A is Rs.5 and that on each article B is Rs.4. If all the articles produced can be sold away, find how many of each kind should be produced to earn the maximum profit per week. Formulate the above problem as L.P.problem.

Solution:

Let x_1 = No of articles in A, x_2 = No of articles in B

To objective is to determine the least number of articles to get the maximum profit

	Machine hours	Graft's man hours	Profit (Rs)
A	1.5	2	5
B	2.5	1.5	4
Available hrs	80	70	

Mathematical formulation of problem:-

Find x_1, x_2 such that

Maximum $z = 5x_1 + 4x_2$

Subject to constraint

$$1.5x_1 + 2.5x_2 \leq 80$$

$$2x_1 + 1.5x_2 \leq 70$$

(OR)

- 2(b) A box contains 3 red and 7 white balls. One ball is drawn at random and in its place a ball of the other color is put in the box. Now one ball is drawn at random from the box. Find the probability that it is red.

Solution:

The no. of red balls=3. The no. of white balls=7, Total=10balls

$$p(A_1) = \text{probability of getting a red ball in the I draw} = \frac{3}{10} = 0.3$$

$$p(A_1) = \text{probability of getting a white ball in the I draw} = \frac{7}{10} = 0.7$$

B = the event of getting a red ball in the II draw

$$p\left(\frac{B}{A_1}\right) = \text{probability of getting a red ball in the II draw,}$$

$$\text{when the I draw gives a red ball} = \frac{2}{10} = 0.2$$

Instead of a red ball, a white ball is placed. Then red = 2, white = 8, total = 10

$$p\left(\frac{B}{A_2}\right) = \text{probability of getting a red ball in the II draw,}$$

$$\text{when the I draw gives a white ball} = \frac{4}{10} = 0.4$$

Instead of a white ball, a red ball is placed. Then red = 4, white = 6, total = 10

Now the probability of getting a red ball at random = $0.3 \times 0.2 + 0.7 \times 0.4 = 0.34$

The required probability = 0.34

- 3(a) From the information given below, calculate Karl Pearson's coefficient of skewness and also Quartile coefficient of skewness

Measure	Place A	Place B
Mean	150	140
Median	142	155
S.D	30	55
Third Quartile	195	260
First Quartile	62	80

Solution:

To find Karl Pearson's coefficient of skewness:

$$\text{Skewness} = \frac{\text{mean} - \text{mode}}{S.D}$$

Place A: In the question mode is not given but can be ascertained in the following method:

$$\text{Mode} = 3\text{median} - 2\text{mean}$$

$$= 3(142) - 2(150)$$

$$\text{Mode} = 126$$

$$\text{Skewness} = \frac{150 - 126}{30} = 0.8$$

Place B:

Mode is not given. We have to find out.

$$\text{Mode} = 3\text{median} - 2\text{mean}$$

$$= 3(155) - 2(140)$$

Mode = 185

$$\text{Skewness} = \frac{140 - 185}{55} = -0.82$$

To find Quartile coefficient of skewness:

Third Quartile = Q_3

First Quartile = Q_1

$$\text{Quartile co. efficient of skewness} = \frac{Q_3 - Q_1 - 2\text{Median}}{Q_3 - Q_1}$$

Place A:

$$\text{Quartile co. efficient of skewness} = \frac{195 + 62 - 2(142)}{195 - 62} = -0.203$$

Place B:

$$\text{Quartile co. efficient of skewness} = \frac{260 + 80 - 2(155)}{260 - 80} = 0.1666$$

(OR)

- 3(b) Assuming that half of the population is vegetarian, so that the chance of an individual being a is vegetarian is $\frac{1}{2}$ and assuming that 10 investigators can take the sample of 10 individuals to see whether they are vegetarians, how many investigators would you expect to report that three people or less were vegetarians?**

Solution:

Let p denotes the probability of an individual being a vegetarian and n denotes the no. of individuals.

N denotes the no. of investigators. Then,

$$p = \frac{1}{2}, q = 1 - p = \frac{1}{2}$$

$$n = 10, N = 100$$

No. of investigators getting three or less vegetarians (i.e.) 0,1,2,3 vegetarians

$$= 100 \left(\frac{1}{2} \right)^{10} + 100 \times 10c_1 \left(\frac{1}{2} \right)^1 \left(\frac{1}{2} \right)^9 + 100 \times 10c_2 \left(\frac{1}{2} \right)^2 \left(\frac{1}{2} \right)^8 + 100 \times 10c_3 \left(\frac{1}{2} \right)^3 \left(\frac{1}{2} \right)^7$$

$$= 100 \left(\frac{1}{2} \right)^{10} + 100 \times 10 \left(\frac{1}{2} \right)^{10} + 100 \times 45 \left(\frac{1}{2} \right)^{10} + 100 \times 120 \left(\frac{1}{2} \right)^{10}$$

$$= 100 \left(\frac{1}{2} \right)^{10} (1 + 10 + 45 + 120)$$

$$= 100 \times \frac{1}{1024} (176)$$

$$= 17(\text{approximately})$$

No. of investigators getting three or less vegetarians = 17(approximately)

- 4(a) what is a sample survey? What point should be kept in mind in the selection of a sample?**

Solution:

Sample survey:

Sample survey is a method of collecting data about the population.

Every government requires specific data and information about the population to make programs and policies that match the needs and requirements of the population.

Then a small group that is representative of the entire population is used. A representative sample, measures a small number of people who fit a particular category of people

However accurately a sample from a population may be generated, there will always be margin for error, whereas in case of Census, entire population is taken into account and as such it is most accurate.

Sampling is quick and inexpensive. If the next Census is far away, then sampling is the most Convenient method of collecting data

How are samples selected?

1. A sample must be robust in its design and large enough to provide a reliable representation of the whole population.
2. Aspects to be considered when designing a sample include, the level of accuracy required, cost, and the timing. Sampling can be random or non-random.
4. In a random sample each unit in the population has a chance of being selected, and this probability can be accurately determined.

(OR)

4(b) Define Hypothesis. What are the characteristic of a good Hypothesis?

Definition:

Hypothesis is an assumption which may or may not be true about a population parameter

Characteristics of a good hypothesis

- It should have elucidating power.
- It should strive to furnish an acceptable explanation of the phenomenon.
- It must be verifiable.
- It must be formulated in simple, understandable terms
- It should correspond with existing knowledge.
- IT should be clearly and concisely stated.
- Simple to understand.
- Portray a relationship with the problem being investigated.
- Limited in the scope and consistent with the problem being studied.

Age X	$X - \bar{X} = X_d$	X_d^2	No.of. Students (y)	No. of regular players	Playing Habits (Y)	$Y = \bar{Y} = Y_d$	Y_d^2	$X_d Y_d$
20	-2.5	6.25	500	400	80	30	900	-75
21	-1.5	2.25	400	300	75	25	625	37.5
22	-0.5	0.25	300	180	60	10	100	-5

5(a) Calculate Karl Pearson's coefficient of correlation between age and playing habits from the data given below:

Age(x): 20 21 22 23 24 25

No. of players(y): 500 400 300 240 200 160

Regular players: 400 300 180 96 60 24

Solution:

Let $x = X$ denote age and Y denote playing habits. Here X is directly given. But Y is not given directly.

So we have to calculate the value of Y by using the formula:

$$Y = \frac{\text{regular players} \times 100}{\text{number of players}}$$

For example, for the age, $X = 20$ the corresponding playing habit,

$$Y = \frac{400 \times 100}{500} = 80 \quad \text{Similarly, the other values can be calculated.}$$

$$, \quad \bar{X} = \frac{\sum X}{n} = \frac{135}{6} = 22.5, \quad \bar{Y} = \frac{\sum Y}{n} = \frac{300}{6} = 50$$

Age(X): 20 21 22 23 24 25

Playing habits (Y) : 80 75 60 40 30 15

23	0.5	0.25	240	96	40	-10	100	-5
24	1.5	2.25	200	60	30	-20	400	-30
25	2.5	6.25	160	24	15	-35	1225	-87.5
135		17.5			300		3350	-240

$$\sum X = 135, \sum X_d^2 = 17.5, \sum Y = 300, \sum Y_d^2 = 3350, \sum X_d Y_d = -240$$

$$r = \frac{\sum X_d Y_d}{\sqrt{\sum X_d^2 \sum Y_d^2}} = \frac{-240}{\sqrt{17.5 \times 3350}} = -0.99$$

$$r = -0.99$$

Here we have inverse correlation between age and playing hobbits. When the age increases the

tendency to play decreases.

(OR)

5(b) Explain the difference between Correlation and Regression.

Solution:

Differences

	Correlation	Regression
1	Correlation is the relationship between 2 or more variance which vary in sympathy with the order in the same or the opposite direction.	Regression means going back and it is mathematical measure showing the average relationship between 2 variable.
2	It finds out the degree of relationship between 2 variables and not the cause and effect of the variable.	It indicates the cause and effect relationship between the variables and establisher a functional relationship.
3	It is used for testing and verifying the relation between 2 variables and gives limited information.	Besides Verification, it is used for the prediction of one value, in relationship to the other given value.
4	It has limited application because it is confined only to linear relationship between the variable.	It has wider application as it studies linear and non-linear relationship between the variable.
5	It is not very useful for further mathematical treatment.	It is widely used for further mathematical treatment.

SECTION-B-(5X10=50)

6(a) Solve the equations by using Cramer's rule:

$$2x - 3y + 4z = 5$$

$$x + 2y - 3z = 8$$

$$x - y - z = 1$$

Solution: Writing the system of equations in Matrix form as

(i.e.) $AX = B$, where

$$\begin{pmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{pmatrix}, X = \begin{pmatrix} x \\ y \\ x \end{pmatrix}, B = \begin{pmatrix} 5 \\ 8 \\ 1 \end{pmatrix}$$

To find A:

$$A = \begin{pmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{pmatrix}, |A| = D = \begin{vmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 2(-2-3) + 3(-1+3) + 4(-1-2)$$

$$D = -14 \neq 0$$

To find D_1, D_2, D_3 :

$$D_1 = \begin{vmatrix} 5 & -3 & 4 \\ 8 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 5(-2-3) + 3(-8+3) + 4(-8-2) = -80; D_1 = -80$$

$$D_2 = \begin{vmatrix} 2 & -3 & 4 \\ 1 & 2 & -3 \\ 1 & -1 & -1 \end{vmatrix} = 2(-8+3) + 5(-1+3) + 4(1-8) = -48; D_2 = -48$$

$$D_3 = \begin{vmatrix} 2 & -3 & 5 \\ 1 & 2 & 8 \\ 1 & -1 & 1 \end{vmatrix} = 2(2+8) + 3(1-8) + 5(-1-2) = -16; D_3 = -16$$

Applying Cramer's rule

$$x = \frac{D_1}{D} = \frac{-80}{-14} = 5, y = \frac{D_2}{D} = \frac{-48}{-14} = 3, z = \frac{D_3}{D} = \frac{-16}{-14} = 1$$

The solution is given by

$$x = 5, y = 3, z = 1$$

(OR)

$$6(b) \quad \text{Given } A = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix}, C = \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix},$$

Show that

$$(i) A(B + C) = AB + AC$$

$$(ii) (A + B)C = AC + BC$$

Solution:

$$(i) \text{ To prove } (i) A(B + C) = AB + AC$$

$$A(B+C) = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 5 & -5 & 4 \\ 11 & 8 & -5 \\ 7 & -13 & 11 \end{bmatrix}$$

$$= \begin{bmatrix} 40+11-14 & -40+8+26 & 32-5-22 \\ -45+99+63 & 45+72-117 & -36-45+99 \\ 30-33+63 & -30-24-117 & 24+15+99 \end{bmatrix}$$

$$A(B+C) = \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix}$$

$$AB = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} -1 & 8 & 4 \\ 99 & -9 & 9 \\ 54 & -111 & 102 \end{bmatrix} + \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 8 & -60 & 36 \end{bmatrix}$$

$$AB + AC = \begin{bmatrix} 37 & -6 & 5 \\ 117 & 0 & 18 \\ 60 & -171 & 138 \end{bmatrix}$$

(i) To prove (ii) $(A+B)C = AC + BC$

$$A+B = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} + \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix}$$

$$(A+B)C = \begin{bmatrix} 9 & -1 & 1 \\ -4 & 15 & 5 \\ 13 & -12 & 17 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

$$AC = \begin{bmatrix} 8 & 1 & -2 \\ -9 & 9 & 9 \\ 6 & -3 & 9 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} 38 & -14 & 1 \\ 18 & 9 & 9 \\ 6 & -60 & 36 \end{bmatrix}$$

$$BC = \begin{bmatrix} 1 & -2 & 3 \\ 5 & 6 & -4 \\ 7 & -9 & 8 \end{bmatrix} \begin{bmatrix} 4 & -3 & 1 \\ 6 & 2 & -1 \\ 0 & -4 & 3 \end{bmatrix} = \begin{bmatrix} -8 & -19 & 12 \\ 56 & 13 & -13 \\ -26 & -71 & 40 \end{bmatrix}$$

$$AC + BC = \begin{bmatrix} 30 & -33 & 13 \\ 74 & 22 & -4 \\ 20 & -131 & 96 \end{bmatrix}$$

Hence (ii) $(A+B)C = AC + BC$

7(a) Solve the following LPP by Graphical method:

Max $z = 3x_1 + 2x_2$

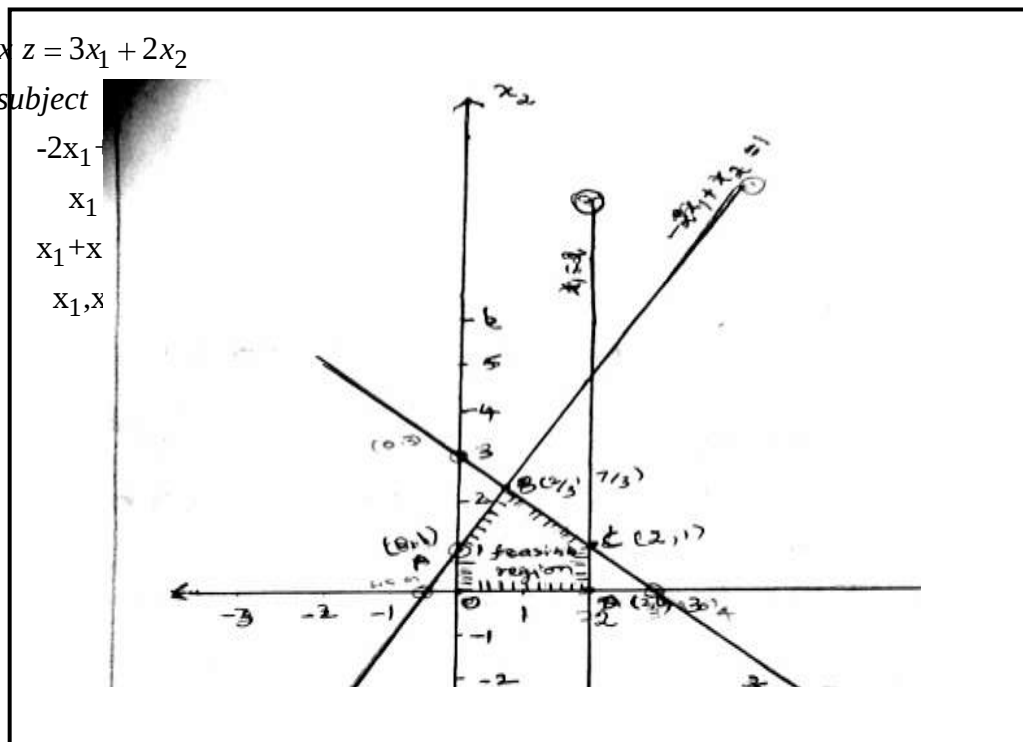
subject

$$-2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$x_1, x_2 \geq 0$$



So
lu
ti
on:

Consider, $-2x_1 + x_2 \leq 1$

Now, Consider $-2x_1 + x_2 = 1$

(1)

Put, $x_1 = 0 \Rightarrow x_2 = 1$,

The pt is $(0,1)$

Put, $x_2 = 0 \Rightarrow x_1 = -\frac{1}{2}$,

The pt is $(-\frac{1}{2}, 0)$

Consider, $x_1 \leq 2$

Now, Consider, $x_1 = 2$

(2)

It is a line parallel to the x_2 axis

Consider $x_1 + x_2 \leq 3$

Consider $x_1 + x_2 = 3$

(3)

Put $x_1 = 0 \Rightarrow x_2 = 3$,

The pt is $(0,3)$

Put, $x_2 = 0 \Rightarrow x_1 = 3$, The pt is $(3,0)$

Feasible region is OABCD

To find B:

Consider (1) and (3)

$$-2x_1 + x_2 = 1 \quad (1)$$

$$x_1 + x_2 = 3 \quad (3)$$

$$(1) - (3) \Rightarrow -3x_1 = -2$$

$$x_1 = \frac{2}{3}, \text{ then } x_2 = \frac{7}{3}$$

We get the point B is $\left(\frac{2}{3}, \frac{7}{3}\right)$

To find C:

$$x_1 = 2$$

$$x_1 + x_2 = 3$$

$$\text{substituting, } x_2 = 1$$

We get the point C is 2, 1

To find the maximum point:-

$$\text{Max } z = 3x_1 + 2x_2$$

$$O(0,0) \Rightarrow z = 0$$

$$A(0,1) \Rightarrow z = 3(0) + 2(1) = 2$$

$$B\left(\frac{2}{3}, \frac{7}{3}\right) \Rightarrow z = 3\left(\frac{2}{3}\right) + 2\left(\frac{7}{3}\right) = 6.07$$

$$C(2,1) \Rightarrow z = 3(2) + 2(1) = 8$$

$$D(2,0) \Rightarrow z = 3(2) + 2(0) = 6$$

The solution is

$$\text{Max } z = 8 \text{ at } x_1 = 2, x_2 = 1$$

(OR)

- 7(b) Assume that a factory has two machines. Past records show that machine 1 produces 30% of the items of output and machine 2 produces 70% of the items. Further, 5% of the items produced by machine 1 were defective and only 1% of the items produced by machine 2 were defective. If the defective items are drawn at random, what is the probability that the defective item was produced by machine 2?

Solution:

A_1 : event of selecting an item produced by machine 1

A_2 : event of selecting an item produced by machine 2

$$p(A_1) = \frac{30}{100} = 0.3, p(A_2) = \frac{70}{100} = 0.7$$

B = the event of selecting a defective item either from machine 1 or machine 2

$p(\frac{B}{A_1})$ = probability of the event of selecting a defective item from machine 1

$$\text{and it is a defective one} = \frac{5}{100} = 0.05$$

$p(\frac{B}{A_2})$ = probability of the event of selecting a defective item from machine 2

$$\text{and it is a defective one} = \frac{1}{100} = 0.01$$

Event (1)	Prior probability (1)	Conditional Probability (1)	Joint Probability (1)	Revised probability (1)
A_1	0.3	0.05	0.015	$0.015/0.022=0.682$
A_2	0.7	0.01	0.007	$0.007/0.002=0.318$
			0.022	1

Probability of selecting an item produced by machine 1 or 2 = 0.022

- 8(a) The number of workers employed, the mean wages (in Rs.) per month and standard Deviation (in Rs.) in each section of a factory are given below. Calculate the mean wages and standard deviation of all the workers taken together**

Section	No. of workers(n)	Mean wages($\bar{x}$)	S.D(σ)
A	50	1113	60
B	60	1120	70
C	90	1115	80

Solution:

Combined mean:

$$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2 + n_3\bar{x}_3}{n_1 + n_2 + n_3} = \frac{50 \times 1113 + 60 \times 1120 + 90 \times 1115}{50 + 60 + 90} = \frac{223200}{200} = 1116$$

Combined S.D:

$$\sigma^2 = \frac{1}{n_1 + n_2 + n_3} [n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2) + n_3(\sigma_3^2 + d_3^2)] \quad (1)$$

$$d_1 = \bar{x}_1 - \bar{x} = 1113 - 1116 = -3$$

$$d_2 = \bar{x}_2 - \bar{x} = 1120 - 1116 = 4$$

$$d_3 = \bar{x}_3 - \bar{x} = 1115 - 1116 = -1$$

Substituting in (1), we have

$$\sigma^2 = \frac{1}{50+60+90} [50(3600+9) + 60(4900+16) + 90(6400+1)]$$

$$\sigma^2 = \frac{1}{200} [180450 + 294960 + 576090] = \frac{1}{200} [1051500] = 5257.5$$

$$\sigma = 72.5 = 73$$

(OR)

- 8(b) In a certain examination the percentage of passes and distinction were 46 and 9 respectively. Estimate the average marks obtained by the candidates. The minimum pass and distinction marks being 40 and 75 respectively (Assume the distribution of marks to be normal) Also, determine what would have been the minimum qualifying marks for admission to a reexamination of the failed candidates, has it been desired that the best 25% of them should be given another opportunity to be examined? Also, determine what would have been the minimum

Solution:

Let $\bar{X}$ – Mean, σ – Standard Deviation of the normal distribution

The percentage of passes = 46

The percentage of distinction = 9

The percentage of failures = 45

The area of the right of the ordinate at $X = 40$ is 0.46

Hence the area between mean and $X = 40$ is 0.04

From the tables corresponding to 0.04, standard normal variate is 0.1

i) Let

$$z_1 = 0.1 = \frac{40 - \bar{X}}{\sigma} \Rightarrow 40 - \bar{X} = 0.1\sigma$$

$$z_2 = 0.1 = \frac{75 - \bar{X}}{\sigma} = 1.34 \Rightarrow 75 - \bar{X} = 1.34\sigma$$

subtracting, $(0.1 - 1.34) \sigma = -35$

$$\sigma = \frac{35}{1.24} = 28.23$$

substituting σ , we have

$$40 - \bar{X} = 0.1(28.23), \bar{X} = 40 - 2.823 = 37.18 \text{ (or) } 37.2$$

The average obtained by the candidate = 37.2

(ii) Let us assume that X_1 is the minimum qualifying marks for re-examination of the failed candidates

The area of the right of the ordinate at $X = 40$ is 0.46

The percentage of student's failing = 54

This is the area to the left of the ordinate at $X = 40$

We want that the best 25% of failed candidates should be given a chance to reappear

Suppose, this area is equal to the shaded area in the diagram

This area is 25% of 54 = $\frac{25}{100} \times 54 = 13.5\% = 0.135$

Area between mean and ordinate $X_1 = -(0.135 - 0.04) = -$

0.095

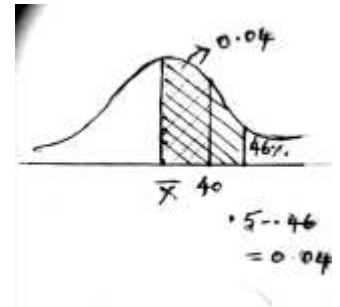
Corresponding to this area standard normal variate from the table

is equal to -0.0378

$$\frac{X_1 - \bar{X}}{\sigma} = -0.0378$$

$$X_1 = \bar{X} - \sigma(0.0378) = 37.2 - (0.0378 \times 28.23)$$

$$X_1 = 36.133 \text{ (or) } 36 \text{ (nearly)}$$



9(a) Explain the methods of sampling in detail.

Types of Sampling

We may consider different types of probability samples. Different methods can be used. They generally can be grouped into one of two categories:

1. Probability samples
2. Non-probability samples.

Probability Samples:

The idea behind this type is random selection.

Each sample from the population of interest has a known probability of selection under a given sampling scheme.

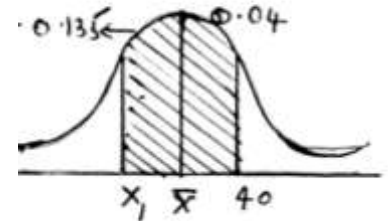
There are four categories of probability samples described below.

1. Simple Random Sampling
2. Stratified Random Sampling
3. Systematic Sampling
4. Cluster Sampling

Simple Random Sampling

Simple random sampling refers to any sampling method that has the following properties.

- The population consists of N objects.
- The sample consists of n objects.
- If all possible samples of n objects are equally likely to occur, the sampling method is called simple random sampling.
- This is characterized by the fact that the probability of selection is the same for every case in the population.



There are many ways to obtain a simple random sample.

1. Lottery method:

- Each of the N population members is assigned a unique number.
- The numbers are placed in a bowl and thoroughly mixed.
- Then, a blind-folded researcher selects n numbers.
- Population members having the selected numbers are included in the sample.

2. Use of an unbiased die or coin:

- Suppose we have to choose between two alternatives.
- We can toss a coin and if head is obtained, one course of action should be followed and if tail is obtained, the alternative should be chosen.
- Similarly a die can be employed if there are six different alternatives

4. Use of Random number

- Random numbers are formed of random digits and arranged in the form of a table having a number of rows and columns.
- These tables are useful to select random samples.
- Samples obtained from such tables have been subjected to tests and their randomness is found to be highly probable
- To recap, though, that simple random sampling is a sampling procedure in which every element of the population has the same chance of being selected and every element in the sample is selected by chance.

3. Stratified Random Sampling:

- In this form of sampling, the population is first divided into two or more mutually exclusive segments based on some categories of variables of interest in the research.
- It is designed to organize the population into homogenous subsets before sampling, then drawing a random sample within each subset.
- With stratified random sampling the population of N units is divided into subpopulations of $N_1, N_2, \dots, N_L$ units respectively. These subpopulations, called *strata*, are non-overlapping and together they comprise the whole of the population
- When these have been determined, a sample is drawn from each, with a separate draw for each of the different strata.
- The sample sizes within the strata are denoted by respectively.
- If a SRS is taken within each stratum, then the whole sampling procedure is described as stratified random sampling.

3. Systematic random sampling.

- With systematic random sampling, we create a list of every member of the population.
- From the list, we randomly select the first sample element from the first k elements on the population list. Thereafter, we select every k th element on the list.
- This method is different from simple random sampling since every possible sample of n elements is not equally likely.

Creating such a sample includes three steps:

4. Divide number of cases in the population by the desired sample size. In this example, dividing 10,000 by 1,000 gives a value of 10.
5. Select a random number between one and the value attained in Step 1. In this example, we choose a number between 1 and 10 - say we pick 7.
6. Starting with case number chosen in Step 2, take every tenth record (7, 17, 27, etc.).

More generally, suppose that the N units in the population are ranked 1 to N in some order (e.g., alphabetic). To select a sample of n units, we take a unit at random, from the 1st k units and take every k -th unit thereafter.

Cluster sampling.

- With cluster sampling, every member of the population is assigned to one, and only one, group.
- Each group is called a cluster.
- A sample of clusters is chosen, using a probability method (often simple random sampling). Only individuals within sampled clusters are surveyed.
- Note the difference between cluster sampling and stratified sampling.
- With stratified sampling, the sample includes elements from each

Important things about cluster sampling:

4. Most large scale surveys are done using cluster sampling;
5. Clustering may be combined with stratification, typically by clustering within strata;
6. In general, for a given sample size n cluster samples are less accurate than the other types of sampling in the sense that the parameters you estimate will have greater variability than an SRS, stratified random or systematic sample.

Multistage sampling.

- Here the sampling procedure is carried out in several stages. The population is first divided into large groups known as first stage units, which again are divided into smaller groups, called second stage units.
- These second stage units are divided into third stage units and so on until the final stage units are reached
- With multistage sampling, we select a sample by using combinations of different sampling methods
- In Stage 1, we might use cluster sampling to choose clusters from a population. Then, in Stage 2, we might use simple random sampling to select a subset of elements from each chosen cluster for the final sample.

Non-probability Samples:

Some of the non-probability samples are:

1. Deliberate, purposive or judgments sampling
2. Quota sampling
3. Block or cluster sampling
4. Convenience sampling
5. Snowball sampling

1. Quota sampling:

With proportional quota sampling, the aim is to end up with a sample where the strata (groups) being studied (e.g., males vs. females students) are proportional to the population being studied. Quota sampling has some similarities to judgment sampling, in that the researcher decides on the quota that “best represents the population.”

Example:

If we were to examine the differences in male and female students, for example, the number of students from each group that we would include in the sample would be based on the proportion of male and female students amongst the 10,000 university students.

2. Convenience sampling:

Convenience samples are the most well-known type of non-probability sampling. Convenience sampling is simply sampling those around you, or those that you know you can reach. Polling a group of people that happen to be in a room would be a form of convenience sampling.

A convenience sample is simply one where the units that are selected for inclusion in the sample are the easiest to access.

Example:

Out of the 10,000 university students, if we were only interested in achieving a sample size of say 100 students, we may simply stand at one of the main entrances to campus, where it would be easy to invite the many students that pass by to take part in the research..

3. Purposive sampling

Purposive sampling, also known as judgmental, selective or subjective sampling, reflects a group of sampling techniques that rely on the judgement of the researcher, when it comes to selecting the units (e.g., people, cases/organisations, events, pieces of data) that are to be studied.

These purposive sampling techniques include maximum variation sampling, homogeneous sampling, typical case sampling, extreme (or deviant) case sampling, total population sampling and expert sampling.

Each of these purposive sampling techniques has a specific goal, focusing on certain types of units, all for different reasons.

The different purposive sampling techniques can either be used on their own or in combination with other purposive sampling techniques.

4. Self-selection sampling

Self-selection sampling is appropriate when we want to allow units or cases, whether individuals or organisations, to choose to take part in research on their own accord. The key component is that research subjects (or organisations) volunteer to take part in the research rather than being approached by the researcher directly.

5. Snowball sampling

Snowball sampling is particularly appropriate when the population you are interested in is hidden and/or hard-to-reach. These include populations such as drug addicts, homeless people, individuals with AIDS/HIV and so forth.

(OR)

9(b) The following table gives the yields of 15 sample plots under three varieties of seeds

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	32

You have to find out if the average yield of land under different variances shows significant differences.

Solutions:

Let us take the hypothesis that the average yield of land under different varieties of seed does not differ significantly.

Applying F-test,

$$\bar{X} = \frac{100}{5} + \frac{95}{5} + \frac{135}{5} = \frac{20+19+27}{3} + \frac{66}{3} = 22$$

Variance between Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
4	9	25
4	9	25
4	9	25
4	9	25
4	9	25
20	45	125

Sum of squares between Samples = 20+45+125 = 190

Variance within Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
0	1	4
1	1	1
4	4	25
16	16	1
0	36	25
26	58	56

Sum of squares within Samples = 26+58+56 = 140

Analysis of variances Table

Source of Variation	Sum of squares	Degree of freedom	Mean square
Between Samples	190	2	95
Within Samples	140	12	11.67
Total	330	14	

$$F = \frac{95}{11.67} = 8.14$$

For $V_1 = 2$, $V_2 = 12$, $F_{0.05} = 3.88$

$$8.14 > 3.88$$

The calculated value > tabulated value

Hence the hypothesis is rejected

The average yield of land under different varieties of seed differ significantly

10(a) Obtain regression equation of Y on X and estimate Y when X = 55 from the following:

X 40 50 38 60 65 50 35
Y 38 60 55 70 60 48 30

Solution:

$$\bar{X} = \frac{\sum X}{n} = \frac{338}{7} = 48.3 \text{ and } \bar{Y} = \frac{\sum Y}{n} = \frac{361}{7} = 51.6$$

X	$X - \bar{X} = x$	x^2	Y	$Y - \bar{Y} = y$	y^2	xy
40	-8.3	68.89	38	-13.6	184.96	112.88
50	1.7	2.89	60	8.4	70.56	14.28
38	-10.3	106.09	55	3.4	11.56	-35.02
60	11.7	136.89	70	18.4	338.56	215.28

65	16.7	278.89	60	8.4	70.56	140.28
50	1.7	2.89	48	-3.6	12.96	-6.12
35	13.3	176.89	30	-21.6	466.56	287.28
338		773.43	361			728.86

$$\sum xy = 728.86, \sum x^2 = 773.43$$

Regression equation of y on x

$$Y - \bar{Y} = r \frac{\sigma_x}{\sigma_y} (X - \bar{X}); \sum xy = 728.86, \sum x^2 = 773.43$$

$$Y - 51.6 = \frac{\sum XY}{\sum x^2} (X - \bar{X}); Y - 51.6 = \frac{728.86}{773.43} (X - 48.3)$$

$$Y - 51.6 = 0.942(X - 48.3)$$

$$Y = 0.942X - 45.4986 + 51.6$$

$$Y = 0.942X + 6.10$$

$$\text{When } X = 55, Y = 0.942(55) + 6.10 = 57.91$$

(OR)

10(b) Obtain the rank correlation coefficient between the variables x and y from the following pairs of observed values:

x	50	55	65	50	55	60	50	65	70	75
y	110	110	115	125	140	115	130	120	115	160

Solution:

First we have to assign ranks to the variables

X	Rank (X)	Y	Rank(Y)	D=X-Y	D ²
50	9	110	9.5	-0.5	0.25
55	6.5	110	9.5	-3	9
65	3.5	115	7	-3.5	12.25
50	9	125	4	5	25
55	6.5	140	2	4.5	20.25
60	5	115	7	-2	4
50	9	130	3	6	36
65	3.5	120	5	-1.5	2.25
70	2	115	7	-5	25
75	1	160	1	0	0
					134

Here 50 is repeated 3 time in X and hence $m = 3$.

Also 65, 55 are repeated 2 times in X and hence $m = 2$.

Also 115 are repeated 3 time in Y and hence $m = 3$. Also 110 repeated 2 time in Y and hence $m=2$.

The formula for rank correlation is given by

$$\rho = 1 - 6 \frac{\sum D^2 + \frac{1}{12}(m^3 - m) + \frac{1}{12}(m^3 - m) + \dots}{N^3 - N}$$

where m = the number of items whose ranks are common

$$\rho = 1 - 6 \frac{[\sum 134 + \frac{1}{12}(2^3 - 2) + \frac{1}{12}(2^3 - 2) + \frac{1}{12}(3^3 - 3) + \frac{1}{12}(3^3 - 3) + \frac{1}{12}(2^3 - 2)]}{10^3 - 10}$$

$$\rho = 1 - 6 \frac{[134 + 0.5 + 0.5 + 2 + 2 + 0.5]}{10^3 - 10} = 1 - 0.845 = 0.1545$$

MBA - DEGREE EXAMINATION - APRIL- 2010 - P8MBA3
MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

- 1(a) A manufacturer produces two types of products A and B. Each A requires 4 man hours and 6 machine hours, while each B requires 5 man hours and 3 machine hours. The available man hours and machine hours are 450 a week and 600 a week respectively. Per unit profit on A is Rs.5 whereas on B is Rs.7. Formulate the above problem into an L.P.P.**

Solution:

Let x_1 = No of product A, x_2 = No of product B

	Man hours	Machine hours	Profit (Rs)
A	4	6	5
B	5	3	7
Available hrs	450	600	

Objective function is given by

$$\max Z = 5x_1 + 7x_2$$

Subject to the constraint

$$4x_1 + 5x_2 \leq 450$$

$$6x_1 + 3x_2 \leq 600$$

Non -negative restriction is

$$x_1, x_2 \geq 0$$

(OR)

- 1(b) Explain Addition Theorem with an example.**

Solution:

Addition Theorem of Probability:

If 'A' and 'B' be any two events, then the probability of occurrence of at least one of the events 'A' and 'B' is given by: $p(A \cup B) = p(A) + p(B) - p(A \cap B)$

Solution:

From set theory, we have:

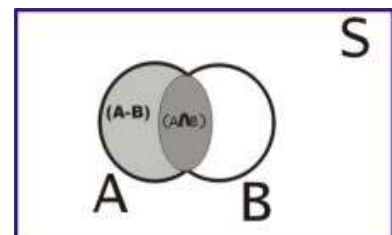
$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

Dividing both sides by $n(S)$

$$\frac{n(A \cup B)}{n(S)} = \frac{n(A)}{n(S)} + \frac{n(B)}{n(S)} - \frac{n(A \cap B)}{n(S)}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

(Ex) Two cards are drawn at random. Find the probability that both the cards are of red color or they are queen.



Solution:

Let S = Sample – space.

A = the event that the two cards drawn are red.

B = the event that the two cards drawn are queen.

$A \cap B$ = the event that the two cards drawn are queen of red color

$$n(S) = 52C_2, n(A) = 26C_2, n(B) = 4C_2, n(A \cap B) = 2C_2,$$

$$p(A) = \frac{n(A)}{n(s)} = \frac{26C_2}{52C_2}, p(B) = \frac{n(B)}{n(s)} = \frac{4C_2}{52C_2}, p(A \cap B) = \frac{n(A \cap B)}{n(s)} = \frac{2C_2}{52C_2}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B) = \frac{26C_2}{52C_2} + \frac{4C_2}{52C_2} - \frac{2C_2}{52C_2} = \frac{26C_2 + 4C_2 - 2C_2}{52C_2}$$

$$p(A \cup B) = \frac{13(25) + 6 - 1}{26(51)} = \frac{55}{221}$$

2(a) A factory produces two types of lamps A and B. In an experiment relating to their life, the following results were obtained. Compare the variability of the life of two lamps:

Life in hours	A	B
500-700	5	4
700-900	11	30
900-1100	26	12
1100-1300	10	8
1300-1500	8	6

Solution:

C.I	A	B	x	d	fd	d ²	f d ²	fd	f d ²
500-700	5	4	600	-2	-10	4	20	-8	16
700-900	11	30	800	-1	-11	1	11	-30	30
900-1100	26	12	1000	0	0	0	0	0	0
1100-1300	10	8	1200	1	10	1	10	8	8
1300-1500	8	6	1400	2	16	4	32	12	32
	60	60			5		73	-18	78

$$C = 200 \quad A = 1000$$

LAMP A:

$$\bar{x} = A + \frac{\sum fd}{N} \times C$$

$$\bar{x} = 1000 + \frac{5}{60} \times 200$$

$$\bar{x} = 1016.667$$

$$\sigma = C \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$$\sigma = 200 \sqrt{\frac{73}{60} - \left(\frac{5}{60}\right)^2}$$

$$\sigma = 241.94$$

$$\text{Coefficient of variation} = \frac{\sigma}{\bar{x}} \times 100$$

$$= \frac{241.94}{1016.667} \times 100$$

$$\text{C.V.} = 23.79$$

LAMP B:

$$\bar{x} = B + \frac{\sum fd}{N} \times c$$

$$\bar{x} = 1000 - \frac{18}{60} \times 200$$

$$\bar{x} = 940$$

$$\sigma = C \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$$

$$\sigma = 200 \sqrt{\frac{78}{60} - \left(\frac{-18}{60}\right)^2}$$

$$\sigma = 200 \sqrt{1.3 - 0.09}$$

$$\sigma = 220$$

$$\text{Coefficient of variation} = \frac{\sigma}{\bar{x}} \times 100; \text{C.V.} = 23.4042$$

(OR)

2(b) For a group of 10 items, $\sum x = 452$, $\sum x^2 = 24270$, Mode=43.7 . Find the Coefficient of Skewness

Solution:

$$\text{Mean } E(x) = \frac{\sum x}{n} = 45.2, \quad E(x^2) = \frac{\sum x^2}{n} = 2427$$

$$\text{Variance} = E(x^2) - (E(x))^2 = 383.96$$

$$\text{S.D} = 19.595 \quad \text{skewness} = \frac{\text{mean} - \text{mode}}{\text{S.D}}, \quad \text{skewness} = 0.0765$$

3(a) Following are the data about the buying rabbits found in two markets:

	Mean Expenses (Rs)	Standard deviation (Rs)	Sample Size
Market A	250	40	400

Market B**220****55****400**

Do you think that there is a significant difference in the expenses spent in the two markets?

Solution:

$$\bar{x}_1 = 250, \bar{x}_2 = 220$$

$$\sigma_1 = 40, \sigma_2 = 55$$

$$n_1 = 400, n_2 = 400$$

$$S.E(\bar{x}_1 - \bar{x}_2) = \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} = 3.4003676$$

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{S.E. \bar{x}_1 - \bar{x}_2} = 8.8225$$

(OR)

- 3(b) A random sample of 400 flowers stems has an average of 10 cm. Can this be regarded as a sample from a large population with a mean of 10.2 cm and a Standard deviation of 2.25 cm?**

Solution:

Given that,

$$n = 400, \bar{x} = 10, \mu = 10.2, \sigma = 2.25$$

$$z = \frac{\bar{x} - \mu}{\sigma / n} = \frac{10 - 10.2}{2.25 / \sqrt{400}} = \frac{-0.2}{0.1125} = -1.7778$$

- 4(a) A Sample of 10 students is selected and their marks secured in Maths and Statistics are found are found to be :**

	1	2	3	4	5	6	7	8	9	10
Maths	52	53	42	60	45	41	37	38	25	27
Statistics	65	68	43	38	77	48	35	30	25	50

Calculate the Spearman's rank correlation.

Solution:

X	Y	R ₁	R ₂	d = R ₁ - R ₂	d ²
52	65	3	3	0	0
53	68	2	2	0	0
42	43	5	6	1	1
60	38	1	7	6	36
45	77	4	1	3	9
41	48	6	5	1	1

37	35	8	8	0	0
38	30	7	9	2	4
25	25	10	10	0	0
27	50	9	4	5	25
					76

$$\gamma = 1 - \frac{6 \sum d^2}{n n^2 - 1} = 1 - \frac{6 * 76}{10(100 - 1)} = 1 - 0.4606 = 0.5393$$

$$\gamma = 0.5393$$

(OR)

4(b) Given the following data, calculate the expected value of X when Y = 75

Solution:

$$\bar{x} = 36, \bar{y} = 85, \sigma_x = 11, \sigma_y = 8, r = 0.66$$

Regression equation of y on x:

$$x - \bar{x} = r \frac{\sigma_x}{\sigma_y} (y - \bar{y})$$

$$x = 0.9075y - 41.1375 \quad (1)$$

put $y = 75$ in (1), we get

$$x = 26.925$$

5(a) If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$

Find the value of $2A+3B$, $A-B$

Solution: Given that,

$$A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$$

To find $2A+3B$:

$$2A = 2 \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} = \begin{bmatrix} 0 & 4 & 6 \\ 4 & 2 & 8 \end{bmatrix}$$

$$3B = 3 \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix} = \begin{bmatrix} 21 & 18 & 9 \\ 3 & 12 & 15 \end{bmatrix}$$

$$2A+3B = \begin{bmatrix} 21 & 22 & 15 \\ 7 & 14 & 23 \end{bmatrix}$$

To find $A-B$:

$$A - B = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix} - \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$$

$$A - B = \begin{bmatrix} -7 & -4 & 0 \\ 1 & -3 & -1 \end{bmatrix}$$

(OR)

5(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}$

Find the value of AB and BA.

Solution: Given that, $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix}$

To find AB:

$$AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 7 \\ 13 & 17 \end{bmatrix}$$

To find BA:

$$BA = \begin{bmatrix} -1 & 3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 10 & 16 \end{bmatrix}$$

SECTION-B-(5X10=50)

6(a) Solve the following using Gauss Jordan method.

$$x_1 + 2x_2 + x_3 = 6$$

$$2x_1 + 3x_2 + 4x_3 = 12$$

$$3x_1 + x_2 + 2x_3 = 7$$

Solution:

The augmented matrix is given by

$$C \sim \begin{pmatrix} 1 & 2 & 1 & 6 \\ 2 & 3 & 4 & 12 \\ 3 & 1 & 2 & 7 \end{pmatrix}$$

$$\sim \begin{pmatrix} 1 & 2 & 1 & 6 \\ 0 & -1 & 2 & 0 \\ 0 & -5 & -1 & -11 \end{pmatrix} \begin{matrix} R_1 \rightarrow R_2 - R_1 \\ R_3 \rightarrow R_3 - 3R_1 \end{matrix}$$

$$\sim \begin{pmatrix} 1 & 0 & 5 & 6 \\ 0 & -1 & 2 & 0 \\ 0 & 0 & -11 & -11 \end{pmatrix} \begin{matrix} R_3 \rightarrow R_3 - 5R_2 \\ R_1 \rightarrow R_1 + 2R_2 \end{matrix}$$

$$\sim \begin{pmatrix} 11 & 0 & 0 & 11 \\ 0 & -11 & 0 & -22 \\ 0 & 0 & -11 & -11 \end{pmatrix} \begin{matrix} R_3 \rightarrow R_3 + 5R_2 \\ R_1 \rightarrow R_1 + 2R_2 \end{matrix}$$

$$\begin{pmatrix} 11 & 0 & 0 \\ 0 & -11 & 0 \\ 0 & 0 & -11 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 11 \\ -22 \\ -11 \end{pmatrix}$$

$$11x_1 = 11 \Rightarrow x_1 = 1$$

$$-11x_2 = -22 \Rightarrow x_2 = 2$$

$$-11x_3 = -11 \Rightarrow x_3 = 1$$

$$x_1 = 1, x_2 = 2, x_3 = 1$$

(OR)

6(b) Let $A = \{3, 6, 9, 12\}$, $B = \{1, 2, 3, 4, 5, 6\}$
and $f : A \rightarrow B$ is defined by

$$f(x) = \frac{1}{3}x + 1$$

Represent f as

- an arrow diagram
- a set of ordered pairs
- a table
- a graph

Solution: Given $A = \{3, 6, 9, 12\}$,
 $B = \{1, 2, 3, 4, 5, 6\}$, $f : A \rightarrow B$ such that

$$f(x) = \frac{1}{3}x + 1$$

Consider $x \in \{3, 6, 9, 12\}$, then

$$f(3) = \frac{1}{3}(3) + 1 = 2, f(6) = \frac{1}{3}(6) + 1 = 3$$

$$f(9) = \frac{1}{3}(9) + 1 = 4, f(12) = \frac{1}{3}(12) + 1 = 5$$

(i) **Arrow diagram:**

$$f(3) \rightarrow 2, f(6) \rightarrow 3, f(9) \rightarrow 4, f(12) \rightarrow 5$$

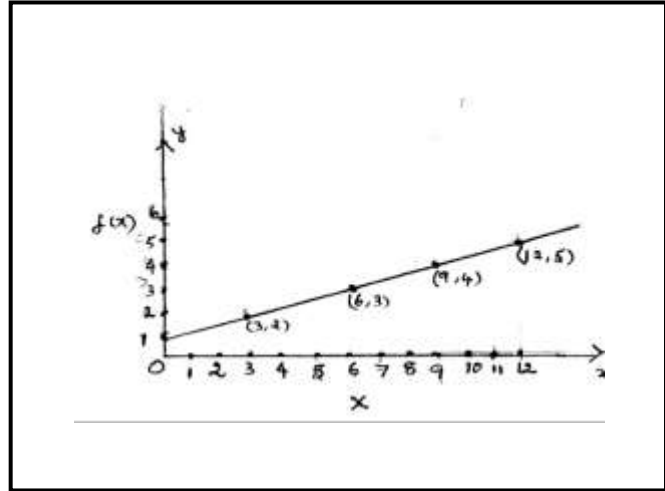
(ii) **A set of ordered pairs:**

$$\{(3, 2), (6, 3), (9, 4), (12, 5)\}$$

(iii) **Table:**

x	3	6	9	12
f(x)	2	3	4	5

(iv) **Graph:** The graph is a straight line



(a) **Solve the LPP by Graphical method:**

$$\text{Maximize } z = 5x_1 + 4x_2$$

Subject to

$$3x_1 + 5x_2 \leq 160 \quad (1)$$

$$4x_1 + 3x_2 \leq 140 \quad (2)$$

$$x_1, x_2 \geq 0$$

Solution:

$$\text{Consider } 3x_1 + 5x_2 \leq 160$$

$$\text{Now let } 3x_1 + 5x_2 = 160$$

Consider

$$4x_1 + 3x_2 \leq 140$$

$$4x_1 + 3x_2 = 140$$

(4)

$$x_1 = 0 \Rightarrow x_2 = 46.6, \text{The point is } (0, 46.6)$$

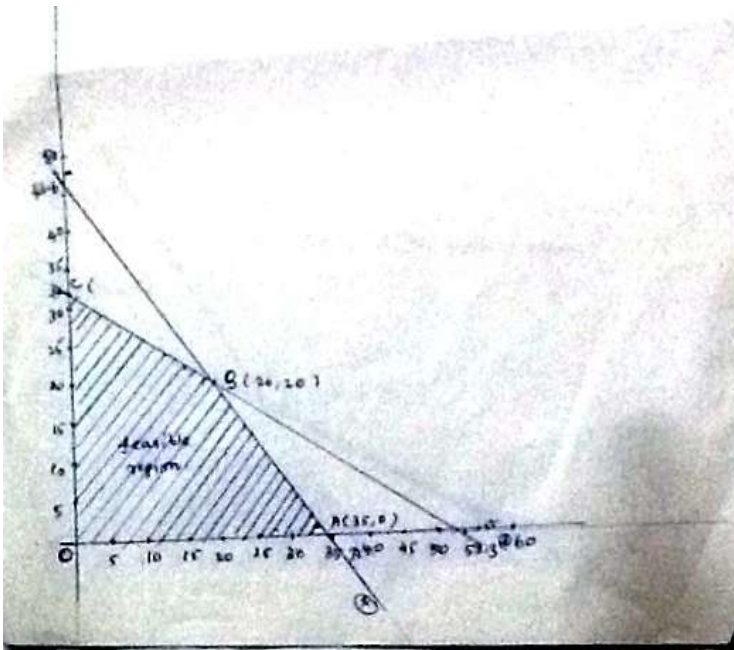
$$x_2 = 0 \Rightarrow x_1 = 35, \text{The point is } (35, 0)$$

$$(3) \cdot 4 + (4) \cdot 3 \Rightarrow 12x_1 + 20x_2 = 640$$

$$12x_1 + 9x_2 = 420$$

$$\Rightarrow x_2 = 20, x_1 = 20$$

We get the point B is $(20, 20)$



$$\text{Max } z = 5x_1 + 4x_2$$

$$O(0,0) \Rightarrow z = 0, A(0,32) \Rightarrow z = 128$$

$$B(20,20) \Rightarrow z = 180, C(35,0) \Rightarrow z = 175$$

The solution is

$$\text{Max } z = 180, \text{ at } x_1 = 20, x_2 = 20$$

(OR)

7(b) The management of XYZ Ltd, is faced with the problem of choosing one of the two products for manufacturing .The probability matrix after market research for the two products is as follows

Product	Nature of Market		
	Good	Fair	Poor
A	0.75	0.15	0.10
B	0.60	0.30	0.10

The profits at different levels of market are as follows:

Product	Profit (in Rs)		
	Good	Fair	Poor
A	35000	15000	5000
B	50000	20000	3000

Calculate the expected value to choose the profitable product

Solution:

	Pby-A (1)	pro-A (2)	Pby-B (3)	Pro- B (4)	Con-A 1x2	Con-B 3x4
Good	0.75	35000	0.60	50000	26250	30000
Fair	0.15	15000	0.30	20000	2250	6000
Poor	0.10	5000	0.10	3000	500	300
				EMV	29000	36300

Since the EMV (Expected Monetary Value) of B is higher than A, B should be chosen

8(a) A Company knows on the basis of past experience that 3% of its bulbs are found to be defective. Find out the probability of 0, 1, 2, 3, 4 and 5 defectives in a sample of 100 bulbs.

Solutions:

Let x represents the number of defective bulbs selected

Then the possible values of x are 0, 1, 2, 3, 4 and 5

p = the probability of defective bulbs

Defective Bulbs = 3% = 0.03

Probability of non de fective bulbs = 1 -0.03 = 0.97

sample size=100

For Binomial Distribution, the Probability density function is

$$p(x) = nC_x p^x q^{n-x}$$

$$p(x) = 100C_x (0.03)^x (0.97)^{100-x}$$

(i) Probability of 0 defective bulb:

$$p(x=0) = 100C_0 (0.03)^0 (0.97)^{100} = (0.97)^{100}$$

(ii) Probability of 1 defective bulb:

$$p(x=1) = 100C_1 (0.03)^1 (0.97)^{100-1} = 100(0.03)(0.97)^{99}$$

(iii) Probability of 2 defective bulbs:

$$p(x=2) = 100C_2 (0.03)^2 (0.97)^{98}$$

(iv) Probability of 3 defective bulbs:

$$p(x=3) = 100c_3(0.03)^3(0.97)^{97}$$

(v) Probability of 4 defective bulbs:

$$p(x=4) = 100c_4(0.03)^4(0.97)^{96}$$

(v) Probability of 5 defective bulbs:

$$p(x=5) = 100c_5(0.03)^5(0.97)^{95}$$

(OR)

8(b) From the following, calculate Karl Pearson's coefficient of Skewness

Class Interval:	130-134	135-139	140-144	145-149	150-154	155-159	160-164
Frequency:	3	12	21	28	19	12	5

Solutions:

X	mid	f	d	fd	d ²	fd ²
129.5-134.5	132	3	-5	-45	25	675
134.5-139.5	137	12	-10	-120	100	1200
139.5-144.5	142	21	-5	-105	25	525
144.5-149.5	147	28	0	0	0	0
149.5-154.5	152	19	5	95	25	475
154.5-159.5	157	12	10	120	100	1200
159.5-164.5	162	5	5	75	25	1125
		100		20		5200

$$\text{Mean} = \bar{x} = A + \frac{\sum fd}{N}, A = 147, \bar{x} = 147 + \frac{20}{100} = 147.2$$

$$S.D = \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2} = \sqrt{\frac{5200}{100} - \left(\frac{20}{100}\right)^2} = 7.20833$$

Mode lies in 144.5-149.5 group which contains the maximum frequency

$$\text{Mode} = L_1 + \frac{f_1 f_2}{2 f_1 - f_0 - f_3} = 144.5 + \frac{28 \times 21}{2 \times 28 - 21 - 19} = 181.25$$

Pearson's coefficient of Skewness:

$$\text{skewness} = \frac{\text{mean} - \text{mode}}{S.D} = \frac{147.2 - 181.25}{7.20833} = -4.72370$$

9(a) Explain different types of sampling methods with their suitability

Solution:

Repeat-Nov-2009

(OR)

- 9(b) There machines A, B and C are used to produce a certain kind of fabrics. The following are the weekly outputs of such machines

A	20	21	23	16	20
B	18	20	17	15	25
C	25	28	22	28	32

Test whether the performance of three machines differ.

Solutions:

Let us take the hypothesis that the performance of three machines does not differ significantly.

Applying F-test,

$$\bar{X} = \frac{100}{5} + \frac{95}{5} + \frac{135}{5} = \frac{20+19+27}{3} + \frac{66}{3} = 22$$

Variance between Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
4	9	25
4	9	25
4	9	25
4	9	25
4	9	25
20	45	125

Sum of squares between Samples = 20+45+125 = 190

Variance within Samples

X_1 $(\bar{X}_1 - \bar{\bar{X}})^2$	X_2 $(\bar{X}_2 - \bar{\bar{X}})^2$	X_3 $(\bar{X}_3 - \bar{\bar{X}})^2$
0	1	4
1	1	1
4	4	25
16	16	1
0	36	25
26	58	56

Sum of squares within Samples = 26+58+56 = 140

Analysis of variances Table

Source of Variation	Sum of squares	Degree of freedom	Mean square
Between Samples	190	2	95
Within Samples	140	12	11.67
Total	330	14	

$$F = \frac{95}{11.67} = 8.14$$

For $V_1 = 2$, $V_2 = 12$, $F_{0.05} = 3.88$
 $8.14 > 3.88$

The calculated value > tabulated value

Hence the hypothesis is rejected

Hence the performance of three machines differ significantly.

10(a) The following data gives the test scores and the sales made by the sales man during a certain period Calculate the coefficient of correlation:

Test scores: 14 19 24 21 26 22 15 20 19

Sales: 31 36 48 37 50 45 33 41 39

Solution:

X	Y	$x = X - \bar{X}$	$y = Y - \bar{Y}$	x^2	y^2	xy
14	31	-6	-9	36	81	54
19	36	-1	-4	1	16	4
24	48	4	8	16	64	32
21	37	1	-3	1	9	-3
26	50	6	10	36	100	60
22	45	2	5	4	25	10
15	33	-5	-7	25	49	35
20	41	0	1	0	1	0
19	39	-1	-1	1	1	1
$\sum X = 180$	$\sum Y = 360$			$\sum x^2 =$	$\sum y^2 = 346$	$\sum xy = 199$

$$N = 9, \bar{x} = \frac{\sum X}{N} = 20, \bar{y} = \frac{\sum Y}{N} = 40$$

X	Y	$x = X - \bar{X}$	$y = Y - \bar{Y}$	x^2	y^2	xy
57	77	-3	-2	9	4	6
58	78	-2	-1	4	1	2
59	75	-1	-4	1	16	4
59	78	-1	-1	1	1	1
60	82	0	3	0	9	0
61	82	1	3	1	9	3
62	79	2	0	4	0	0
64	81	4	2	16	4	8
$\sum X = 480$	$\sum Y = 632$			$\sum x^2 = 36$	$\sum y^2 = 44$	$\sum xy = 24$

$$r = \frac{\sum xy}{\sqrt{\sum x^2 - \sum y^2}} = 0.95$$

(OR)

10(b) Find out the two regression equations from the following and estimate the value of Y

when the value of X is 65:

X:	57	58	59	59	60	61	62	64
Y:	77	78	75	78	82	82	79	81

Solution:

$$\bar{x} = \frac{\sum x}{N} = \frac{480}{8} = 60, \bar{y} = \frac{\sum y}{N} = \frac{632}{8} = 79$$

$$r \frac{\sigma_x}{\sigma_y} = \frac{\sum xy}{\sum y^2} = 0.55, r \frac{\sigma_y}{\sigma_x} = \frac{\sum xy}{\sum x^2} = 0.67$$

Regression equation x on y:

$$x - \bar{x} = r \frac{\sigma_x}{\sigma_y} (y - \bar{y}), \quad x - 60 = 0.55(y - 79)$$

$$x - 60 = 0.55y - 43.45, \quad x = 0.55y + 16.55$$

Regression equation y on x:

$$y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x}), \quad y - 79 = 0.67 (x - 60)$$

$$y = 0.67x + 38.8$$

$$\text{when } x=65, \quad y = 0.67(65) + 38.8, \quad y = 82.35$$

$$A^2 - 4A + 3I = \begin{bmatrix} 5 & -4 \\ -4 & 5 \end{bmatrix} - \begin{bmatrix} 8 & -4 \\ -4 & 8 \end{bmatrix} + 3 \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$A^2 - 4A + 3I = 0$$

Hence proved

7(a) Define probability and explain the importance of this concept in statistics

Definition:

Probability:

The probability of an event is defined as a ratio given as follows;

$$\text{The probability of an event} = \frac{\text{No. of favourable outcome}}{\text{Total number of possible outcome}}$$

Importance of probability in statistics:

- (i) The theory of probability is the base on which the law of statistical regularity and the law of inertia of large numbers are formed.
- (ii) Different tests of significance z –test, xi – tests etc., are derived.
- (iii) It gives solutions to betting and games.
- (iv) The probability theory is a base for the decision theory.
- (v) It is very helpful to foresee the uncertainties of betting and chances of success. All the circumstances are not under the control of human beings. A certain amount of uncertainty always exists. Therefore we depend upon probability.

(OR)

- 7(b) A dairy firm has two milk plants with daily milk production of 6 million liters and 9 million liters respectively. Each day the firm must fulfill the needs of its three distribution centers which have milk requirements of 7, 5 and 3 million liters respectively. Cost of shipping one million liters of milk from each plant to each distribution centre is given in hundreds of rupees below.**

Formulate the L.P. model to minimize the transportation cost.

	Distribution Centres			supply
	D ₁	D ₂	D ₃	
Plants- O ₁	2	3	11	6
Plants -O ₂	1	9	6	9
Demand	7	5	3	

Solution:

Let us identify the two plant locations as O₁, O₂ and distribution centers as D₁, D₂, D₃

Let a_1, a_2 be the supply (available) of milk at O_1, O_2 , respectively

Let b_1, b_2, b_3 be the demand (requirement) of milk at D_1, D_2, D_3 respectively

Let the cost of transporting one million litre of milk from plant O_1 to D_1, D_2, D_3 be

C_{11}, C_{12}, C_{13}

Let the cost of transporting one million litres of milk from plant O_2 to D_1, D_2, D_3 be

C_{21}, C_{22}, C_{23}

Let x_{11}, x_{12}, x_{13} be the amount of milk in millions in litres to be transported from Origin O_1 to the destination D_1, D_2, D_3 respectively

Let x_{21}, x_{22}, x_{23} be the amount of milk in millions in litres to be transported from Origin O_2 to the destination D_1, D_2, D_3 respectively

Then the problem is to determine x_{ij} as to

$$\text{Minimize } \text{Min } z = \sum_{i=1}^2 \sum_{j=1}^3 x_{ij} C_{ij}$$

Subject to the constraints

$$\sum_{j=1}^3 x_{ij} = a_i, \quad i = 1, 2$$

$$\sum_{i=1}^2 x_{ij} = b_j, \quad j = 1, 2, 3$$

and $x_{ij} \geq 0$ for all i and j

Where

$$a_1 = 6, a_2 = 9; b_1 = 7, b_2 = 5, b_3 = 3$$

$$C_{11} = 2, C_{12} = 3, C_{13} = 11, C_{21} = 1, C_{22} = 9, C_{23} = 6$$

[Transportation-out of syllabus]

8(a) The daily temperature recorded in a city in Russia in a year is given below:

Temperature °C	No of days :
-40 to -30	10
-30 to -20	28
-20 to -10	30
-10 to 0	42
0 to 10	65
10 to 20	180
20 to 30	10

	365

Calculate the mean and standard deviation.

Solution:

C.I	m	f	fm	$d = m - \bar{x}$ $= m - 4.28$
-40 to -30	-35	10	-350	-39.28
-30 to -20	-25	28	-700	-29.28
-20 to -10	-15	30	-450	-19.28
-10 to 0	-5	42	-210	-9.28
0 to 10	5	65	320	0.72
10 to 20	15	180	2700	10.72
20 to 30	25	10	250	20.72
		$\sum f = 365$	$\sum fm = 1565$	

$$\bar{x} = \frac{\sum fm}{\sum f} = 4.28$$

d^2	Fd	fd^2
1542.91	-392.8	15429.1
857.31	-819.84	24009.68
371.71	-578.4	11151.3
86.11	-389.76	3616.62
0.5184	46.8	33.6260
114.91	1929.6	20683.8
429.384	207.2	4293.84
	$\sum fd = 2.8$	$\sum fd^2 = 79213.036$

$$\sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2} = 14.7317$$

$$\sigma = 14.7317$$

(OR)

8(b) The following data relates to the age of a group of workers. Calculate the arithmetic mean standard deviation.

Age:	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No of workers;	170	110	80	45	40	30	25

Solution:

Age	m	No.of workers	$d = \frac{m - 37.5}{5}$	d^2	fd	fd^2
20-25	22.5	170	-3	9	-510	1530
25-30	27.5	110	-2	4	-220	440

30-35	32.5	80	-1	1	-80	80
35-40	37.5	45	0	0	0	0
40-45	42.5	40	1	1	40	40
45-50	47.5	30	2	4	60	120
50-55	52.5	25	3	9	75	225
		$\sum f = 500$			$\sum fd = -635$	$\sum fd^2 = 2435$

$$\bar{x} = A + \frac{\sum fd}{f} \times c = 37.5 - \frac{635}{500} \times 5 = 37.5 - 6.35 = 31.15$$

$$\bar{x} = 31.15$$

$$\sigma = \sqrt{\frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f}\right)^2} \times c = \sqrt{\frac{2435}{500} - \left(-\frac{635}{500}\right)^2} \times 5 = \sqrt{4.87 - 1.61} \times 5 = 9.05$$

$$\text{mean} = 31.5; \sigma = 9.05$$

- 9(a) **Point out the difference between a sample survey and a census survey. Under what Conditions are these undertaken? Explain the law which forms the basis of sampling.**

Solution:

Census and sampling are methods of collecting data about the population.

Every government requires specific data and information about the population to make programs and policies that match the needs and requirements of the population

There are stark differences between Census and sampling, though both serve the purpose of providing data and information about a population.

- 1. When the whole population is taken into account, data collection is called Census**

Method. Whereas when a small group that is representative of the entire population is

used, it is called a Sample Method

- 2. A census measures absolutely everyone in the whole country. A representative sample, measures a small number of people who fit a particular category of people**
- 3. However accurately a sample from a population may be generated there will always be margin for error, whereas in case of Census, entire population is taken into account and as such it is most accurate.**

- 4 Census is very time consuming and expensive, whereas sampling is quick and inexpensive. owever, if the next Census is far away, sampling is the most convenient method of Collecting data**

(OR)

- 9(b) In a sample random of 600 mean taken from a big city, 400 are found to be smokers. In another simple random sample 900 mean taken from another city 450 are smokers. Do the data indicate that there is a significant difference in the habit of smoking in the two cities?

Solution:

Given: $x_1 = 400$, $x_2 = 450$, $n_1 = 600$, $x_1 = 450$, $n_2 = 900$

$$p_1 = \text{probability of smoking in the I city} = \frac{400}{600} = 0.667$$

$$p_2 = \text{probability of smoking in the II city} = \frac{450}{900} = 0.5$$

$$p = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2} = \frac{600(0.667) + 900(0.5)}{600 + 900} = \frac{850.2}{1500} = 0.5668$$

$$q = 1 - p = 1 - 0.5668 = 0.4332$$

Null hypothesis: The two samples have been drawn from the same population

Alternative hypothesis: The two samples have not been drawn from the same population

$$S.E = \sqrt{pq \left[\frac{1}{n_1} + \frac{1}{n_2} \right]} = \sqrt{(0.5668)(0.4332) \left[\frac{1}{600} + \frac{1}{900} \right]} = \sqrt{(0.2455) \frac{15}{5400}} = 0.026$$

$$Z = \frac{P_1 - P_2}{S.E} = \frac{0.667 - 0.5}{0.026} = \frac{0.167}{0.026} = 6.432$$

Since the difference is more than 2.58 (S.E at 1% level of significance) the hypothesis is rejected. Hence there is a significant difference in the habit of smoking in the two cities.

- 10(a) Find Karl Pearson's coefficient of correlation from the following data:

Wages :	100	101	102	102	100	99	97	98	96	95
Cost of living:	98	99	99	97	95	92	95	94	90	91

Solution:

X	A=99 dx=X-A	dx ²	Y	B=95 dy=Y-B	dy ²	dxdy
100	+1	1	98	+3	9	3
101	+2	4	99	+4	16	8
102	+3	9	99	+4	16	12
102	+3	9	97	+2	4	6
100	+1	1	95	0	0	0
99	0	0	92	-3	9	0
97	-2	4	95	0	0	0
98	-1	1	94	-1	1	1
96	-3	9	90	-5	25	15
95	-4	16	91	-4	16	16

$\sum x = 90$	$\sum dx = 0$	$\sum dx^2 = 54$	$\sum y = 950$	$\sum dy = 0$	$\sum dx^2 = 96$	$\sum dxdy = 61$
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$$r = \frac{\sum dxdy}{\sqrt{\sum dx^2 \sum dy^2}} = \frac{61}{\sqrt{54 \times 96}} = 0.847; r=0.847$$

(OR)

10(b) Given the following data, calculate the expected value of Y when X=12

	x	y	
Average	7.6	14.8	
Standard deviation	3.6	2.5,	r=0.99

Solution:

We have to calculate the expected value of y when x is 12. so we have to find out regression equation of y on x.

Mean of x-series = $\bar{x} = 7.6$

S.D of x-series = $\sigma_x = 3.6$

Mean of y-series = $\bar{y} = 14.8$

S.D of y-series = $\sigma_y = 2.5$

Correlation co. efficient $r = 0.99$

Regression of y on x:

$$y - \bar{y} = r \frac{\sigma_y}{\sigma_x} (x - \bar{x})$$

$$y - 14.8 = 0.99 \times \frac{2.5}{3.6} (x - 7.6) = 0.688x - 5.23$$

$$y = 0.688x + 9.57$$

To find y when x=12

$$y = 0.688x + 9.57$$

$$y = 0.688(12) + 9.57 = 17.826 = 17.826$$

MBA - DEGREE EXAMINATION – NOV- 2011 - P8MBA3
MATHEMATICS AND STATISTICS

(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

- 1. (a) What do you mean by a function? Given $y = 5x - 1$ Is it a function? Give reason.**

Solution: $y = 5x - 1$ is a function.

The reason:

$$y = 5x - 1$$

$$\text{When } x = 1, y = 4; \quad x = -1, y = -6; \quad x = 0, y = -1$$

For each value of x there exists a unique value of y

Hence $y = 5x - 1$ is a function.

(Or)

- (b) Find maximum and minimum values of the following function: $2x^3 - 9x^2 + 12x - 1$**

Solution:

$$y = 2x^3 - 9x^2 + 12x - 1$$

$$\frac{dy}{dx} = 6x^2 - 18x + 12$$

$$\frac{dy}{dx} = 0 \Rightarrow 6x^2 - 18x + 12 = 0$$

$$x^2 - 3x + 2 = 0 \Rightarrow (x-1)(x-2) = 0 \Rightarrow x = 1, x = 2$$

$$\frac{d^2y}{dx^2} = 12x - 18$$

$$\text{when } x=1, \frac{d^2y}{dx^2} = -6 = \text{negative}$$

$$\text{when } x=2, \frac{d^2y}{dx^2} = +6 = \text{positive}$$

Hence the maximum is obtained at $x=1$

$$\text{the maximum value is obtained as } y = 2(1)^3 - 9(1)^2 + 12.1 - 1 = 4$$

the minimum is obtained at $x=2$

$$\text{the minimum value is obtained as } y = 2(2)^3 - 9(2)^2 + 12.2 - 1 = 4 = 16 - 36 + 24 - 1 = 3$$

2. (a) Solve the following LPP graphically:

$$\text{Max } z = 45x_1 + 80x_2$$

subject to

$$5x_1 + 20x_2 \leq 400$$

$$10x_1 + 15x_2 \leq 450$$

$$x_1, x_2 \geq 0$$

Solution:

Consider

$$5x_1 + 20x_2 \leq 400$$

(0,0) Lies in the feasible region

$$5x_1 + 20x_2 = 400 \quad (1)$$

When $x_1 = 0, x_2 = 20$

Then the point is (0, 20)

When $x_2 = 0, x_1 = 80$

Then the point is (80, 0)

Consider

$$10x_1 + 15x_2 \leq 450$$

(0,0) Lies in the feasible region

$$10x_1 + 15x_2 = 450 \quad (2)$$

When $x_1 = 0, x_2 = 30$

Then the point is (0, 30)

When $x_2 = 0, x_1 = 45$

Then the point is (45, 0)

The feasible region is OABC

To find the maximum point:-

$$z = 45x_1 + 80x_2$$

$$O(0,0); \quad z = 0$$

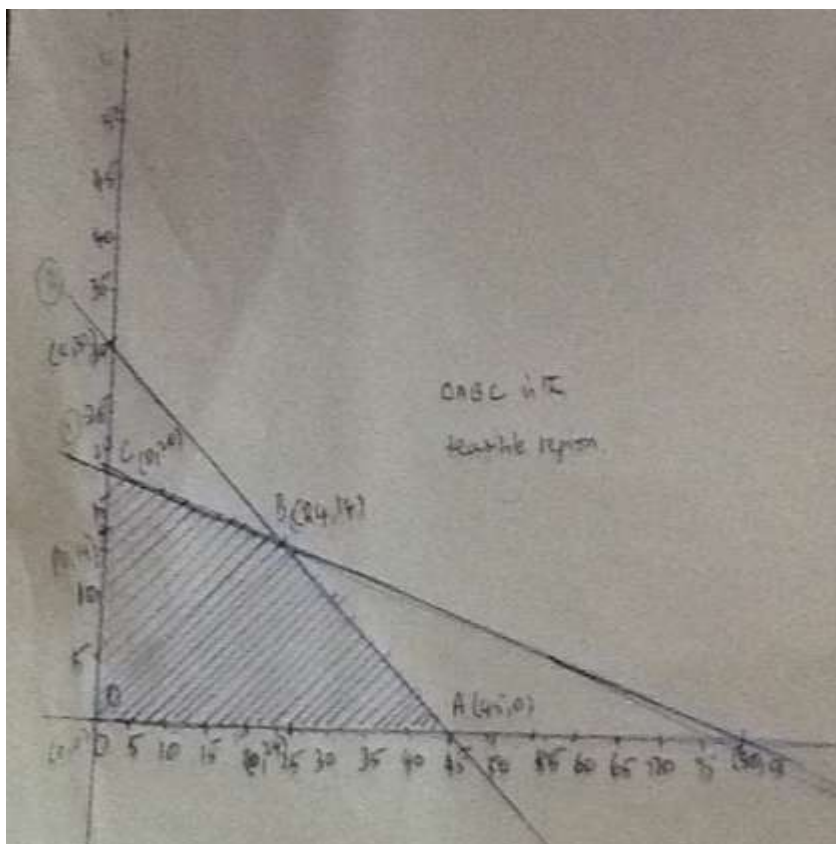
$$A(45,0); \quad z = 45 \cdot 45 = 2025$$

$$B(24,14); \quad z = 45(24) + 80(14) = 2200$$

$$C(0,20); \quad z = 45(0) + 80(20) = 1600$$

The maximum is obtained at

$B(24,14)$ and the maximum value is $z = 2200$



(Or)

(b) Prove that

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$$

Solution:

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = \begin{vmatrix} 0 & 0 & 1 \\ a-b & b-c & c \\ a^2-b^2 & b^2-c^2 & c^2 \end{vmatrix} \quad \begin{array}{l} c_1 \rightarrow c_1 - c_2 \\ c_2 \rightarrow c_2 - c_3 \end{array}$$

$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c) \begin{vmatrix} 0 & 0 & 1 \\ 1 & 1 & c \\ a+b & b+c & c^2 \end{vmatrix}$$

$$= (a-b)(b-c)[0-0+b+c-a-b] = (a-b)(b-c)(c-a)$$

Hence the result.

3. (a) From the following frequency distribution, find out mean wages of the workers

Wages	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150
No. of workers	12	18	35	42	50	45	20	8

Solution:

Wages(x)	No. of workers (f)	m	fm
70-80	12	75	900
80-90	18	85	1530
90-100	35	95	3325
100-110	42	105	4410
110-120	50	115	5750
120-130	45	125	5625
130-140	20	135	2700
140-150	8	145	1160
	$\sum f = 230$		$\sum fm = 25400$

$$\bar{x} = \frac{\sum fm}{\sum f} = \frac{25400}{230} = 110.435$$

(Or)

(b) If an average of 8 ships out of 10 arrives safely to ports obtain mean and standard deviation of number of ships returning safely out of total of 150 ships

Solution:

Probability of safety arrival

$$p = \frac{8}{10} = 0.8$$

$$q = 1 - p = 1 - 0.8 = 0.2$$

Mean number of ships returning safely is given by

$$m = np = 150 \times 0.8 = 120$$

S.D will be given by

$$\sigma = \sqrt{npq} = \sqrt{150 \times 0.8 \times 0.2} = \sqrt{24} = 4.898$$

4. (a) Explain the following terms:

(i) Population (ii) Sample (iii) Null and Alternative Hypotheses

Solution: Repeat

(Or)

(b) Give an account for non-sampling errors.

Solution: Repeat

5(a) Find out rank correlation:

Maths	29	32	53	47	45	321	70	45	70	53
Hindi	56	60	72	48	72	35	67	67	75	31

Solution:

Maths (x)	Hindi(y)	x_i	y_i	$d_i = x_i - y_i$	d_i^2
29	56	10	7	3	9
32	60	8.5	6	2.5	6.25
53	72	3.5	2.5	1	1
47	48	5	8	-3	9
45	72	6.5	2.5	4	16
32	35	8.5	9	-0.5	0.25
70	67	1.5	4.5	-3	9
45	67	6.5	4.5	2	4
70	75	1.5	1	0.5	0.25
53	31	3.5	10	-6.5	42.5
					$\sum d_i^2 = 97$

$$\rho = 1 - \frac{1}{n(n^2 - 1)} 6 \left[\sum d^2 + \frac{m(m^2 - 1)}{12} + \frac{m(m^2 - 1)}{12} + \frac{m(m^2 - 1)}{12} + \frac{m(m^2 - 1)}{12} + \frac{m(m^2 - 1)}{12} + \frac{m(m^2 - 1)}{12} \right]$$

$$\rho = 1 - \frac{1}{10(10^2 - 1)} \cdot 6 \left[\sum 97 + \frac{2(2^2 - 1)}{12} + \frac{2(2^2 - 1)}{12} + \frac{2(2^2 - 1)}{12} + \frac{2(2^2 - 1)}{12} + \frac{2(2^2 - 1)}{12} + \frac{2(2^2 - 1)}{12} \right]$$

$$\rho = 1 - \frac{1}{990} 6[97 + 0.5 + 0.5 + 0.5 + 0.5 + 0.5 + 0.5] = 1 - \frac{1}{990} 6[97 + 3] = 1 - \frac{600}{990} = 1 - 0.6060$$

$$\rho = 0.394$$

(Or)

(b) Calculate the regression equation from the following:

x	1	2	3	4	5
y	138	180	140	184	166

Solution:

x	y	xy	x^2	y^2
1	138	138	1	19044
2	180	360	4	32400
3	142	426	9	20164
4	184	736	16	33856

5	166	830	25	27556
$\sum x = 15$	$\sum y = 810$	$\sum xy = 2490$	$\sum x^2 = 55$	$\sum y^2 = 133020$

$$\bar{x} = \frac{\sum x}{n} = \frac{15}{5} = 3, \quad \bar{y} = \frac{\sum y}{n} = \frac{810}{5} = 162$$

x on y regression line

$$x - \bar{x} = \frac{r\sigma_x}{\sigma_y}(y - \bar{y}); \quad \frac{r\sigma_x}{\sigma_y} = b_{xy}$$

$$x - \bar{x} = b_{xy}(y - \bar{y}) \quad (1)$$

Now

$$b_{xy} = \frac{n\sum xy - \sum x \sum y}{n\sum y^2 - (\sum y)^2} = \frac{5(2490) - 15(810)}{5(133020) - (810)^2} = \frac{300}{900} = 0.033$$

$$, x - 3 = 0.033(y - 162)$$

$$x - 3 = 0.033(y - 162) = 0.033y - 5.346$$

$$x = 0.033y - 2.346$$

$$x = 0.033y - 2.346$$

y on x regression line

$$y - \bar{y} = \frac{r\sigma_y}{\sigma_x}(x - \bar{x}); \quad \frac{r\sigma_y}{\sigma_x} = b_{yx}$$

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

Now

$$b_{yx} = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2} = \frac{5(2490) - 15(810)}{5(55) - (15)^2} = \frac{300}{50} = 6$$

$$, y - 162 = 6(x - 3)$$

$$y - 162 = 6x - 18$$

$$y = 6x + 144$$

x on y regression line

$$x = 0.033y - 2.346$$

y on x regression line

$$y = 6x + 144$$

SECTION-B-(5X10=50)

6. (a) A Function $f(x)$ is defined as follows:

$$f(x) = \begin{cases} 1-x, & 0 \leq x \leq 1 \\ x-1, & x \geq 1 \end{cases}$$

Find $f(1/2)$, is $f(x)$ continuous at $x=1$

Solution:

A function $f(x)$ is said to be continuous at $x=a$ if and only if

(i) $f(x)$ is defined at the point $x=a$

(ii) $\lim_{x \rightarrow a} f(x)$ exists and

(iii) $\lim_{x \rightarrow a} f(x) = a$

A function $f(x)$ is said to be continuous in the interval (a,b) or $[a,b]$ if it is continuous at each point of the interval. Otherwise, it is said to be discontinuous

$(a,b) = \{x \text{ is a real number such that } a < x < b\}$

$[a,b] = \{x \text{ is a real number such that } a \leq x \leq b\}$

To verify the continuity at $x=1$ for $f(x)$

$$f(x) = \begin{cases} 1-x, & 0 \leq x \leq 1 \\ x-1, & x \geq 1 \end{cases}$$

When $x=1$,

Left limit :

When $x=1$, $f(1)=1-1=0$, in $0 \leq x \leq 1$

Right limit :

$f(x)=x-1$, $x \geq 1$

When $x=1$, $f(1)=1-1=0$, in $x \geq 1$

Hence, Left limit $= \lim_{x \rightarrow 1+1} f(x) = \text{Right limit} = \lim_{x \rightarrow 1-1} f(x) = 1$

Hence, $f(x)$ continuous at $x=1$

The value of $f(1/2) = 1 - 1/2 = 1/2$

(Or)

(b) (i) If A and B are two $m \times n$ matrices and 0 is the null matrix of order $m \times n$ then show that

$A+B=0$ implies $A=-B$ and $B=-A$

(ii) If A is an $m \times n$ matrix, Show that $-(-A) = A$

(iii) If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$ **and** $B = \begin{pmatrix} -3 & -2 \\ 1 & -5 \\ 4 & 3 \end{pmatrix}$ **Find** $D = \begin{pmatrix} p & q \\ r & s \\ t & u \end{pmatrix}$ **such that** $A+B-D=0$

Solution:

(i) Let A and B are two $m \times n$ matrices and 0 is the null matrix of order $m \times n$

$$A + B = 0 = B + A$$

Let

$$A = a_{ij}^{m \times n} \text{ and } B = b_{ij}^{m \times n}$$

$$A + B = a_{ij} + b_{ij} = 0 \Rightarrow a_{ij} = -b_{ij}$$

$$A = -B$$

(ii) A is an $m \times n$ matrix

$$A = a_{ij}^{m \times n}$$

$$-A = -a_{ij}^{m \times n}$$

$$-(-A) = -(-a_{ij}) = a_{ij} = A$$

$$-(-A) = A$$

(iii) Given $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix}$, $B = \begin{pmatrix} -3 & -2 \\ 1 & -5 \\ 4 & 3 \end{pmatrix}$, $D = \begin{pmatrix} p & q \\ r & s \\ t & u \end{pmatrix}$

$$A + B - D = \begin{pmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{pmatrix} + \begin{pmatrix} -3 & -2 \\ 1 & -5 \\ 4 & 3 \end{pmatrix} - \begin{pmatrix} p & q \\ r & s \\ t & u \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$$

$$A + B - D = \begin{pmatrix} 1-3-p & 2-2-q \\ 3+1-r & 4-5-s \\ 5+4-t & 6+3-u \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$$

comparing corresponding terms,

$$1-3-p = -2 - p = 0 \Rightarrow p = -2,$$

$$2-2-q = 0 - q = 0 \Rightarrow q = 0, \dots$$

similarly we have The other elements

$$D = \begin{pmatrix} p & q \\ r & s \\ t & u \end{pmatrix} = \begin{pmatrix} -2 & 0 \\ 4 & -1 \\ 9 & 9 \end{pmatrix}$$

7. (a) The items in three identical boxes are as follows

Box	Components	Defective Components
I	2000	25%
II	5000	20%
III	2000	600

A box is selected at random and a component is removed at random from the box. What is the probability that this component is defective? What is the probability that it was taken out from the second box?

Solution:

A box is selected at random

a) Prior probabilities:

$$p(A_1) = \text{The probability of selecting box I} = \frac{1}{3}$$

$$p(A_2) = \text{The probability of selecting box II} = \frac{1}{3}$$

$$p(A_3) = \text{The probability of selecting box III} = \frac{1}{3}$$

E = The event of drawing a defective item

$$p\left(\frac{E}{A_1}\right) = \text{The probability that the item is drawn from box I and it is defective; } p\left(\frac{E}{A_1}\right) = 0.25$$

$$p\left(\frac{E}{A_2}\right) = \text{The probability that the item is drawn from box II and it is defective; } p\left(\frac{E}{A_2}\right) = 0.20$$

$$p\left(\frac{E}{A_3}\right) = \text{The probability that the item is drawn from box III and it is defective}$$

$$p\left(\frac{E}{A_3}\right) = \frac{600}{2000} = 0.30$$

Joint probabilities:

$$p(A_1 \cap E) = p(A_1) \cdot p\left(\frac{E}{A_1}\right) = \frac{1}{3} \times 0.25 = 0.0833$$

$$p(A_2 \cap E) = p(A_2) \cdot p\left(\frac{E}{A_2}\right) = \frac{1}{3} \times 0.2 = 0.067$$

$$p(A_3 \cap E) = p(A_3) \cdot p\left(\frac{E}{A_3}\right) = \frac{1}{3} \times 0.3 = 0.1$$

$$p(E) = \sum p(A_i) \cdot p\left(\frac{E}{A_i}\right) = 0.0833 + 0.067 + 0.1 = 0.2503$$

Posterior probability:

$$p\left(\frac{A_1}{E}\right) = \text{The probability that the item is defective and it is drawn from box I}$$

$$= p\left(\frac{A_1}{E}\right) = \frac{p(A_1 \cap E)}{p(E)} = \frac{0.0833}{0.2503} = 0.3328$$

$p\left(\frac{A_2}{E}\right)$ = The probability that the item is drawn from box II and it is defective

$$p\left(\frac{A_2}{E}\right) = \frac{p(A_2 \cap E)}{p(E)} = \frac{0.067}{0.2503} = 0.26768$$

$p\left(\frac{A_3}{E}\right)$ = The probability that the item is drawn from box II and it is defective

$$p\left(\frac{A_3}{E}\right) = \frac{p(A_3 \cap E)}{p(E)} = \frac{0.1}{0.2503} = 0.3395$$

The probability that it was taken out from the second box is

$$\frac{0.067}{0.067 + 0.0833 + 0.1} = \frac{0.067}{0.2503} = 0.26768$$

(Or)

(b) If A, B, C are any three events such that, $P(A) = P(B) = P(C) = \frac{1}{4}$

$$P(A \cap B) = P(B \cap C) = 0; P(C \cap A) = \frac{1}{8}.$$

What is the probability that at least one of the events A, B, C occurs, given

$$P(A \cap B \cap C) = \frac{2}{8}$$

Solution:

$$P(A) = P(B) = P(C) = \frac{1}{4}, P(A \cap B) = P(B \cap C) = 0; P(C \cap A) = \frac{1}{8}$$

The probability that at least one of the events A, B, C occurs is given by

$$\begin{aligned} P(A \cup B \cup C) &= P(A) + P(B) + P(C) - P(A \cap B) - P(B \cap C) - P(C \cap A) + P(A \cap B \cap C) \\ &= \frac{1}{4} + \frac{1}{4} + \frac{1}{4} - 0 - 0 - \frac{1}{8} + \frac{2}{8} = \frac{7}{8} \end{aligned}$$

8. (a) (i) If the coefficient of variation of a series is 4.42 percent and Its standard deviation is 57.85. Find out the mean.

(ii) The first of two sub-groups has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standard deviation $\sqrt{13.44}$. Find the standard deviation of the second sub-group.

(iii) The mean of 5 observations is 4.4 and the variance is 8.24. If three of the observations are 1, 2 and 6. Find the other two.

(iv) Mean and standard deviation of two distributions of 100 and 150 items and 50, 5 and 40, 6 respectively. Find the mean and standard deviation of all the 250 items taken together.

Solution:

(i) The coefficient of variation of a series $C.V = \frac{\sigma}{\bar{x}} \times 100$

$$4.42 = \frac{\sigma}{\bar{x}} \times 100 = \frac{57.85}{\bar{x}} \times 100$$

$$\bar{x} = \frac{57.85}{4.42} \times 100 = 1308.8$$

(ii) The standard deviation of the second sub-group.

$$n_1 = 100; ; x_1 = 15; \sigma_1 = 3;$$

$$n_1 + n_2 = 250; n_2 = 250 - 100 = 150$$

$$\sigma = \sqrt{13.44}; \sigma^2 = 13.44; \bar{x} = 15.6$$

$$\bar{x} = \frac{n_1 x_1 + n_2 x_2}{n_1 + n_2} \Rightarrow$$

$$\sigma^2 = \frac{n_1 \sigma_1^2 + n_2 \sigma_2^2}{n_1 + n_2}; 13.44 = \frac{100(9) + 150 \sigma_2^2}{250}$$

$$13.44(250) - 900 = 150 \sigma_2^2$$

$$\sigma_2^2 = \frac{2460}{150} = 16.4; \sigma_2 = 4.04$$

(iii) The mean of 5 observations is 4.4 and the variance is 8.24.

Three of the observations are 1, 2 and 6.

Mean:

$$\bar{x} = \frac{\sum x}{n}; n = 5; \bar{x} = 4.4; \sum x = n\bar{x} = 5 \times 4.4 = 22$$

$$\bar{x} = \frac{1 + 2 + 6 + x_1 + x_2}{5} = 4.4$$

$$x_1 + x_2 = 22 - 9 = 13$$

$$x_1 + x_2 = 13$$

Let the two missing items be x_1 and x_2

The two missing values are 9, 4

(iv) Mean and standard deviation of two distributions of 100 and 150 items and 50, 5 and 40, 6 respectively. Find the mean and standard deviation of all the 250 items taken together.

$$n_1 = 100; x_1 = 50; \sigma_1 = 5;$$

$$n_2 = 150; x_2 = 40; \sigma_2 = 6;$$

$$n_1 + n_2 = 250;$$

$$\sigma = \sqrt{13.44}; \sigma^2 = 13.44; \bar{x} = 15.6$$

$$\bar{x} = \frac{n_1 x_1 + n_2 x_2}{n_1 + n_2} = \frac{100(50) + 150(40)}{250} = 44$$

$$\sigma^2 = \frac{n_1 \sigma_1^2 + n_2 \sigma_2^2}{n_1 + n_2} = \frac{100(25) + 150(36)}{250} = 31.6$$

$$\sigma = 5.621$$

The mean and standard deviation of all the 250 items taken together are given

Mean = 44; Standard deviation = 5.621

(Or)

(b) In an entrance test for admission 900 students appeared. Their average marks were 50 and standard deviation 20. Assuming normal distribution, Find:

(i) The number of students securing between 30 and 70.

(ii) The number of students exceeding the score of 65.

Solution: $\bar{x} = 50$; $\sigma = 20$

(i) The number of students securing between 30 and 70

$$x = 30; z = \frac{x - \bar{x}}{\sigma} = \frac{30 - 50}{20} = -1$$

$$x = 70; z = \frac{x - \bar{x}}{\sigma} = \frac{70 - 50}{20} = 1$$

Area between $z = -1$ and $z = 1$ is $2(.34134) = 0.6826$

The no. of students securing between 30 and 70 is $900 \times 0.6826 = 614.34$

Nearly 614 students

(i) The number of students exceeding the score of 65.

$$x = 65; z = \frac{x - \bar{x}}{\sigma} = \frac{65 - 50}{20} = 0.75$$

Area between $z = 0$ and $z = 0.75$ is $= 0.2734$

Area greater than 75 is $0.5 - 0.2734 = 0.2266$

The number of students exceeding the score of 65 is $900 \times 0.2266 = 203.9 = 204$

9 (a) For a population of 2000 students living in hostels, the monthly mean expenditure on 3 meals a day is Rs.500 with a variance of Rs.81. If sampling with replacement, find the probability that random sample of 36 students from this populations yields a mean expenditure of (i) Less than Rs.495 and (ii) Find the probability that a mean expenditure is more than Rs.495 and the sampling is without replacement

Solution: Given, $n = 36$; $\bar{x} = 495$; $\mu = 500$; $\sigma^2 = 81$; $\sigma = 9$;

Sampling with replacement:

$$N = 2000, n = 36, \sigma_x = \frac{\sigma}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}},$$

The probability that random sample of 36 students from these populations yields a mean expenditure of

(i) Less than Rs.495

For finite population with replacement, we have to use finite population multiplier given by

$$\sqrt{\frac{N-n}{N-1}} \text{ when } N \text{ is not large, } \frac{n}{N} = \frac{36}{2000} = 0.018 < 0.05 \text{ then we can ignore the multiplier}$$

Hence

$$z = \frac{\mu - \bar{x}}{\frac{\sigma}{n}}, \quad z = \frac{495 - 500}{9/n} < 495$$

$$\Rightarrow \frac{-n}{9} < 99 \Rightarrow n < -891$$

$$p(z) = \frac{|\bar{x} - \mu|}{\frac{\sigma}{n}} = \frac{|495 - 500|}{\frac{9}{36}} = \frac{5}{\frac{9}{6}} = 30/9 = -3.33$$

$$p(z < -3.33) = 0.0004$$

When

$$n > 36, p(z) \rightarrow 0$$

$$p(z < -16.5) = 0, z = 0$$

$$n > 36, p(z) \rightarrow 0$$

$$p(z) = \frac{|495 - 500|}{\frac{9}{\sqrt{891}}} = \frac{-5 \times 29.9}{9} = -5 \times 3.33 = 16.5$$

$$p(z < -16.5) = 0$$

The probability that a mean expenditure is more than Rs.495 and the sampling is without replacement:

$$p(z < 495) = 0.0004$$

$$p(z > 495) = 1 - 0.000 = 0.9996$$

(b) Two independent samples of 8 and 7 items respectively had the following values of the variables. Do the estimates of the population variance differ significantly? Given that for (7, 6) if the value of F at 5% level of significance is 4.21.

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	

Solution: Let us take the hypothesis that the two populations have the same variance.

Applying F test: $F = \frac{S_1^2}{S_2^2}$

Sample I X_1	$X_1 - \bar{X}_1 = x_1$ $\bar{X}_1 = 11.75$	x_1^2	Sample II X_2	$X_2 - \bar{X}_2 = x_2$ $\bar{X}_2 = 10.43$	x_2^2
9	-2.75	7.5625	10	-0.43	0.1849
11	-0.75	0.5625	12	1.57	2.4649
13	1.25	1.5625	10	-0.43	0.1849
11	-0.75	0.5625	14	3.57	12.7449
15	3.25	10.5625	9	-1.43	2.0449
9	-2.75	7.5625	8	-2.43	5.9049
12	0.25	0.0625	10	-0.43	0.1849
14	2.25	5.0625			
$\sum X_1 = 94$	$\sum x_1 = 0$	$\sum x_1^2 = 33.5$	$\sum X_2 = 73$	$\sum x_2 = 0.01$	$\sum x_2^2 = 23.7143$

$$\bar{X}_1 = \frac{\sum X_1}{n_1} = \frac{94}{8} = 11.75 \quad \bar{X}_2 = \frac{\sum X_2}{n_2} = \frac{73}{7} = 10.428$$

$$S_1^2 = \frac{\sum x_1^2}{n_1 - 1} = \frac{33.5}{8 - 1} = \frac{33.5}{7} = 4.78571$$

$$S_2^2 = \frac{\sum x_2^2}{n_2 - 1} = \frac{23.7143}{7 - 1} = \frac{23.7143}{6} = 3.9524$$

$$F = \frac{S_1^2}{S_2^2} = \frac{4.7857}{3.9524} = 1.2108; F_{0.05}(7, 6) = 4.21$$

Table value=4.21; Calculated value=1.2108

Since the calculated value is less than the table value the hypothesis is accepted.

Hence the two populations have the same variance

10 (a) A random sample of 20 pairs of observations given $r=0.5$ cm it be regarded as drawn from a bi-variate

Solution:

$$\rho = 0.6; r = 0.5; n = 20$$

$$H_0 := \rho = 0.6; H_1 := \rho \neq 0.6$$

$$Z = \frac{1}{2} \log_e \frac{1+r}{1-r}; Z = \frac{1}{2} \log_e 10 \cdot \log_{10} \frac{1+r}{1-r};$$

$$Z = \frac{1}{2} \cdot 3.026 \cdot \log_{10} \frac{1+0.6}{1-0.6} = 1.1513 \log_{10} \frac{1.6}{0.4} = 1.1513 \log_{10} 4$$

$$Z = 1.1513 \times 0.6020 = 0.6931$$

$$Z_0 = \frac{1}{2} \log_e \frac{1+\rho}{1-\rho}; \quad Z = \frac{1}{2} \log_e 10 \cdot \log_{10} \frac{1+\rho}{1-\rho};$$

$$Z_0 = \frac{1}{2} \cdot 3.026 \cdot \log_{10} \frac{1+0.5}{1-0.5} = 1.1513 \log_{10} \frac{1.5}{0.5} = 1.1513 \cdot \log_{10} 3$$

$$Z_0 = 1.1513 \times 0.4771 = 0.5493$$

$$Z = \frac{|Z - Z_0|}{\sqrt{\frac{1}{N-3}}} = \frac{|0.6931 - 0.5493|}{\sqrt{\frac{1}{20-3}}} = 0.1438 \times 4.1231 = 0.5929$$

$$Z = 0.5929$$

95 percent confidence limits=1.96 Since the calculated value is less than the table value the hypothesis is accepted. It can be regarded as drawn from a bi-variate normal population having the correlation as 0.6.

95 percent confidence limits for the population correlation coefficient:

$$r \pm r + 1.96 \frac{r}{\sqrt{n}} = 0.6 + 1.96 \frac{0.6}{\sqrt{20}} = 0.6 + 0.26 = 0.86$$

(Or)

10 (b) The following data give the height in inches (x) and the weight in lbs (y) of a random sample of 10 students from a large group of students of age 17 years. Find the two regression lines

Height x'	61	68	68	64	70	63	62	64	67
Weight y'	112	123	130	115	125	100	113	116	126

Solution:

x	y	xy	x ²	y ²
61	112	6832	3721	12544
68	123	8364	624	15129
68	130	8840	4624	16900
64	115	7360	4096	13225
65	110	7150	4225	12100
70	125	8750	4900	15625
63	100	6300	3969	10000
62	113	7006	3844	12769
64	116	7424	4096	13456
67	126	8442	4489	15876
$\sum x = 652$	$\sum y = 1170$	$\sum xy = 76468$	$\sum x^2 = 42588$	$\sum y^2 = 137624$

$$\bar{x} = \frac{\sum x}{n} = \frac{652}{10} = 65.2, \quad \bar{y} = \frac{\sum y}{n} = \frac{1170}{10} = 117$$

y on x regression line; $y - \bar{y} = b_{yx}(x - \bar{x})$

$$b_{yx} = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2} = \frac{10(76468) - 652(1170)}{10(4258855) - (652)^2} = \frac{1840}{776} = 2.371$$

$$b_{yx} = 2.371$$

$$, y - 117 = 2.371x - 154.589$$

$$y = 2.371x - 37.589$$

Given $x = 69$

$$y = 2.371(69) - 37.589; y = 126.01$$

x on y regression line; $x = 0.033y - 2.346$

y on x regression line; $y = 6x + 144$

MBA - Degree Examination –NOV.2013 - P8MBA3
Mathematics and Statistics
 (With Answers)

SECTION – A (5 X 5 = 25)

1. (a) A manufacturer produces two types of products A and B. these products are processed in the same machine It takes 10 minutes to process one unit of A and 2 minutes to process one unit of B. The machine operates for a maximum of 35 hours. Product A requires 2 kg of raw material and product B requires 1 kg of raw materials. The maximum available raw material is 600kg. Per unit profit on A is Rs.4 whereas on B is Rs.6. Formulate the above problem into an L.P.P.

Solution:

Let x_1 = No of product A, x_2 = No of product B

	Machine time(minutes)	Raw Materials(kgs)	Profit (Rs)
A	10	2	4
B	2	1	6
Available hrs	35	600	

Objective function is given by

$$\max Z = 4x_1 + 6x_2$$

Subject to the constraint

$$10x_1 + 2x_2 \leq 35$$

$$2x_1 + x_2 \leq 600$$

Non -negative restriction is

$$x_1, x_2 \geq 0$$

(OR)

- 1(b) Explain Maxima and Minima criteria with examples:

Solution:

Increasing function:

If $y = f(x)$ is a function of x and y increases as x increases in a certain interval, then y is called an Increasing function of x in that interval.

Decreasing function:

If $y = f(x)$ is a function of x and y decreases as x increases in a certain interval, then y is called a Decreasing function of x in that interval.

Test for increasing function:

If $y = f(x)$ is a function of x and y increases as x increases in a certain interval,

then $\frac{dy}{dx} > 0$

Test for decreasing function:

If $y = f(x)$ is a function of x and y decreases as x increases in a certain interval,
then $\frac{dy}{dx} < 0$

Maximum value of $y = f(x)$:

A function $y = f(x)$ is said to have a maximum value at $x = a$, if $f(a)$ is greater than any other value, that $f(x)$ can have in some small neighborhood of $x = a$

Minimum values of $y = f(x)$:

A function $y = f(x)$ is said to have a minimum value at $x = a$, if $f(a)$ is less than any other value that $f(x)$ can have in some small neighborhood of $x = a$

Maxima:

The points where a function has a maximum value are called Maxima

Minima:

The points where a function has a minimum value are called Minima

Maxima and Minima are also called turning points or stationary points

Condition for the Maximum values of a function at

at $x = a$

$$\frac{dy}{dx} = 0 \text{ at } x = a$$

$$\frac{d^2y}{dx^2} = \text{negative at } x = a$$

Condition for the Minimum values of a function at

at $x = a$

$$\frac{dy}{dx} = 0 \text{ at } x = a$$

$$\frac{d^2y}{dx^2} = \text{positive at } x = a$$

Example:

Find the maximum or minimum value of $2x^3 - 9x^2 + 12x + 6$

Solution:

Find the maximum or minimum value of $2x^3 - 9x^2 + 12x + 6$

Solution: Let

$$f(x) = 2x^3 - 9x^2 + 12x + 6$$

$$f'(x) = 6x^2 - 18x + 12$$

$$f'(x) = 6(x^2 - 3x + 2)$$

$$f'(x) = 6(x - 2)(x - 1) = 0$$

$$(x - 2)(x - 1) = 0$$

$$x = 2, x = 1$$

$$f''(x) = 12x - 18$$

When $x = 1$, then $f''(x) = 12 - 18 = -6 < 0$

$x = 1$ is a maxima

Maximum value at $x = 1$

$$y = 2x^3 - 9x^2 + 12x + 6$$

$$y = 2 \cdot 1^3 - 9(1^2) + 12(1) + 6$$

$$y = 11$$

When $x = 2$, then $f''(x) = 24 - 18 = 6 > 0$

$x=2$ is a **minima**

Minimum value at $x=2$

$$y = 2x^3 - 9x^2 + 12x + 6$$

$$= 2(8) - 9(4) + 24 + 6$$

$$= 16 - 36 + 24 + 6$$

$$y = 10$$

$x=1$ is a **maxima**

Maximum value = $y = 11$

$x=2$ is a **minima**

Minimum value = $y = 10$

- 2(a) City residents were surveyed recently to determine readership of newspaper available. 50% of the residents read the morning paper, 60% residents read the evening paper, 20% read both newspapers. Find the probability that a resident selected reads either the morning or evening or both.

Solution:

A = morning paper readers = 50%

$$\text{Probability of morning paper readers} = p(A) = \frac{50}{100}$$

B = Evening paper readers = 60%

$$\text{Probability of evening paper readers} = p(B) = \frac{60}{100};$$

$$\text{Probability of morning and evening paper readers} = p(A \cap B) = \frac{20}{100};$$

$$p(A) = \frac{50}{100} = \frac{1}{2}; p(B) = \frac{60}{100} = \frac{3}{5}; p(A \cap B) = \frac{20}{100} = \frac{1}{5}$$

The probability that a resident selected reads either the morning or evening or both is given by

$$\begin{aligned} p[(A \cup B) \cup (A \cap B)] &= p(A \cup B) = p(A) + p(B) - p(A \cap B) \\ &= \frac{1}{2} + \frac{3}{5} - \frac{1}{5} = \frac{5+6-2}{10} = \frac{9}{10} \end{aligned}$$

$$\text{The required probability} = \frac{9}{10}$$

(OR)

- b) Calculate mean, median and mode from the following:

Marks:	0-20	20-40	40-60	60-80	80-100	100-120	120-140
No. of students:	80	76	50	28	18	9	3

Solution:

Marks X	No.ofStudents (f)	Mid value (m)	fm	cf
0-20	4	10	40	80
20-40	8	25	200	156
40-60	18	35	630	206
60-80	30	45	1350	234
80-100	15	55	825	252
100-120	10	65	650	261
120-140	8	75	600	264
	$\sum f = 264$		$\sum fm = 10540$	

$$\text{Mean} = \bar{x} = \frac{\sum fm}{N} = \frac{10540}{264} = 39.924$$

$$\text{Median} = L_1 + \frac{\frac{N}{2} - cf}{f} \times i$$

$$M = 20 + \frac{132 - 80}{76} \times 20$$

$$= 20 + 13.684$$

$$\text{Median} = 33.684$$

$$\text{Mode} = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

$$\text{Mode} = 20 + \frac{76 - 80}{152 - 80 - 50} \times 20$$

$$z = 16.363$$

3(a) The incidence of occupational diseases in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of six workers, 4 or more will contract disease?

Solution:

Let X be the event of getting diseases.

Then the probability is $p(X) = 20/100 = 0.2$

$$p = 0.2, \quad q = 0.8$$

$x = \text{number of people affected by disease} = 1, 2, 3, 4, 5, 6$

Out of 6, 4 or more are affected by disease

Then, $x = 4, 5, 6$

Consider $X = x \geq 4$

$$p(X = x \geq 4) = p(x = 4) + p(x = 5) + p(x = 6)$$

$$= 6C_4 \left(\frac{1}{5}\right)^4 \left(\frac{4}{5}\right)^2 + 6C_4 \left(\frac{1}{5}\right)^5 \left(\frac{4}{5}\right) + \left(\frac{1}{5}\right)^6 = \left(\frac{1}{5}\right)^6 [60(4)^2 + 6(4) + 1] = \left(\frac{1}{5}\right)^6 [985] = 0.06304$$

The required probability = 0.06304

(OR)

(b) Explain the features of cluster sampling.

Repeat

(OR)

4(a) What are the characteristic of hypothesis?

Repeat

(OR)

(b) A sample of 100 students is taken from a college. The mean height is 164 inches and the standard deviation is 6 inches. Can it be reasonably regarded that the students Mean height is 166 inches?

Solution:

Given

$n = 100$ (large sample)

$\bar{x} = 164, \sigma = 6, \mu = 166$

Null hypothesis H_0 : $\bar{x} = \mu$

There is no significant different between the sample mean and population mean.

Alternative hypothesis H_1 : $\bar{x} \neq \mu$

There is significant different between the sample mean and population mean.

Level of significance = 5%

Test statistic:

$$|z_{cal}| = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$|z_{cal}| = \frac{164 - 166}{6 / \sqrt{100}} = |-2 / 0.6| = 3.33$$

Critical level: $z_{0.05} = 1.96$

Inference:

Since the calculated value is greater than the tabulated value, the hypothesis rejected.

Hence there is significant different between the sample mean and population mean.

5(a) A factory produces blades in packets of 10. The probability of blades to be defective is 0.2%. Find the number of packets having two defective blades in a Consignment of 10000 packets.

Solution:

Here

$$p = 0.2\% = \frac{.2}{100} = 0.002, n = 10,$$

$$\lambda = np = 0.002 \times 10 = 0.02$$

Using the formula for Poisson distribution, the probability of x defective blades is

$$p(x) = \frac{e^{0.02}(0.02)^x}{x!}$$

The frequencies of 0,1,2 3,.....defective blades given by

$$= 10000 \times \frac{e^{0.02}(0.02)^x}{x!}$$

No of pockets having two defective blades is got by taking $x = 2$

$$p(x) = 10000 \times \frac{e^{0.02}(0.02)^2}{2!} = 1.02 \times 10000 \times .0004 \times \frac{1}{2} = 2.04$$

(OR)

(b) Two judges in a beauty competition rank the 12 entries as follows:

X:	1	2	3	4	5	6	7	8	9	10	11	12
Y:	12	9	6	10	3	5	4	7	8	2	11	1
No question												

SECTION – B (10x5=50)

6(a) Find the inverse of the following:

$$A = \begin{pmatrix} 2 & -2 & 3 \\ 1 & 0 & -3 \\ 3 & 4 & 0 \end{pmatrix}$$

Solution:

$$\text{The inverse of } A = A^{-1} = \frac{\text{adj.}A}{|A|}$$

$$|A| = \begin{vmatrix} 2 & -2 & 3 \\ 1 & 0 & -3 \\ 3 & 4 & 0 \end{vmatrix} = 2(0 + 12) + 2(0 + 9) + 3(4 - 0) = 54$$

The Co-Factor Matrix is

$$= \begin{pmatrix} + \begin{vmatrix} 0 & -3 \\ 4 & 0 \end{vmatrix} & - \begin{vmatrix} 1 & -3 \\ 3 & 0 \end{vmatrix} & + \begin{vmatrix} 1 & 0 \\ 3 & 4 \end{vmatrix} \\ - \begin{vmatrix} -2 & 3 \\ 4 & 0 \end{vmatrix} & + \begin{vmatrix} 2 & 3 \\ 3 & 0 \end{vmatrix} & - \begin{vmatrix} 2 & -2 \\ 3 & 4 \end{vmatrix} \\ + \begin{vmatrix} -2 & -3 \\ 0 & -3 \end{vmatrix} & - \begin{vmatrix} 2 & 3 \\ 1 & -3 \end{vmatrix} & + \begin{vmatrix} 2 & -2 \\ 1 & 0 \end{vmatrix} \end{pmatrix}$$

$$= \begin{pmatrix} 12 & -9 & 4 \\ 12 & -9 & -14 \\ 6 & 9 & 2 \end{pmatrix}$$

The adjoint of A =
$$\begin{pmatrix} 12 & 12 & 6 \\ -9 & -9 & 9 \\ 4 & -14 & 2 \end{pmatrix}$$

The inverse of A is

$$A^{-1} = \frac{1}{54} \begin{pmatrix} 12 & 12 & 6 \\ -9 & -9 & 9 \\ 4 & -14 & 2 \end{pmatrix}$$

b) Solve the following using Cramer's rule:

$$5x - 6y + 4z = 15$$

$$7x + 4y + 3z = 19$$

$$2x + y + 6z = 46$$

Solution:

Writing the system in matrix form, we have

$$\begin{pmatrix} 5 & -6 & 4 \\ 7 & 4 & 3 \\ 2 & 1 & 6 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 15 \\ 19 \\ 46 \end{pmatrix}$$

$$\mathbf{AX} = \mathbf{B}$$

$$D = |A| = \begin{vmatrix} 5 & -6 & 4 \\ 7 & 4 & 3 \\ 2 & 1 & 6 \end{vmatrix} = 5(24 - 3) + 6(42 - 6) + 4(7 - 8)$$

$$= 5(21) + 6(36) + 4(-1) = 105 + 216 - 4 = 317$$

$$D = 317 \neq 0$$

$$D_1 = \begin{vmatrix} 15 & -6 & 4 \\ 19 & 4 & 3 \\ 46 & 1 & 6 \end{vmatrix} = 15(24 - 3) + 6(114 - 138) + 4(19 - 184)$$

$$D_1 = -489$$

$$D_2 = \begin{vmatrix} 5 & 15 & 4 \\ 7 & 19 & 3 \\ 2 & 46 & 6 \end{vmatrix} = 5(114 - 138) - 15(42 - 6) + 4(322 - 38)$$

$$D_2 = 476$$

$$D_3 = \begin{vmatrix} 5 & -6 & 15 \\ 7 & 4 & 19 \\ 2 & 1 & 46 \end{vmatrix} = 5(165) + 6(284) + 15(7 - 8)$$

$$D_3 = 2514$$

Cramer's rule

$$x = \frac{D_1}{D} = \frac{-489}{317} = 1.5425868$$

$$y = \frac{D_2}{D} = \frac{476}{317} = 1.5015773$$

$$z = \frac{D_3}{D} = \frac{2514}{317} = 7.9305994$$

7(a) Solve the following LPP by Graphical method:

$$\text{Max } z = 6x_1 + 5x_2$$

$$4x_1 + 6x_2 \leq 180$$

$$4x_1 + 3x_2 \leq 120$$

$$x_1, x_2 \geq 0$$

Solution:

Consider

$$4x_1 + 6x_2 \leq 180$$

(0,0) lies in the feasible region

$$4x_1 + 6x_2 = 180 \quad (1)$$

When $x_1 = 0, x_2 = 30$

Then the point is (0, 30)

When $x_2 = 0, x_1 = 45$

Then the point is (45, 0)

Consider

$$4x_1 + 3x_2 \leq 120$$

(0,0) Lies in the feasible region

$$4x_1 + 3x_2 = 120 \quad (2)$$

When $x_1 = 0, x_2 = 40$

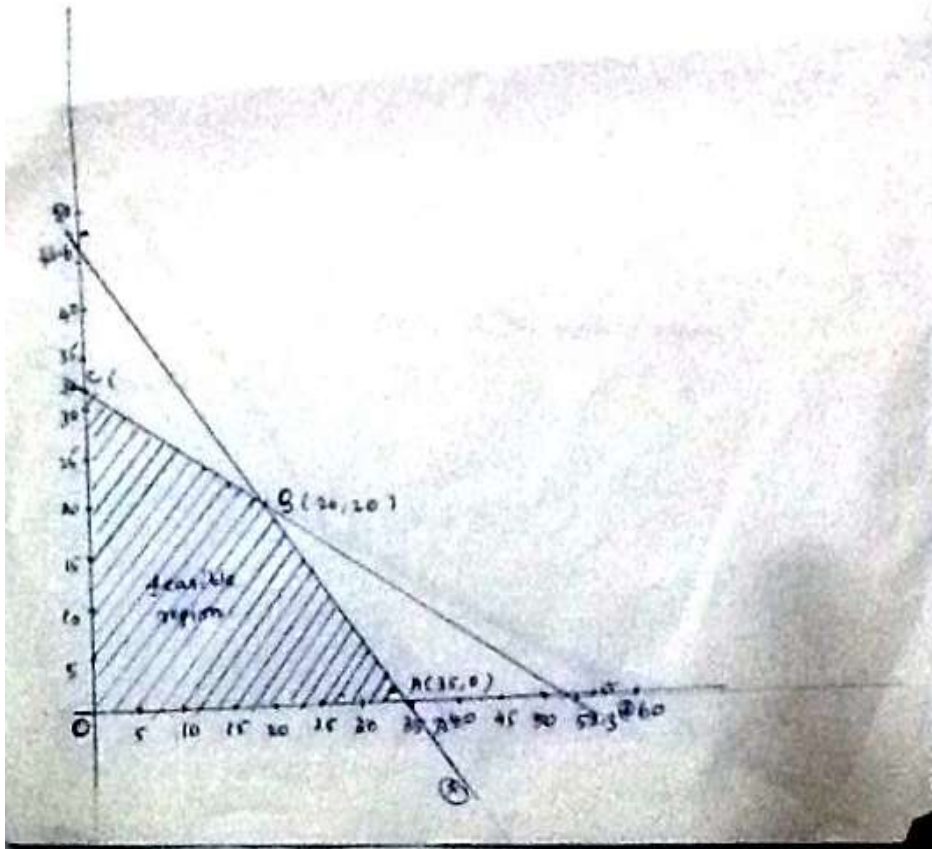
Then the point is (0, 40)

When $x_2 = 0, x_1 = 30$

Then the point is (30, 0)

The feasible region is OABC

To find the maximum point:-



$$z = 6x_1 + 5x_2$$

$$O(0,0); \quad z = 0$$

$$A(30,0); \quad z = 180$$

$$B(15,20); \quad z = 6(15) + 5(20) = 190$$

$$C(0,30); \quad z = 6(0) + 5(30) = 150$$

The maximum is obtained at

B(15,20) and the maximum value is $z = 190$

(OR)

(b) Explain Addition law in probability with examples.

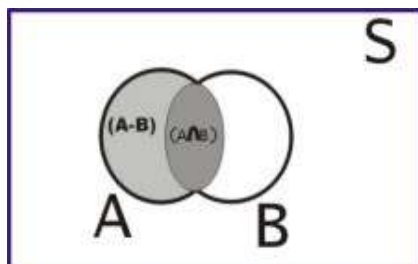
Solutions:

Addition Theorem of Probability

If 'A' and 'B' be any two events, then the probability of occurrence of at least one of the events

'A' and 'B' is given by: $p(A \cup B) = p(A) + p(B) - p(A \cap B)$

Solution



From set theory, we have:

$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

Dividing both sides by $n(S)$

$$\frac{n(A \cup B)}{n(S)} = \frac{n(A)}{n(S)} + \frac{n(B)}{n(S)} - \frac{n(A \cap B)}{n(S)}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

(Ex) Two cards are drawn at random. Find the probability that both the cards are of red color or they are queen.

Solution: Let S = Sample – space.

A = the event that the two cards drawn are red.

B = the event that the two cards drawn are queen.

$A \cap B$ = the event that the two cards drawn are queen of red color

$$n(S) = 52C_2, n(A) = 26C_2, n(B) = 4C_2, n(A \cap B) = 2C_2,$$

$$p(A) = \frac{n(A)}{n(s)} = \frac{26C_2}{52C_2}, p(B) = \frac{n(B)}{n(s)} = \frac{4C_2}{52C_2}, p(A \cap B) = \frac{n(A \cap B)}{n(s)} = \frac{2C_2}{52C_2}$$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B) = \frac{26C_2}{52C_2} + \frac{4C_2}{52C_2} - \frac{2C_2}{52C_2} = \frac{26C_2 + 4C_2 - 2C_2}{52C_2}$$

$$p(A \cup B) = \frac{13(25) + 6 - 1}{26(51)} = \frac{55}{221}$$

8. (a) Find the coefficient of skewness from the data given below:

Size:	3	4	5	6	7	8	9	10
Frequency:	7	10	14	35	102	136	43	8

Soution:

Size	f	x^2	fx	fx^2
3	7	9	21	63
4	10	16	40	160
5	14	25	70	350
6	35	36	210	1260
7	102	49	714	4998
8	136	64	1088	8704
9	43	81	387	3483
10	8	100	80	800
	$\sum f = 355$		$\sum fx = 2610$	$\sum fx^2 = 19818$

$$\text{Mean} = \bar{x} = \frac{\sum fx}{N} = \frac{2610}{355} = 7.352$$

$$\begin{aligned} \text{S.D} = \sigma &= \sqrt{\frac{\sum fx^2}{N} - \left(\frac{\sum fx}{N}\right)^2} \\ &= \sqrt{\frac{19818}{355} - (7.352)^2} \\ &= \sqrt{55.825 - 54.053} \\ &= \sqrt{1.772} \\ \sigma &= 1.331 \end{aligned}$$

Mode - Grouping table

Size	1(f)	2	3	4	5	6
3	7			31		
		17				
4	10					
			24			
5	14				59	
		49				151
6	35					
			137			
7	102					
		238		273		
8	136					
			179		281	
9	43					187
		51				
10	8					

Analysis table:

Size	3	4	5	6	7	8	9	10
1						1		
2					1	1		
3						1	1	
4				1	1	1		
5					1	1	1	
6						1	1	1
Total	0	0	0	1	3	6	3	1

Mode=8

$$\text{Co.efficient of skewness} = \frac{\bar{x} - \text{mode}}{\sigma}$$

$$= \frac{7.352 - 8}{1.331}$$

$$= -0.4868$$

Coefficient of Skewness = -0.4868

(OR)

(b) Explain the theory of expectation with examples

Solution:

The Mathematical Expectation of a random variable is the weighted arithmetic mean of the variable. The weights are the probabilities of the corresponding variables.

If X denotes a discrete random variable which can assume the values $X_1, X_2, X_3, \dots, X_k$

with respective probabilities $p_1, p_2, p_3, \dots, p_k$, Then the Mathematical Expectation of X denoted by $E(X)$ is defined as $p_1X_1 + p_2X_2 + p_3X_3 + \dots + p_kX_k$

Example:

A random variable X has probability function as follows

Value of X: -1 0 1
Probability: 0.2 0.3 0.5

Find $E(3X + 1)$

$$E(3X + 1) = \sum (3X + 1)p(x) = (-3+1)0.2 + (0+1)0.3 + (3+1)0.5 = 1.9$$

$$E(3X + 1) = 1.9$$

9. (a) A manufacturing company has purchased three new machines of different makes. Five hourly production figures are observed at random from each machine and the results are given below:

Observations	A ₁	A ₂	A ₃
1	25	31	24
2	30	39	30
3	36	38	28
4	38	42	25
5	31	35	28

Use ANOVA to test whether there is any significant difference between three machines

Soluton:

Let us take the hypothesis that the machines are not significantly different in their mean speed. Applying ANOVA technique

X ₁	X ₂	X ₃
25	31	24
30	39	30
36	38	28
38	42	25
31	35	28
$\sum X_1 = 160$	$\sum X_2 = 185$	$\sum X_3 = 135$
$\bar{X} = 32$	37	27

Grand mean or $\bar{\bar{X}} = \frac{32 + 37 + 27}{3} = 32.67$

VARIANCE BETWEEN SAMPLES

$(\bar{X}_1 - \bar{\bar{X}})^2$	$(\bar{X}_2 - \bar{\bar{X}})^2$	$(\bar{X}_3 - \bar{\bar{X}})^2$
0	25	25
0	25	25
0	25	25
0	25	25
0	25	25
0	125	125

Sum of squares between samples = 0 + 125 + 125 = 250

VARIANCE WITHIN SAMPLES

X ₁	$(X_1 - \bar{X}_1)^2$	X ₂	$(X_2 - \bar{X}_2)^2$	X ₃	$(X_3 - \bar{X}_3)^2$
25	49	31	36	24	9
30	4	39	4	30	9
36	16	38	1	28	1
38	36	42	25	25	4
31	1	35	4	28	1
	$\sum (X_1 - \bar{X}_1)^2 = 106$		$\sum (X_2 - \bar{X}_2)^2 = 70$		$\sum (X_3 - \bar{X}_3)^2 = 24$

Sum of squares within samples = 106 + 70 + 24 = 200

TOTAL SUM OF SQUARES

X ₁	$(X_1 - \bar{\bar{X}})^2$	X ₂	$(X_2 - \bar{\bar{X}})^2$	X ₃	$(X_3 - \bar{\bar{X}})^2$
----------------	---------------------------	----------------	---------------------------	----------------	---------------------------

25	49	31	1	24	64
30	4	39	49	30	4
36	16	38	36	28	16
38	36	42	100	25	49
31	1	35	9	28	16
	$\sum (X_1 - \bar{X}_1)^2 = 106$		$\sum (X_2 - \bar{X}_2)^2 = 195$		$\sum (X_3 - \bar{X}_3)^2 = 149$

Total sum of squares=106+194+149=450=

Sum of squares between samples+ Sum of squares within samples=450

ANOVA TABLE

Source of variation	Sun of squares	Degree of freedom	Mean square
between samples	250	2	125
within samples	200	12	16.667
total	400	14	

$$F = \frac{\text{Between samples}}{\text{within samples}} = \frac{125}{16.667} = 7.5$$

$$F_{2,12} = 3.89$$

The calculated value of Fis greater than the table value The hypothesis is rejected

Hene the machines are significantly different in their mean speed

(OR)

(b) Fit a straight line trend by the method of least squares to the following data and calculate trend values:

Year:	2003	2004	2005	2006	2007
Sales of T.V. sets:	4	6	7	8	10
(in thousands)					

Estimate the sales for the year 2012.

Solution:

year	Sales of T.V Y	X=year-2005	XY	X ²	Trend values
2003	4	-2	-8	4	4.8
2004	6	-1	-6	1	5.6
2005	7	0	0	0	7
2006	8	1	8	1	8.4
2007	10	2	20	4	9.8
N = 5	$\sum Y = 35$	$\sum X = 0$	$\sum XY = 14$	$\sum X^2 = 10$	$\sum Y_c$

The equation of the st. line is $Y_c = a + bX$

$$\sum X = 0; a = \frac{\sum Y}{N} = \frac{35}{5} = 7, b = \frac{\sum XY}{\sum X^2} = \frac{14}{10} = 1.4$$

The equation of the st. line trend is

$$Y_c = a + bX; Y_c = a + bX = 7 + 1.4X$$

Origin=2005

$$Y_c = 7 + 1.4X$$

When

$$X = -2, Y_c = 7 + 1.4(-2) = 4.8; X = -1, Y_c = 7 + 1.4(-1) = 5.6$$

$$X = 0, Y_c = 7 + 1.4(0) = 7; X = 1, Y_c = 7 + 1.4(1) = 8.4$$

$$X = 2, Y_c = 7 + 1.4(2) = 9.8$$

To find the sales for the year 2012, X will be +7

$$X = 7, Y_c = 7 + 1.4(7) = 7 + 9.8 = 16.8$$

The sales for the year 2012 is 16.8 thousands

10. (a) Calculate the correlation coefficient between the height of father and son from the data given below:

Height of father (in inches): 64 65 66 67 68 69 70

Height of son (in inches): 66 67 65 68 70 68 72

Soluton:

Ht of father X	Ht of sun Y	$dx = X - \bar{X}$ $= X - 67$	$dy = Y - \bar{Y}$ $= Y - 68$	$(dx)^2$	$(dy)^2$	$dx dy$
64	66	-3	-2	9	4	6
65	67	-2	-1	4	1	2
66	65	-1	-3	1	9	3
67	68	0	0	0	0	0
68	70	1	2	1	4	2
69	68	2	0	4	0	0
70	72	3	4	9	16	12
469	476			$\sum (dx)^2 = 28$	$\sum (dy)^2 = 34$	$\sum dx dy = 25$

$$N = 7, \bar{X} = \frac{\sum X}{N} = \frac{469}{7} = 67; \bar{Y} = \frac{\sum Y}{N} = \frac{476}{7} = 68$$

$$r = \frac{\sum dx dy}{\sqrt{\sum (dx)^2 \cdot \sum (dy)^2}} = \frac{25}{\sqrt{28 \times 34}} = 0.8$$

(OR)

(b) Calculate the two regression equation of X on Y and Y on X from the data given below taking deviations from actual means of X and Y:

Price(Rs.): 10 12 13 12 16 15

Amount demanded: 40 38 43 45 37 43

Estimate the likely demand when the price is Rs.20.

Soluton:

X	Y	$x = X - \bar{X}$ $=X-13$	$y = Y - \bar{Y}$ $=Y-41$	x^2	y^2	xy
10	40	-3	-1	9	1	3
12	38	-1	-3	1	9	3
13	43	0	2	0	4	0
12	45	-1	4	1	16	-4
16	37	3	-4	9	16	-12
15	43	2	2	4	4	4
$\sum X = 78$	$\sum Y = 246$	$\sum x = 0$	$\sum y = 0$	$\sum x^2 = 24$	$\sum y^2 = 50$	$\sum xy = -6$

$$\bar{X} = \frac{\sum X}{N} = \frac{78}{6} = 13, \bar{Y} = \frac{\sum Y}{N} = \frac{246}{6} = 41$$

$$r \frac{\sigma_x}{\sigma_y} = \frac{\sum xy}{\sum y^2} = \frac{-6}{50} = -0.12, r \frac{\sigma_y}{\sigma_x} = \frac{\sum xy}{\sum x^2} = \frac{-6}{24} = -0.25$$

Regression equation X on Y:

$$X - \bar{X} = r \frac{\sigma_x}{\sigma_y} (Y - \bar{Y}), X - 13 = -0.12(Y - 41)$$

$$X - 13 = -0.12Y + 4.92$$

$$X = -0.12Y + 17.92$$

Regression equation Y on X:

$$Y - \bar{Y} = r \frac{\sigma_y}{\sigma_x} (X - \bar{X}), Y - 41 = -0.25 (X - 13)$$

$$Y - 41 = -0.25x + 3.25$$

$$Y = -0.25x + 44.25$$

$$\text{when } x=20, Y = -0.25(20) + 44.25$$

$$Y = -5 + 44.25 = 39.25$$

When the price is Rs.20. the likely demand is 39.25

MBA - DEGREE EXAMINATION - NOV – 2014 - P8MBA3
MATHEMATICS AND STATISTICS
(WITH ANSWERS)

SECTION – A (5 X 5 = 25)

1. (a) An animal feed company must produce 200 lbs of a mixture containing the ingredients X_1 and X_2 . X_1 costs Rs.3 per lb and X_2 costs Rs.8 per lb. Not more than 80 lbs X_1 can be used and minimum quantity to be used for X_2 is 60 lbs. Find how much of each ingredients should be used if the company wants to minimize the cost. Formulate the problem into L.P.P.

Solutions:

Let x_1 be the amount of Ingredients X_1 and

x_2 be the amount of Ingredients X_2 in the mixture

Given:

The required amount of mixture = 200 lbs

$$x_1 + x_2 = 200$$

	Cost (Rs)
Ingredients X_1	3
Ingredients X_2	8
Not more than 80lbs of X_1 (i.e.) $x_1 \leq 80$	

Minimum quantity of X_2 is 60 lbs (i.e.) $x_2 \geq 60$

Mathematical formulation:

Find x_1, x_2 such that

$$\text{Min } z = 3x_1 + 8x_2$$

subject to

$$x_1 + x_2 = 200$$

$$x_1 \leq 80$$

$$x_2 \geq 60$$

$$x_1, x_2 \geq 0$$

(Or)

1. (b) A problem in business statistics is given to five students A, B, C, D and E. Their chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{6}$ What is the probability that the problem will be solved?

Solution:

Probability that A fails to solve the problem is $1 - \frac{1}{2} = \frac{1}{2}$

Probability that B fails to solve the problem is $1 - \frac{1}{3} = \frac{2}{3}$

Probability that C fails to solve the problem is $1 - \frac{1}{4} = \frac{3}{4}$

Probability that D fails to solve the problem is $1 - \frac{1}{5} = \frac{4}{5}$

Probability that E fails to solve the problem is $1 - \frac{1}{6} = \frac{5}{6}$

Since the events are independent the probability that all the five students fail to solve the problem is

$$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} = \frac{1}{6}$$

The problem will be solved if anyone of them is able to solve it.

The probability that the problem will be solved = $1 - \frac{1}{6} = \frac{5}{6}$

2. (a) Find the mode of the following frequency distribution.

Size (x)	1	2	3	4	5	6	7	8	9	10	11
frequency(f)	3	8	15	23	35	40	32	28	20	45	14

Solution:

Mode - Grouping table

Size	1(f)	2	3	4	5	6
1	3					
		11				
2	8			26		
			23			
3	15				46	
		38				
4	23					73
			58			
5	35			98		
		75				
6	40				107	
			72			
7	32					100
		60				
8	28			80		
			48			
9	20				93	
		65				
10	45					79
			59			
11	14					

Analysis table:

Size	1	2	3	4	5	6	7	8	9	10	11
1										1	
2					1	1					
3						1	1				
4				1	1	1					
5					1	1	1				
6						1	1	1			
Total	0	0	0	1	3	5	3	1	0	1	0

Mode=6**(Or)****(b) State the merits and demerits of standard deviation.****Solution:****Merits and demerits of standard deviation****Merits:**

1. It is well defined and suited for algebraic treatment
2. It is based on all observations
3. It is the most commonly used measure of dispersion
4. It is less affected by sampling fluctuations
5. It is useful for comparing the variability of two dispersions
6. Given the mean and SD of two groups we can determine the mean and SD of the combined groups
7. It provides a unit of measurement for the normal distribution
8. It provides a high degree of accuracy of results

Demerits

1. It is not easy to understand.
2. It is difficult to compute

3(a) Write the requisites for an ideal measure of central tendency**Solution:**

The following are the characteristics to be satisfied by an ideal measure of central tendency

1. It should be rigidly defined
2. It should be readily comprehensible and easy to calculate
3. It should be based on all the observations
4. It should be suitable for further mathematical treatment.
5. It should be affected as little as possible by fluctuations of sampling
6. It should not be affected much by extreme values

(Or)

(b) Find out if there is any significant difference in the intelligence of boys and girls.

Girls	Mean 84	Standard deviation 10	No. of samples 121
Boys	Mean 81	Standard deviation 12	No. of samples 81

Solution:

$$n_1 = 121, n_2 = 81,$$

$$\text{Given, } \sigma_1 = 10, \sigma_2 = 12,$$

$$\bar{x}_1 = 84, \bar{x}_2 = 81$$

Null hypothesis H_0 : $\mu_1 = \mu_2$

There is no significant different between the two means

Alternative hypothesis H_1 : $\mu_1 \neq \mu_2$

There is significant different between the two means

Level of significance = 5%

Test statistic:

$$|z_{cal}| = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$|z_{cal}| = \frac{84 - 81}{\sqrt{\frac{10^2}{121} + \frac{12^2}{81}}} = \frac{3}{\sqrt{0.8264 + 1.7777}}$$

$$= \frac{3}{\sqrt{2.6042}} = \frac{3}{1.614}$$

$$z_{cal} = 1.859$$

Critical value: 5% = 1.96

Inference: Since the calculated value is greater than the tabulated value at 5% level of significance, we reject the null hypothesis. That there is significant different between two means

4 (a) calculate the correlation co efficient for the following heights (in inches) of father (X) and their sons (Y)

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

Solution:

x	y	dx	dy	(dx) ²	dx dy	(dy) ²
65	67	-3	-2	9	6	4
66	68	-2	-1	4	2	1
67	65	-1	-4	1	4	16
67	68	-1	-1	1	1	1
68	72	0	3	0	0	9
69	72	1	3	1	3	9
70	69	2	0	4	0	0
72	71	4	2	16	8	4
544	552	0	0	36	24	44

$$dx = x - 68, \quad dy = y - 69$$

$$r = \frac{N \sum dx dy - \sum dx \sum dy}{\sqrt{N \sum dx^2 - \sum dx^2} \sqrt{N \sum dy^2 - \sum dy^2}} = \frac{8 \times 24 - 0 \times 0}{\sqrt{8 \times 36 - 0} \sqrt{8 \times 44}}$$

$$r = \frac{8 \times 24 - 0 \times 0}{\sqrt{36} \sqrt{44}} = 0.603$$

The correlation coefficient = 0.603

(Or)

b) Explain clearly random error and sampling distribution

Repeat-April-2014

5. (a) Explain and illustrate binomial distribution.

Solution:

Binomial distribution:

It deals with consecutive trials, each of which has two possible outcomes. It uses the concept of Bernoulli Process.

It is defined as

$$P(X) = {}^n C_x p^x q^{n-x}; \quad x = 0, 1, 2, \dots, n$$

where n: number of trials; x: number of success; p: the probability of success and q: the probability of failure (q=1-p)

Conditions of Binomial distribution:

- Trials are independent and carried over under identical conditions for a finite number of times
- The two possible outcomes are namely success and failure.
- The probability of success should be constant for all trials

Properties of Binomial distribution:

- It is a discrete probability distribution. The random variable X takes the values 0, 1, 2, 3, ..., n, where n is finite.
- Mean = np: Standard deviation = $\sqrt{npq}$;
- Skewness = $\frac{q-p}{\sqrt{npq}}$ and Kurtosis = $\frac{1-6pq}{npq}$
- The mode corresponds to the value of x for which the p(x) is maximum.

- $X \sim (n_1, p)$ and $Y \sim (n_2, p)$ are two random variables follow binomial distribution,
- then $(X+Y) \sim (n_1 + n_2, p)$ be a random and follow Binomial distribution

Example: If the probability of defective bolts be $1/10$, find the following for the Binomial distribution of defective bolts in a total of 400. Evaluate mean and Variance.

Given, $n=400$;

p = the probability for the selected bolt being defective = $1/10$

$q = 1-p = 1 - 0.1 = 0.9$

By definition,

Mean = np , Variance = npq ,

Mean = $400 \times 0.1 = 40$, Variance = $400 \times 0.1 \times 0.9 = 36$

(Or)

(b) Explain multiplication theorem.

Solution:

Multiplication theorem:

When events are independent:

If two events A and B are independent, the probability that both will occur is equal to the product of their individual probability. Symbolically if A and B are Independent, then

$$P(A \text{ and } B) = P(A) \times P(B).$$

The theorem can be extended to three or more independent events. Thus

$$P(A, B \text{ and } C) = P(A) \times P(B) \times P(C).$$

Proof: If an event A can happen in n_1 ways of which a_1 are successful and the event B can happen in n_2 ways of which a_2 are successful, then we can combine each successful event in the first with each successful event in the second case. Thus the total number of successful happenings in both cases is $a_1 \times a_2$. The total number of possible cases is $n_1 \times n_2$

Thus the probability of the occurrence of both the events is

$$\frac{(a_1 \times a_2)}{(n_1 \times n_2)} = \frac{a_1}{n_1} \times \frac{a_2}{n_2}, \text{ But } \frac{a_1}{n_1} = P(A), \frac{a_2}{n_2} = P(B)$$

$$\therefore P(A \text{ and } B) = P(A) \times P(B)$$

In a similar way the theorem can be extended to any number of variables

Illustration: A bag contains 4 white 3 black and 5 red balls. What is the probability of getting a white or red ball at random in a draw?

Solution:

The probability of getting a white ball = $\frac{4}{12}$

The probability of getting a red ball = $\frac{5}{12}$

The probability of getting a white or a red ball = $\frac{4}{12} + \frac{5}{12} = \frac{9}{12}$

When events are dependent:

If the events are dependent, the probability is conditional.

(i.e.) If the two events A and B are dependent; B occurs only when A is known to have already occurred

$P\left(\frac{B}{A}\right) = \text{The probability of B when A has occurred already}$

$$P\left(\frac{B}{A}\right) = \frac{P(A \text{ and } B)}{P(A)}$$

$$P\left(\frac{A}{B}\right) = \frac{P(A \text{ and } B)}{P(B)}$$

SECTION – A (5 X 10 = 50)

6 (a) Solve the following LPP using graphical method:

$$\text{Maximize } z = 3x_1 + 2x_2$$

subject to

$$-2x_1 + x_2 \leq 1$$

$$x_1 \leq 2$$

$$x_1 + x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

Solution:

Consider,

$$-2x_1 + x_2 \leq 1$$

(0,0) lies in the feasible region

Now, Consider

$$-2x_1 + x_2 = 1$$

Put $x_1 = 0$, $x_2 = 1$, The point is (0,1)

$x_2 = 0$, $x_1 = -\frac{1}{2}$, The point is $(-1/2, 0)$

Consider, $x_1 \leq 2$

Now, Consider, $x_1 = 2$

It is a line parallel to the x_2 -axis

Consider

$$x_1 + x_2 \leq 3$$

Now, Consider

$$x_1 + x_2 = 3$$

Put,

$x_1 = 0 \Rightarrow x_2 = 3$, The point is (0,3)

$x_2 = 0 \Rightarrow x_1 = 3$, The point is (3,0)

Feasible region is OABCD

To find B:

Consider

$$-2x_1 + x_2 = 1 \tag{1}$$

$$x_1 + x_2 = 3 \tag{3}$$

$$(1) - (3) \Rightarrow x_1 = \frac{2}{3}$$

Substituting the value of x_1

$$x_2 = 7/3$$

We get the point B is $\left(\frac{2}{3}, \frac{7}{3}\right)$

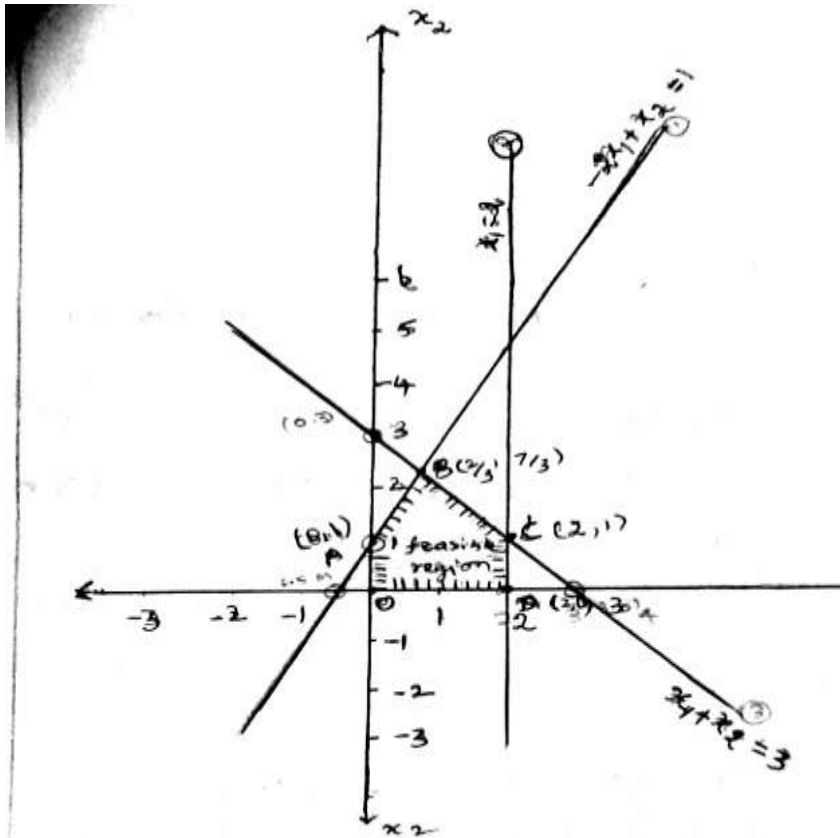
To find C:

$$x_1 = 1$$

$$x_1 + x_2 = 3$$

$$x_2 = 2$$

We get the point C is 2, 1



To find the maximum point:-

$$\text{Max } z = 3x_1 + 2x_2$$

$$O(0,0) \Rightarrow z = 0$$

$$A(0,1) \Rightarrow z = 3(0) + 2(1) = 2$$

$$B\left(\frac{2}{3}, \frac{7}{3}\right) \Rightarrow z = 3\left(\frac{2}{3}\right) + 2\left(\frac{7}{3}\right) = 6.07$$

$$C(2,1) \Rightarrow z = 3(2) + 2(1) = 8$$

$$D(2,0) \Rightarrow z = 3(2) + 2(0) = 6$$

The solution is obtained at the point C.

$$x_1 = 2, x_2 = 1 \text{ Max } z = 8$$

(OR)

6(b) Solve using Cramer's rule.

$$5x+3y=65$$

$$2y-z=11$$

$$3x+4z=57$$

Solution:

Repeat-April-2014

7. (a) Find inverse of the following

$$\begin{pmatrix} 1 & 4 & 3 \\ 4 & 2 & 3 \\ 3 & 2 & 2 \end{pmatrix}$$

Solution:

$$\text{The inverse of } A = A^{-1} = \frac{\text{adj.}A}{|A|}$$

$$|A| = \begin{vmatrix} 1 & 4 & 3 \\ 4 & 2 & 3 \\ 3 & 2 & 2 \end{vmatrix} = (4-6) - 4(8-9) + 3(8-6) = 8$$

The Co-Factor Matrix of A

$$C = \begin{pmatrix} + \begin{vmatrix} 2 & 3 \\ 2 & 2 \end{vmatrix} & - \begin{vmatrix} 4 & 3 \\ 3 & 2 \end{vmatrix} & + \begin{vmatrix} 4 & 2 \\ 3 & 2 \end{vmatrix} \\ - \begin{vmatrix} 4 & 3 \\ 2 & 2 \end{vmatrix} & + \begin{vmatrix} 1 & 3 \\ 3 & 2 \end{vmatrix} & - \begin{vmatrix} 1 & 4 \\ 3 & 2 \end{vmatrix} \\ + \begin{vmatrix} 4 & 3 \\ 2 & 3 \end{vmatrix} & - \begin{vmatrix} 1 & 3 \\ 4 & 3 \end{vmatrix} & + \begin{vmatrix} 1 & 4 \\ 4 & 2 \end{vmatrix} \end{pmatrix}$$
$$= \begin{pmatrix} -2 & 1 & 2 \\ -2 & -7 & 10 \\ 6 & 9 & -14 \end{pmatrix}$$

$$\text{The adjoint of } A = C^T = \begin{pmatrix} -2 & -2 & 6 \\ 1 & -7 & 9 \\ 2 & 10 & -14 \end{pmatrix}$$

The inverse of A is

$$A^{-1} = \frac{1}{8} \begin{pmatrix} -2 & -2 & 6 \\ 1 & -7 & 9 \\ 2 & 10 & -14 \end{pmatrix}$$

(Or)

(b) Obtain the rank correlation for the following data:

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

Solution:

X	Y	Rank X (x)	Rank Y (y)	d=x-y	d ²
68	62	4	5	-1	1
64	58	6	7	-1	1
75	68	2.5	3.5	-1	1
50	45	9	10	-1	1
64	81	6	1	5	25
80	60	1	6	-5	25
75	68	2.5	3.5	-1	1
40	48	10	9	1	1
55	50	8	8	0	0
64	70	6	2	4	16
				$\sum d = 0$	$\sum d^2 = 72$

In the X series we see that the value 75 occurs 2 times. The common rank given to these values is 2.5 which is the average of 2 and 3, the ranks which these values would have taken if they were different. The next value 68, then given the next rank which is 4. Again we see that value 64 occurs thrice. The common rank given to it is 6 which is the average of 5, 6, and 7. Similarly in the Y-series, the value 68 occurs twice and its common rank is 3.5 which is the average of 3, and 4.

As a result of these common rankings, the formula for ρ has to be corrected. To $\sum d^2$ we add $\frac{m(m-1)}{12}$ for each value repeated, where m is the number of times a value occurs. In the X-series the correction is to be applied twice, once for the value 75 which occurs twice (n=2) and then for the value 64 which occurs thrice (m=3). The total correction for the X-series is

$$\frac{2(2-1)}{12} + \frac{3(3-1)}{12} = \frac{5}{12}$$

Similarly, this correction for the Y-series is $\frac{2(2-1)}{12} = \frac{1}{6}$ as the value 68 occurs twice

$$\rho = 1 - \frac{6 \left[\sum d^2 + \frac{5}{2} + \frac{1}{2} \right]}{n(n^2 - 1)} = 1 - \frac{6(72 + 3)}{10 \times 99} = 0.545$$

8. (a) Ten competitors in a beauty contest are ranked by three judges in the following orders:

JUDGE 1	1	5	4	8	9	6	10	7	3	2
JUDGE 2	4	8	7	6	5	9	10	3	2	1
JUDGE 3	6	7	8	1	5	10	9	2	3	4

Use rank correlation to discuss which pair of judges has the nearest approach to common taste in beauty.

Solution:

1st and 2nd Judge

$$\text{Rank co.rrelation coefficient } \gamma = 1 - \frac{6 \sum D_1^2}{N^3 - N}$$

$$\sum D_1^2 = 74, N = 10$$

$$\gamma = 1 - \frac{6 \times 74}{10^3 - 10} = 1 - \frac{444}{990} = 1 - 0.448 = +0.552$$

I Judge R ₁	II Judge R ₂	III Judge R ₃	(R ₁ - R ₂) ² D ₁	(R ₂ - R ₃) ² D ₂	(R ₁ - R ₃) ² D ₃
1	4	6	9	4	25
5	8	7	9	1	4
4	7	8	9	1	16
8	6	1	4	25	49
9	5	5	16	0	16
6	9	10	9	1	16
10	10	9	0	1	1
7	3	2	16	1	25
3	2	3	1	1	0
2	1	4	1	9	4
			$\sum D_1^2 = 74$	$\sum D_2^2 = 44$	$\sum D_3^2 = 156$

2nd and 3rd Judge

$$\text{Rank co.rrelation coefficient } \gamma = 1 - \frac{6 \sum D_2^2}{N^3 - N}$$

$$\sum D_2^2 = 44, N = 10$$

$$\gamma = 1 - \frac{6 \times 44}{10^3 - 10} = 1 - \frac{264}{990} = 1 - 0.267 = +0.733$$

1st and 3rd Judge

$$\text{Rank co.rrelation coefficient } \gamma = 1 - \frac{6 \sum D_3^2}{N^3 - N}$$

$$\sum D_3^2 = 156, N = 10$$

$$\gamma = 1 - \frac{6 \times 156}{10^3 - 10} = 1 - \frac{936}{990} = 1 - 0.945 = +0.055$$

The second and third judges have the nearest approach in common tastes in beauty, because the coefficient of correlation is highest between them.

(OR)

(b) Calculate coefficient of skewness from the following:

Marks above	0	10	20	30	40	50	60	70	80
No. of students	150	140	100	80	80	70	30	14	0

Solution:

Marks	m.p m	No.of students f	$(m - 45) / 10$ d	fd	fd^2	c.f
0-10	5	10	-4	-40	160	10
10-20	15	40	-3	-120	360	50
20-30	25	20	-2	40	80	70
30-40	35	0	-1	0	0	70
40-50	45	10	0	0	0	80
50-60	55	40	+1	+40	40	120
60-70	65	16	+2	+32	64	136
70-80	75	14	+3	+42	126	150
		$N = 150$		$\sum fd = -86$	$\sum fd^2 = 830$	

For finding out mode we have to prepare grouping table and analysis table.

Marks	(f)	I	II	III	IV	V	VI
0-10	10						
			50				
10-20	40				70		
				60			
20-30	20					60	
			20				
30-40	0						30
				10			
40-50	10						
			50		50		
50-60	40					66	

			56			
60-70	16					70
		30				
70-80	14					

Col.No	10-20	20-30	50-60
I	1		1
II	1		1
III	1	1	
IV	1	1	
V			1
VI			1
Total	4	2	4

$$\text{Co.efficient of skewness} = \frac{\bar{x} - \text{mode}}{\sigma}$$

$$\bar{X} = A + \frac{\sum fd}{N} \times i = 45 - \frac{86}{150} \times 10 = 45 - 5.73 = 39.27$$

$$\sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N} \right)^2} \times i = \sqrt{\frac{830}{150} - \left(\frac{-86}{150} \right)^2} \times 10$$

$$\sigma = \sqrt{5.533 - .329} \times 10 = 2.281 \times 10 = 22.81$$

This is a binomial series and hence for calculating skewness, the following formula is used.

$$\text{Co.efficient of skewness} = \frac{3(\bar{x} - \text{median})}{\sigma}$$

$$\text{Med} = \text{size of } \frac{N}{2} = 150 / 2 = 75^{\text{th}} \text{ item. It lies in the class } 40 - 50$$

$$\text{Med} = L + \frac{\frac{N}{2} - c.f}{f} \times i = 40 + \frac{75 - 70}{10} \times 10 = 40 + 5 = 45$$

$$\text{Co.efficient of skewness} = \frac{3(39.27 - 45)}{22.81} = \frac{-17.19}{22.81} = -0.754$$

$$\text{Coefficient of Skewness} = -0.754$$

(OR)

9 (a) from the following table, calculate the correlation co efficient by Karl Pearson's method:

X	43	44	46	40	44	42	45	42	38	40	42	57
Y	29	31	19	18	19	27	27	29	41	30	26	10

Solution:

x	y	dx dx=x-44	dy dy=y-26	dx ²	dy ²	dx dy
43	29	-1	3	1	9	-3
44	31	0	5	0	25	0
46	19	2	-7	4	49	-14
40	18	-4	-8	16	64	32
44	19	0	-7	0	49	0
42	27	-2	1	4	1	-2
45	27	1	1	1	1	1
42	29	-2	3	4	9	-6
38	41	-6	15	36	225	-90
40	30	-4	4	16	16	-16
42	26	-2	0	4	0	0
57	10	13	-16	169	256	-208
		-5	-6	255	704	-306

The correlation coefficient is given by

$$r = \frac{\sum dx dy - \frac{\sum dx \cdot \sum dy}{N}}{\sqrt{\sum dx^2 - \frac{(\sum dx)^2}{N}} \cdot \sqrt{\sum dy^2 - \frac{(\sum dy)^2}{N}}}$$

$$r = \frac{-306 - \frac{(-5)(-6)}{12}}{\sqrt{255 - \frac{(-5)^2}{12}} \sqrt{704 - \frac{(-6)^2}{12}}}$$

$$= \frac{-306 - 2.50}{\sqrt{255 - 2.08} \sqrt{704 - 3}} = \frac{-308.5}{\sqrt{252.92} \sqrt{701}}$$

$$r = \frac{-308.5}{421.05}$$

$$r = -0.733$$

(OR)

(b) Fit a straight line trend for the following series:

Year:	1990	1991	1992	1993	1994	1995	1996
Production of stock	60	72	75	65	80	85	95

Solution:

Year	Value (Y)	Deviation from 1993 (X)	XY	X ²
1990	60	-3	-180	9
1991	72	-2	-144	4
1992	75	-1	-75	1
1993	65	0	0	0
1994	80	1	80	1
1995	85	2	170	4
1996	95	3	285	9
N = 7	$\sum Y = 532$	$\sum X = 0$	$\sum XY = 136$	$\sum X^2 = 28$

The equation of the straight line is given by

$$\sum Y_c = a + bX, \text{ Since } \sum X = 0,$$

$$a = \frac{\sum Y}{N} = \frac{532}{7} = 76, \quad b = \frac{\sum XY}{\sum X^2} = \frac{136}{28} = 4.8571$$

$$\sum Y_c = a + bX = 76 + 4.8571X$$

The straight line trend is given by

$$\sum Y_c = a + bX = 76 + 4.8571X$$

10.(a) State the merits and demerits of sampling.**The merits and demerits of sampling:****Merits:**

1. Less time consuming: Since the sample is the study of the population considerable time and lab our are saved, when a sample survey is carried out. Time is saved in collecting data and processing it .For these reasons a sample provides more timely data in practice than a census.

2. .More reliable results: Although the sampling technique involves certain inaccuracies owing to sampling errors, the result obtained is generally more reliable than that obtained from a complete count. There are several reasons for it. First, iris always possible to determine the extent of sampling errors. Secondly, other types of errors to which a servey is subject, such as inaccuracy of information, incompleteness of returns etc., are likely to be moreserious in a complete census than in a sample survey. This is because more effective precautions can be taken in a sample survey to ensure that information is accurate and complete. For these reasons not only the total error be expected to be smaller in a sample survey but sample result can also be used with a greater degree of confidence because of our knowledge of the probable size of errors. Thirdly, it is possible to avail of the services of experts' and to impart through training in their investigators in a sample survey which further reduces the possibility of errors. Follow up work can also be undertaken much more effectively in the sampling method. Indeed, even a complete census can only be tested for accuracy by some type of sampling check.

3. More detailed information: sine the sampling technique saves time and money, it is possible to collect more detailed information in a survey. for example, if the population consists

of 1999 persons in a survey of the consumption pattern of the people, the two alternative techniques available are as follows;

I We may collect the necessary data from each one of the 1000 people through a questionnaire containing, say, 100 questions (census method), or

II we may take a sample of 11 persons (i.e. 10% of population) and prepare questionnaire containing as many as 10 questions. the expenses involves in the latter case would almost be the same as in the former but it will enable nine times more information to be obtained.

4. Sampling method is the only method that can be used in certain cases: There are some cases in which the census method is inapplicable and the only predictable means is provided by the sample method. For example, if one is interested in testing the breaking strength of chalks manufactured in a factory under the census method, all the chalks would be broken in the process of testing. Hence, census method is inapplicable and resort must be had in the sample method. Similarly, if the producer wants to find out whether the tensile strength of a list of steel wires meets the specified standard, he must resort the sample method because census would mean complete destruction of al the wires. also, if the population under investigation is infinite, sampling is the only possible basis.

5. Accuracy: The sample method is often used to Judge the accuracy of the Information obtained on a census basis. For example, in the population census which is conducted very often (10 years in our country) the field officers comply the sample method to determine the accuracy of information obtained by the enumerators on the census basis.

Limitations:

Some of the difficulties involved in sampling are stated below:

1. A sample survey must be carefully planned and executed. Otherwise the results obtained may be accurate and misleading. Of course even for complete count, care must be taken but serious errors `arise in sampling, if the sampling procedure is not perfect.

2. Sampling generally requires the services of experts, if only for consultation purposes. In the absence of qualified and experienced persons, the information obtained from sample surveys cannot be relied upon. In India, shortage of experts in the sampling field is a serious hurdle in the way of reliable statistics.

3. At times the sampling plan may be so complicated that it requires more time, labour and money than a complete count. This is so if the size of the sample is a large predation of the total population and if complicated weighted procedures are used. With each additional complication in the survey, the chances of error multiply and greater care has to be taken, which in turn means more time and labour.If the information is required for each and every unit in the domains of study, a complete enumeration survey is necessary.

(OR)

(b) The following are the marks in statistics (X) and mathematics (Y) of ten students:

X	56	55	58	58	57	56	60	64	69	57
Y	68	67	67	70	65	68	70	66	68	66

Calculate the co efficient of correlation and estimate the marks in Mathematics of students who secure 62 marks in Statistics.

Solution:

x	y	x^2	y^2	xy
---	---	-------	-------	----

56	68	3136	4624	3808
55	67	3025	4489	3685
58	67	3364	4489	3886
58	70	3364	4900	4060
57	65	3249	4225	3705
56	68	3136	4624	3808
60	70	3600	4900	4200
64	66	4096	4356	4224
69	68	4761	4624	4692
57	66	3249	4356	3762
$\sum x = 590$	$\sum y = 675$	$\sum x^2 = 34980$	$\sum y^2 = 45587$	$\sum xy = 39830$

$$\bar{x} = \frac{\sum x}{n} = \frac{590}{10} = 59 \quad \bar{y} = \frac{\sum y}{n} = \frac{675}{10} = 67.5$$

$$r = \frac{\frac{1}{n} \sum xy - \bar{x} \bar{y}}{\sqrt{\frac{1}{n} \sum x^2 - \bar{x}^2} \sqrt{\frac{1}{n} \sum y^2 - \bar{y}^2}} = \frac{\frac{1}{10}(39830) - 59(67.5)}{\sqrt{\frac{1}{10}(34980) - (59)^2} \sqrt{\frac{1}{10}(45587) - (67.5)^2}}$$

$$r = \frac{.5}{\sqrt{17} \sqrt{2.45}} = \frac{.5}{6.454} = 0.076$$

$$b_{xy} = \frac{n \sum xy - \sum x \cdot \sum y}{n \sum y^2 - (\sum y)^2} = \frac{10(39830) - (590)(675)}{10(45587) - (675)^2} = \frac{398300 - 398250}{455870 - 455625} = \frac{50}{245} = 0.204$$

$$b_{yx} = \frac{n \sum xy - \sum x \cdot \sum y}{n \sum x^2 - (\sum x)^2} = \frac{10(39830) - (590)(675)}{10(34980) - (590)^2} = \frac{398300 - 398250}{349800 - 348100} = \frac{50}{1700} = 0.029$$

The regression equation of y on x:

$$y - \bar{y} = b_{yx}(x - \bar{x})$$

$$y - 67.5 = 0.029(x - 59) = 0.029x - 1.711$$

$$y = 0.029x - 1.711 + 67.5$$

$$y = 0.029x + 65.789$$

$$\text{When } x = 62, y = 0.029(62) + 65.789 = 1.798 + 65.789 = 67.587$$

When the marks in Statistics is 62, the marks in Mathematics=67.59

(For candidate admitted from 2008-2009 onwards)

M.B.A. Degree Examination, april 2012

Business administration

ORGANISATIONAL BEHAVIOUR

TIME: THREE HOURS

Maximum: 75 marks

PART A-(5 X 5=25)

Answer all questions

1. (a) How did Hawthorne studies revolutionize the understanding of organizational behaviour?
Or
(b) Critically review F.W.taylor's scientific management school of management thought.
2. (a) How do you define personality? What are the specific determinants that constitute personality?
Or
(b) Differentiate between classical conditioning and operant conditioning
3. (a) What is meant by systems approach to management?
Or
(b) What is meant by bureaucratic organization? Give the characteristics of bureaucratic organization.
4. (a) Explain theory "x" and theory "y" and discuss its suitability in modern time.
Or
(b) Explain vroom's Expectancy model.
5. (a) How can managers tackle resistance to change?
Or
(b) What is OD? Discuss the benefits and limitations of OD?

PART B (5 X10=50)

Answer all questions

6. (a) Explain henry fayol's principles of management.
Or
(b) Trace some highlights in the historical development of organizational behaviour.
8. (a) Describe the perception process, highlights the factors which play a significant part perceptual organization?
Or
(b) 'A happy employee is productive employee' Discuss the statement.
10. (a) What is neo classical theory? Does it of modification to classical theories-discuss.
Or
(b) What is power? What are the sources powers in organization?
11. (a) Explain the content theories of motivation detail?

Or

(b) What are the different approaches leadership?

12. (a) What are the barriers to cultural adaptation and explain how to overcome the barriers cultural adaptation?

Or

(b) What are the sources of conflict? Explain the conflict resolution process

(For candidate admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2011

Business administration

ORGANISATIONAL BEHAVIOUR

TIME: Three hours

maximum: 75 marks

PART A- (5 X 5 =25)

Answer all questions

1. (a) How did Hawthorne studies revolutionize the understanding of organizational behaviour?
Or
(b) Critically review F.W. Taylor's scientific management school of management thought.
2. (a) How do you define personality? What are the specific determinants that constitute personality?
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Or
(b) Explain vroom's expectancy model.
5. (a) How can managers tackle resistance to change?
Or
(b) What is OD? Discuss the benefits and limitation of OD?

PART B- (5 X 10 = 50)

Answer all questions

6. (a) Explain Henry Fayol's of management.
Or
(b) Trace some highlight in the historical development of organizational behaviour.
7. (a) Describe the perception process, highlighting the factors which play a significant part in perceptual organization.
Or
(b) 'A happy employee is productive employee' - discuss the statement.
8. (a) What is neo classical theory? Does it offer modification to classical theories-discuss.
Or
(b) What is power? What are the sources of power in organization?
9. (a) Explain the content theories of motivation in detail.
Or

- (b) What are the different approaches to leadership?
10. (a) What are the barriers to cultural adaptation and explain how to overcome the barriers to cultural adaptation?

Or

- (b) What are the sources of conflict? Explain the conflict resolution process?

**S.NO.5508
P8MBA5**

**(For candidates admitted from 2008-2009 onwards)
M.B.A Degree examination, November-2012
Business Administration
ORGANISATION BEHAVIOUR**

TIME: Three hours maximum: 75 marks

PART A- (5 x 5= 25)

Answer all questions.

- 1 (a) Describe the importance of OB in the modern management practices.
Or
(b) Briefly discuss the features of systems school of management thought.
- 2 (a) What are the common barriers of perceptual accuracy?
Or
(b) Explain how employees attitude are important in organizational functioning.
- 3 (a) Give a critical note on classical theory of organization.
Or
(b) Differentiate power from leadership.
- 4 (a) Discuss the features of extrinsic and intrinsic reward system.
Or
(b) What are the various styles of leadership?
- 5 (a) Can organizational culture be changed? Explain.
Or
(b) What are the various levels of conflict in an organization?

PART B (5 X 10= 50)

Answer all questions

- 6 (a) Describe the Hawthorne studies and the results achieved and the implication on modern management functioning.
Or
(b) Explain the outcomes of scientific management principles and discuss about the employers criticisms on scientific management.
- 7 (a) Explain the various theories of personalities.
Or

- (b) What is organizational politics? Can organizations be totally free of political behaviour? Give reasons for your answer.
- 8 (a) 'Power in organizations is vested only in the hands of few peoples' - discuss.
Or
(b) What are the bases of power?
- 9 (a) How behaviour modification principles could enhance the employee productivity?
Or
(b) Explain the features and pitfalls of contingency theories of leadership.
- 10 (a) Why people resist planned change in organizations?

Or

- (b) Describe the various OD intervention strategies and explain how they improve the functioning of the organization.

(For candidates admitted from 2008-2009 onwards)

M.B.A Degree Examination, November 2013.

Business administration- major

ORGANISATIONAL BEHAVIOUR

TIME: three hours

maximum: 75 marks

SECTION A- (5 X 5 =25)

ANSWER ALL QUESTIONS

1. (a) Explain the philosophy of scientific management.

Or

(b) Discuss the weaknesses of MBO.

2. (a) Explain different forms of learning.

Or

(b) Define attitude. State the characteristics of attitudes.

3. (a) Explain about power and authority.

Or

(b) Explain different types of group.

4. (a) Explain the relevance of motivation to morale.

Or

(b) Why is leadership important in an organization?

5. (a) What can be experienced through training?

Or

(b) How does change bring about improvement in performance?

SECTION B (5 X 10= 50)

ANSWER ALL QUESTIONS

6. (a) Evaluate the contributions of P.F. Drucker to the modern management theory and practice.

Or

(b) What are the main functions of a manager as identified by Fayol?

7. (a) People are similar, yet they are different. –comment.

Or

(b) What do you mean by group norms? Explain the factors influencing conformance to norms.

8. (a) How do organizational rules regulate the employees in an organization?

Or

(b) Explain the impact of environment to organization.

9. (a) How do group dynamics develop leadership qualities?

Or

(b) Explain Herzberg's two factor theory of motivation.

10. (a) How is health of an organization determined?

Or

(b) What are to be done so that change management will be successful?

S.NO.5500

P8MBA5

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER-2014

Business Administration

ORGANISATIONAL BEHAVIOUR

TIME: Three hours

maximum: 75marks

PART A (5 X5=25)

Answer all questions

1. (a) Explain the benefits of studying OB.

Or

(b) Elucidate the basic approaches of organizational behaviour.

2. (a) What are the components of attitude? How they are measured?

Or

(b) What are the various types of groups? Give example.

3. (a) 'Any employee who joins an organisation need trading' Do you believe in the statement? Justify.

Or

(b) Explain the various types of power.

4. (a) Define motivation. Explain different types of motives.

Or

(b) Explain the various effective styles of leadership.

5. (a) Explain the steps in the process of OD.

OR

(b) Discuss about organizational effectiveness.

PART B (5 X10 = 50)

Answer all questions

6. (a) Bring out the importance of organizational behaviour. Brief the basic concepts which regard to the nature of people.

Or

(b) Briefly discuss the anchors of organizational behaviour.

7. (a) Explain how individual differences can be assessed. Brief the stages of psychoanalytic formulation.

Or

(b) Discuss the key personality attributes. Identify the stages of personality development.

8. (a) What are the organizational rules and explain briefly about social organization.

Or

(b) Discuss power and politics in organizations. How to manage this.

9. (a) In vroom's motivations model, what is valence, expectancy and instrumentality? How these variables relate to work motivation.

Or

(b) Explain the types of leadership styles. List out the characteristics of the good leader.

10. (a) Discuss the various interventions of OD?

Or

(b) How to achieve organizational effectiveness taking the view of Indian organizational context?

S.NO.6339

P8MBA5

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2015

Business Administration

ORGANISATIONAL BEHAVIOUR

Time: Three hours

maximum: 75 marks

PART A (5X5=25)

Answer all questions.

1. (a) Discuss the implications of Henri Fayol's theory.
Or
(b) Pictures the structure of an organization.
2. (a) "Personality determines personal ability"- discuss
Or
(b) Enumerate the process of perception.
3. (a) Outline the objective of organizational rules and regulations.
Or
(b) Describe the advantages of social organization.
4. (a) Explain the process of motivation
Or
(b) "Organization development depends on organization culture". Discuss.
5. (a) Write a brief note on management change.
Or
(b) List out the effectiveness of organizational health.

PART B-(5X10=50)

Answer all questions

6. (a) Describe the nature of organization behaviour.
Or
(b) Discuss the similarities and difference between Taylor's scientific management principles and Fayol's management principles.
7. (a) Highlight the need and benefit of individual behaviour.
Or
(b) Explain the types and importance of learning.
8. (a) Write a short note on bases of power.
Or
(b) Discuss the tactics which are used and use power.
9. (a) Discuss the Herzberg's two factors theory.
Or
(b) Write detailed note on:
 - i. Employee morale,

- ii. Group Dynamics,
 - iii. Group cohesiveness.
10. (a) Elucidate the necessity of management culture.
Or
(b) Explain the various types of conflict.

S.NO:3454

P16MBA5

(For candidates admitted from 2016-2017 onwards)

M.B.A. Degree Examination, November 2016

Business Administration

ORGANIZATIONAL BEHAVIOUR

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. What is the importance of study of organizational behavior?
2. What is attitude?
3. Define personality
4. What is inter personal roles?
5. Define conflict.
6. What is organizational culture?
7. Enlist important leadership qualities.
8. Define motivation.
9. What do you mean by organizational development?
10. Define organizational effectiveness.

SECTION-B (5×5=25)

Answer All questions.

11. a) Scope organization behavior-discuss

Or

- b) Autocratic model of OB. With example.

12. a) determents of personality- with example.

Or

- b) Discuss internal and external locus of control.

13. a) What are the stage of group development?

Or

- b) Informal group. Illustrate with an example in organizational context.

14. a) explain Maslow's theory- with example.

Or

- b) What is reinforcement theory? With example.

15. a) Approaches to measures effectiveness in organization.

Or

b) How to sustain the organizational change?

SECTION-C (3×10=30)

Answer Three Questions.

- 16. Examine the causes of social behavior.
- 17. Write a note on managerial grid with example.
- 18. Types of groups. With example.
- 19. Theories of leadership- discuss
- 20. Examine the functional and dysfunctional outcomes of conflict.

(For candidate admitted from 2008-2009 onwards)

M.B.A. Degree Examination, april 2012

Business administration

ORGANISATIONAL BEHAVIOUR

TIME: THREE HOURS

Maximum: 75 marks

PART A-(5 X 5=25)

Answer all questions

1. (a) How did Hawthorne studies revolutionize the understanding of organizational behaviour?
OR
(b) Critically review F.W.taylor's scientific management school of management thought.
2. (a) How do you define personality? What are the specific determinants that constitute personality?
Or
(b) Differentiate between classical conditioning and operant conditioning
3. (a) What is meant by systems approach to management?
Or
(b) What is meant by bureaucratic organization? Give the characteristics of bureaucratic organization.
4. (a) Explain theory "x" and theory "y" and discuss its suitability in modern time.
Or
(b) Explain vroom's Expectancy model.
5. (a) How can managers tackle resistance to change?
Or
(b) What is OD? Discuss the benefits and limitations of OD?

PART B (5 X10=50)

Answer all questions

6. (a) Explain henry fayol's principles of management.
Or
(b) Trace some highlights in the historical development of organizational behaviour.
7. (a) Describe the perception process, highlights the factors which play a significant part perceptual organization?
Or
(b) 'A happy employee is productive employee' Discuss the statement.
8. (a) What is neo classical theory? Does it of modification to classical theories-discuss.
Or

(b) What is power? What are the sources powers in organization?

9. (a) Explain the content theories of motivation detail?

Or

(b) What are the different approaches leadership?

10. (a) What are the barriers to cultural adaptation and explain how to overcome the barriers cultural adaptation?

Or

(b) What are the sources of conflict? Explain the conflict resolution process

(For candidate admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2011

Business administration

ORGANISATIONAL BEHAVIOUR

TIME: Three hours

maximum: 75 marks

PART A- (5 X 5 =25)

Answer all questions

1. (a) How did Hawthorne studies revolutionize the understanding of organizational behaviour?
Or
(b) Critically review F.W. Taylor's scientific management school of management thought.
2. (a) How do you define personality? What are the specific determinants that constitute personality?
Or
(b) Differentiate between classical conditioning and operant conditioning.
3. (a) What is meant by systems approach to management?
Or
(b) What is meant by bureaucratic organization? Give the characteristics of bureaucratic organization.
4. (a) Explain theory 'X' and 'Y' and discuss its suitability in modern time.
Or
(b) Explain vroom's expectancy model.
5. (a) How can managers tackle resistance to change?
Or
(b) What is OD? Discuss the benefits and limitation of OD?

PART B- (5 X 10 = 50)

Answer all questions

6. (a) Explain Henry Fayol's of management.
Or
(b) Trace some highlight in the historical development of organizational behaviour.
7. (a) Describe the perception process, highlighting the factors which play a significant part in perceptual organization.
Or
(b) 'A happy employee is productive employee' - discuss the statement.
8. (a) What is neo classical theory? Does it offer modification to classical theories-discuss.
Or
(b) What is power? What are the sources of power in organization?
9. (a) Explain the content theories of motivation in detail.

Or

(b) What are the different approaches to leadership?

10. (a) What are the barriers to cultural adaptation and explain how to overcome the barriers to cultural adaptation?

Or

(b) What are the sources of conflict? Explain the conflict resolution process?

(For candidates admitted from 2008-2009 onwards)

M.B.A Degree examination, November-2012

Business Administration

ORGANISATION BEHAVIOUR

TIME: Three hours

maximum: 75 marks

PART A- (5 x 5= 25)

Answer all questions.

1. (a) Describe the importance of OB in the modern management practices.
Or
(b) Briefly discuss the features of systems school of management thought.
2. (a) What are the common barriers of perceptual accuracy?
Or
(b) Explain how employees attitude are important in organizational functioning.
3. (a) Give a critical note on classical theory of organization.
Or
(b) Differentiate power from leadership.
4. (a) Discuss the features of extrinsic and intrinsic reward system.
Or
(b) What are the various styles of leadership?
5. (a) Can organizational culture be changed? Explain.
Or
(b) What are the various levels of conflict in an organization?

PART B (5 X 10= 50)

Answer all questions

6. (a) Describe the Hawthorne studies and the results achieved and the implication on modern management functioning.
Or
(b) Explain the outcomes of scientific management principles and discuss about the employers criticisms on scientific management.
7. (a) Explain the various theories of personalities.
Or
(b) What is organizational politics? Can organizations be totally free of political behaviour? Give reasons for your answer.
8. (a) 'Power in organizations is vested only in the hands of few peoples' - discuss.
Or
(b) What are the bases of power?
9. (a) How behaviour modification principles could enhance the employee productivity?
Or
(b) Explain the features and pitfalls of contingency theories of leadership.
10. (a) Why people resist planned change in organizations?
Or
(b) Describe the various OD intervention strategies and explain how they improve the functioning of the organization.

(For candidates admitted from 2008-2009 onwards)

M.B.A Degree Examination, November 2013.

Business administration- major

ORGANISATIONAL BEHAVIOUR

TIME: three hours

maximum: 75 marks

SECTION A- (5 X 5 =25)

ANSWER ALL QUESTIONS

1. (a) Explain the philosophy of scientific management.
Or
(b) Discuss the weaknesses of MBO.
2. (a) Explain different forms of learning.
Or
(b) Define attitude. State the characteristics of attitudes.
3. (a) Explain about power and authority.
Or
(b) Explain different types of group.
4. (a) Explain the relevance of motivation to morale.
Or
(b) Why is leadership important in an organization?
5. (a) What can be experienced through training?
Or
(b) How does change bring about improvement in performance?

SECTION B (5 X 10= 50)
ANSWER ALL QUESTIONS

6. (a) Evaluate the contributions of P.F. Drucker to the modern management theory and practice.
Or
(b) What are the main functions of a manager as identified by Fayol?
7. (a) People are similar, yet they are different. –comment.
Or
(b) What do you mean by group norms? Explain the factors influencing conformance to norms.
8. (a) How do organizational rules regulate the employees in an organization?
Or
(b) Explain the impact of environment on organization.
9. (a) How do group dynamics develop leadership qualities?
Or
(b) Explain Herzberg's two factor theory of motivation.

10. (a) How is health of an organization determined?

Or

(b) What are to be done so that change management will be successful?

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER-2014

Business Administration

ORGANISATIONAL BEHAVIOUR

TIME: Three hours

maximum: 75marks

PART A (5 X5=25)

Answer all questions

2. (a) Explain the benefits of studying OB.

Or

(b) Elucidate the basic approaches of organizational behaviour.

2. (a) What are the components of attitude? How they are measured?

Or

(b) What are the various types of groups? Give example.

3. (a) 'Any employee who joins an organisation need training' Do you believe in the statement? Justify.

Or

(b) Explain the various types of power.

4. (a) Define motivation. Explain different types of motives.

Or

(b) Explain the various effective styles of leadership.

5. (a) Explain the steps in the process of OD.

OR

(b) Discuss about organizational effectiveness.

PART B (5 X10 = 50)

Answer all questions

6. (a) Bring out the importance of organizational behaviour. Brief the basic concepts which regard to the nature of people.

Or

(b) Briefly discuss the anchors of organizational behaviour.

7. (a) Explain how individual differences can be assessed. Brief the stages of psychoanalytic formulation.

Or

(b) Discuss the key personality attributes. Identify the stages of personality development.

8. (a) What are the organizational rules and explain briefly about social organization.

Or

(b) Discuss power and politics in organizations. How to manage this.

9. (a) In Vroom's motivations model, what is valence, expectancy and instrumentality? How these variables relate to work motivation.

Or

(b) Explain the types of leadership styles. List out the characteristics of the good leader.

10. (a) Discuss the various interventions of OD?

Or

(b) How to achieve organizational effectiveness taking the view of Indian organizational context?

S.NO.6339

P8MBA5

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2015

Business Administration

ORGANISATIONAL BEHAVIOUR

Time: Three hours

maximum: 75 marks

PART A (5X5=25)

Answer all questions.

1. (a) Discuss the implications of Henri Fayol's theory.
Or
(b) Pictures the structure of an organization.
2. (a) "Personality determines personal ability"- discuss
Or
(b) Enumerate the process of perception.
3. (a) Outline the objective of organizational rules and regulations.
Or
(b) Describe the advantages of social organization.
4. (a) Explain the process of motivation
Or
(b) "Organization development depends on organization culture". Discuss.
5. (a) Write a brief note on management change.
Or
(b) List out the effectiveness of organizational health.

PART B-(5X10=50)

Answer all questions

6. (a) Describe the nature of organization behaviour.
Or
(b) Discuss the similarities and difference between Taylor's scientific management principles and Fayol's management principles.
7. (a) Highlight the need and benefit of individual behaviour.
Or
(b) Explain the types and importance of learning.
8. (a) Write a short note on bases of power.
Or
(b) Discuss the tactics which are used and use power.
9. (a) Discuss the Herzberg's two factors theory.
Or
(b) Write detailed note on:
Employee morale,

Group Dynamics,
Group cohesiveness.

10. (a) Elucidate the necessity of management culture.

Or

11. (b) Explain the various types of conflict.

(For candidates admitted from 2016-2017 onwards)

M.B.A. Degree Examination, November 2016

Business Administration

ORGANIZATIONAL BEHAVIOUR

Time: Three hours

maximum: 75 marks

SECTION-A (10×2=20)

Answer All Questions

1. What is the importance of study of organizational behavior?
2. What is attitude?
3. Define personality
4. What is inter personal roles?
5. Define conflict.
6. What is organizational culture?
7. Enlist important leadership qualities.
8. Define motivation.
9. What do you mean by organizational development?
10. Define organizational effectiveness.

SECTION-B (5×5=25)

Answer All questions.

11. a) Scope organization behavior-discuss

Or

- b) Autocratic model of OB. With example.

12. a) determents of personality- with example.

Or

- b) Discuss internal and external locus of control.

13. a) What are the stage of group development?

Or

- b) Informal group. Illustrate with an example in organizational context.

14. a) explain Maslow's theory- with example.

Or

- b) What is reinforcement theory? With example.

15. a) Approaches to measures effectiveness in organization.

Or

b) How to sustain the organizational change?

SECTION-C (3×10=30)

Answer Three Questions.

16. Examine the causes of social behavior.
17. Write a note on managerial grid with example.
18. Types of groups. With example.
19. Theories of leadership- discuss
20. Examine the functional and dysfunctional outcomes of conflict.

MBA DEGREE EXAMINATION APRIL-2012

FINANCIAL MANAGEMENT (P16MBA10)

Time: Three hours

maximum: 75marks

SECTION A-(5*5=25)

Answer ALL Questions.

1. (a) How does the “Modern” Financial manager differ from the “traditional manager”?
(Or)

(b) What is an EBIT-EPS analysis? Illustrate your answer.

2. (a) A firm purchases a machinery for Rs. 8,00,000 by making a down payments of Rs. 1,50,000 and remainder in equal installments of Rs. 1,60,000 for six years. What is the rate of firm?

(Or)

(b) “We use payback primarily as a method of coping with Risk” comment.

3. (a) “The equity capital is cost free” Do you agree? Give Reasons.

(Or)

(b) The expected value of the probability distribution of the possible net present value for a project is Rs.30, 000 and the standard deviation about the expected value is Rs.15, 000. Assuming a normal distribution, what is the

Probability that the net present value will be

- i. Zero or less
- ii. Greater than Rs. 45,000 and
- iii. Less than Rs. 7,500

4. (a) Do you recommend that a firm should finance its

Current assets entirely with short term financing? Explain

Your answers.

(Or)

(b) A manufacturing company has an expected usage of 50,000 units of certain product the next year. The cost processing an order is Rs.20 and the carrying cost per units is Rs.0.50 for one year lead time on an order is five days

And the company will keep a reserve supply of two usages.

Your are required to calculate

- i. The economic order quantity and
 - ii. The recorder.
5. (a) "The primary purpose for which a firm exists is the Payment of dividend. Therefore, irrespective of the firm's needs and the desires of shareholders; a firm should follow a policy of very high dividend payout" Do you agree? Why?

(Or)

(b) What is meant by internal financing? What is its Rationale?

SECTION-B (5*10=50)

Answer the entire question

6. (a) "The basic rationale for the objective of shareholders wealth maximization is that it reflects the most efficient use of society's economic resources and thus leads to a maximization of society's economic wealth"-comment critically.

(Or)

(b) Phillips Electronics decides to effort a 10% reduction in the price of its product because it is felt that such a step may lead to a greater volume of sales. It is anticipated that there are no prospects of a Change in total fixed costs and variable costs per unit. The directors wish to maintain net profits at the present level.

The following information has been obtained from its

Book-

Sales - 10,000 units

Variable costs

Fixed costs

How would management proceed to implement this decision?

7. (a) What is financial risk? Is it necessary to assume that Firm's financial structure remains unchanged when evaluating the firm's cost of capital? Why is this assumption impractical?

(Or)

(b) A large sized chemical company is considering investing in A project that costs Rs. 5, 00,000. The estimated salvage Value is zero, tax rate is 35%. The company uses straight Line depreciation for tax purposes and the proposed project has cash flows before tax (CFBT) as follows

Year	Rs.
1	Rs.1,00,000
2	Rs.1,00,000
3	Rs.1,50,000
4	Rs.1,50,000
5	Rs.2,50,000

Determine the following

- i. Payback period, and
 - ii. Average rate of return
8. (a) Briefly explain and illustrate the concept of "time value of Money".

(Or)

(b)” _ _ _ _ an analysis of the magnitude and stability of Cash flows relative to fixed charges is extremely important in determining an appropriate capital structure”-comment.

9. (a)How is working capital affected by

- i. Sales
- ii. Technology and production policy, and
- iii. Inflation? Explain.

(Or)

(b) MNG Ltd. Wants to relax its credit on sales from the current level of one month to 2months.Due to this, sales would increase to Rs. 72 lacks from the present level of Rs. 60 lacks per annum but the percentage of bad debts losses is likely to go up by 2% of sales which is now at 3% of sales. The company’s variable cost is 75% of sales and fixed expenses are Rs. 12 lacks per annum.

Advise the company on the implications of revising the Credit policy. The firm’s required rate of return is 10%.

10. (a)The earnings per share of a company are Rs. 10. The equity capitalization rate is 20%. Interval rate of return on retained earnings is 10%. Using Gordon’s formula

- i. What should be optimum payout ratio of the company?
- ii. What should be price of share at optimum payout ratio?
- iii. Shall this price be affected if different payout (say 80%) Were employed?

(Or)

(b) Explain the implication of financial modeling in the Present day corporate environment.

MBADEGREE EXAMINATION, APRIL-2013
BUSINESS ADMINISTRATION
FINANCIAL MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION A-(5*5=25)

Answer ALL Questions

1. (a) Write the financial management functions to a large firm.
(Or)
(b) ABC Ltd. Manufactures and sells four types of products under the brand names of A,B,C and D. The sales mix in values comprises 33.33, 41.67 and 8.33 per cent for products. A, B, C and D respectively. The total budgeted sales (100 per cent) are Rs. 60,000 per month. Operating costs are: variable costs as per cent of selling price: Products A 60, B 68, C 80 and D 40. Fixed costs, Rs.14,700 per month.
Calculate the break –even point for the products on over-all basis.
2. (a) Explain the merits and demerits of CAPM approach.
(Or)
(b) An executive is about to retire at the age of 60. His Employer has offered him two post-retirement options:
 - i. Rs.20,00,00 lump sum,
 - ii. Rs.2, 50,000 for 10years. Assuming 10 per cent interest, which is a better option?
3. (a) Briefly describe on the trade off theory of capital structure.
(Or)
(b) From the following selected data, determine the value of the firms, P and Q belonging to the homogeneous Risk class under NI approach.

EBIT	Rs. 2, 25,000	Rs. 2, 25,000
Interest (.15)	75000	-
Equity capitalization rate (ke)-0.20		
Tax rate-0.35		

Which of the two firms has an optimal capital structure?

4. (a) What are the determinants of working capital?
(b) Economics enterprise requires 90,000 units of certain items annually. The cost per unit is Rs.3. The cost per purchase order is Rs.300 and the inventory carrying cost is Rs.6 per unit per year.
 - i. What is the EOQ?
 - ii. What should the firms do if the suppliers offer discounts as detailed below:

Order quantity	Discount
4,500-5,999	2 per cent
6,000 and above	3

5. (a) What are the determining factors of dividend policy?
(b) From the following information supplied to you, determine the theoretical market value of equity shares of a company as per Walter's model:
Earnings of the company Rs.5, 00,000

Dividends paid
 Number of shares outstanding Rs.1, 00,000
 Price earnings ratio
 Rate of return on investment 0.15

Are you satisfied with the current dividend policy of the firm? If not, what should be the optimal dividend payout ratio in this case?

SECTION B-(5*10=50)

Answer ALL questions.

6. (a) Define break-even analysis and outline its uses and applications.

(b) The selected financial data for A, B and C companies for the current year ended march 31 are as follows:

Particulars	A	B	C
Variable Expenses as a			
Percentage of sales	66.67	75	50
Interest expenses (Rs.)	200	300	1000
Degree of operating leverage	5	6	2
Degree of financial leverage	3	4	2
Income tax rate	0.35	0.35	0.35

- Prepare income statements for A, B and C companies.
- Comment on the financial position and structure of these companies.

7. (a) Elucidate on the source of long term finance.

(b) Mr. X has Rs. 1, 00,000 to deposit in a bank account for 3 year. Assuming

- Annual compounding
- Semi-annual compounding and
- Quarterly compounding at a stated annual interest rate of 4% compute (1) the amount he would have at the end of the third year, leaving all interest paid on deposits in the bank, (2) the effective rate of interest he would earn on each alternative, and (3) which plan should be choose?

8. (a) Explain the problems faced in determining the cost of Capital. How is the cost of capital relevant in capital Budgeting decisions?

(b) XYZ Ltd., has the following book value capital structure:
 (Rs. crore)

Equity capital (in shares of Rs. 10each, Rs. 15

Fully paid up at par)

12% preference capital (in shares of 1

Rs. 100 each fully paid up at par)

Retained earnings 20

11.5% debentures (of Rs. 100 each) 10

11% term loans

The next expected dividend on equity shares per share is Rs. 3.60; the dividend per share is expected to grow at the ratio of 7 per share is Rs. 40. Preference stock, redeemable after six years, is selling at Rs. 75 per share.

Debentures, redeemable after six years, are selling at Rs. 80 per debenture.

The Income tax rate for the company is 40% required: **Calculate the weighted average cost of capital**

Using

- i. Book value proportions; and
- ii. Market value proportions.

9. (a) What is networking capital and what are the three Approaches to determining an appropriate financing mix?

(b) X Ltd. Sells goods at a gross profit of 20%It includes depreciation as a part of cost of production. The following figures for the 12 month-period ending March 31, current year are given to enable you to ascertain the requirements of working capital of the company of the company on a cash basis.

In your working, you are required to assume that:

- i. A safety margin of 15 per cent will be maintained;
- ii. Cash is to be held to the extent of 50 per cent of current liabilities;
- iii. There will be no work-in progress;
- iv. Tax is to be ignored;
- v. Finished goods are to be valued at manufacturing costs. Stocks of raw materials and finished goods are kept at one month's requirements.

Sales at 2 month's credit, Rs.27, 00,000

Materials consumed (suppliers credit is for 2 months), Rs.6, 75,000

Wages (paid on the last day of the month), Rs. 5, 40,000

Manufacturing expenses outstanding at the end the year (Cash expenses are paid one month in arrear), Rs. 60,000

Total administrative expenses (paid as above),
Rs.1, 80,000

Sales promotion expenses (paid quarterly in advance), Rs. 90,000

10. (a) Write a note o share repurchase.

(b) X company earns Rs. 5 per share, is capitalized at a rate of 10 %and has a rate of return on investment of 18% According to Walter's model; what should the price per Share at 25 per cent dividend payout ratio? Is this the

Optimum payout ratio according to Walter?

M.B.A DEGREE EXAMINATION, APRIL-2014

Business Administration

FINANCIAL MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION A-(5*5=25)

Answer ALL questions

1. (a) A Ltd issues 10% irredeemable preference shares. The Nominal value each share is Rs. 100 calculate the cost of Preference shares capital in the following cases:
- When issued at 5% discount and
 - When issued at 5% premium?

(Or)

(b) Explain the significance of capital budgeting.

2. (a) From the following calculate operating financial and

Combined leverage:

Total sales	Rs.60, 000
Variable cost	60% of sales
Fixed cost	Rs. 5,000

Capital Structure:

Equity	Rs. 30,000
10% Debenture	Rs. 10,000

(Or)

(b) Explain the scope of financial management.

3. (A) what are the financial needs of a business?

(Or)

(b) Explain the concept of money value in investment.

4. (A) what are the motives for holding cash?

(Or)

(b)What are the objectives of bills receivable?

5. (A) Explain about internal financing.

(Or)

(b)Explain different forms of dividend.

SECTION B-(5*10=50)

Answer ALL questions.

6. (a)From the following, compute Payback period under Traditional Payback period and Discounted Payback period method:

Initial outlay	Rs. 80,000
Estimated life 5 Years	
Profit after tax	
I Year	Rs. 6,000
II Year	Rs. 14,000
III Year	Rs. 24,000
IV Year	Rs. 16,000
V Year	Nil.

Depreciation is calculated under Straight line method. The cost of capital may be taken at 20% pa. And the P.V of Re. 1 at 20%pa.is given below:

Year	:	1	2	3	4	5	
PV factor	:		83	69	58	48	40

(Or)

(b)What are the factors that determine capital investment decisions?

7. (a) What are the merits and demerits of financing through debentures?

(Or)

(b) Explain the Indian Financial System in brief.

8. (a) From the following details, determine weighted average Cost of capital using book value as weights and market Value as weights:

Type of capital	Book Value	Market Value	Specific Cost
	Rs.	Rs.	
Debentures	40,000	38,000	5%

Pref. capital	10,000	11,000	8%
Equity capital	60,000	1, 20,000	13%
Retained	20,000	-	9%
Earnings			

(Or)

(b) What are the factors that determine the capital structure?

9. (a) A Performa cost sheet of a company provide the following particulars :

Raw-materials	40%;
Labour	10%;
Overhead	30%;

The following further particulars are available:

- i. Raw-materials are to remain in stores on an average 6 weeks
 - ii. Processing time is 4 weeks
 - iii. Finished goods are to remain in stock on an average 8 weeks
 - iv. Credit period allowed to debtors on an average 10 weeks
 - v. Lag in payment of wages 2 weeks
 - vi. Credit period allowed by the creditors 4 weeks
 - vii. Selling price per unit Rs.50
- Prepare an estimate of working capital requirements, adding 10% margin for contingencies for a level of activity of 130000 units of production.

(Or)

(b) Explain the techniques of inventory management.

10. (a) Explain the concept of MM theory to dividend policy.

(b) Following are the details regarding two companies:

A Ltd

$r=15\%$

$k=10\%$

$E=Rs.10$ $E=Rs.10$

Calculate the effect of dividend payment on the value of each of the above companies under the following Situations :(Apply Walter Formula)

- i. When no dividend is paid.
- ii. When dividend is paid at Rs.4 per share.
- iii. When dividend is paid at Rs.8 per share.
- iv. When dividend is paid at Rs.10 per share.

MBA DEGREE EXAMINATION, APRIL 2015

Business Administration

FINANCIAL MANAGEMENT

Time: Three hours

maximum: 75hours

SECTION A - (5*5=25)

Answer all questions.

1. (a) Briefly point out some emerging role of the finance manager in India.
(b) How is the finance function typically organized in a large Organization?
2. (a) An executive is about to retire at the age of 60. His employer Has offered him two past-requirement options:
 - i. Rs. 20,00,000 lumpsum,
 - ii. Rs. 2, 50,000 for 10 years. Assuming 10 percent interest,
Which is a better option?(Or)
(b) What is meant by the concept 'financial risk'? What is the Relationship between leverage and the cost of capital?
3. (a) Hilt share is quoted at Rs.60. Nitin expects the company to pay a dividend of Rs. 3 per share, one year from now. The expected Price one year from now is Rs. 78.50, what is the Intrinsic Value of the share? How does it compare with the current Market price?
(Or)
(b) Distinguish between realized and expected return.
4. (a) Distinguish between gross working capital and net working Capital and net working capital.
(Or)
(b) What is the principal motive for holding cash?
5. (a) X company earns Rs. 5 per share, is capitalized at a rate of 10% And has a rate of return on investment of 18%. According to Walter's model, what should be the price per Share at 25% dividend payout ratio?
(Or)
(b) What do you think are the determinants of the dividend policy of corporate enterprises?

SECTION B - (5*10=50)

Answer all questions.

6. (a) Why must the finance manager keep in mind the degree of Financial leverage in evaluating various financing plans? When does financial leverage become favorable?

(Or)

(b) Two businesses, AB Ltd and CD Ltd, Sell the same type of Product in the same type of market. Their budgeted profit and Loss accounts for the current year ending March 31 are as follows:

Particulars	AB Ltd		CD Ltd
	(Rs.)		(Rs.)
Sales	1, 50,000		1, 50, 000
Less: variable costs		1, 00,000	
Rs. 1, 20,000	1, 35,000	35,000	1, 35,000
	-----	-----	-----
Fixed Costs 15,000	15,000		15,000
Net budgeted profit			

- i. Calculate the break-even points of each business and
- ii. State which business is likely to earn greater profits in conditions of heavy demand for the product.

7. (a) Given a critical approach of the

- i. Traditional approach and
- ii. The Modigliani- Miller approach to the theory of capital structure.

(Or)

(b) Illustrate on green shoe option.

8. (a) “Beta is not the sole factor affecting security required rate of Return” Elucidate the statement.

(Or)

(b) An existing company has a machine which has been in operation

For 2 year; its estimated remaining useful life is 4 years with no
Salvage value is Rs. 25,000. The management is considering a
Proposal to purchase an improvement model of the machine which
Gives increased output; the relevant particulars are as following:

Particulars	Existing Machine	New Machine
Purchase price (Rs.)	60,000	1, 07,500
Estimated life (year)	6	4
Salvage value	0	0
Annual operating	1000	1,000
Selling price per unit (Rs.)	3	3
Material per unit (Rs.)	0.40	0.40
Output per hour (units)	15	30
Labour cost per hours (Rs.)	11	16
Consumable stores per Year (Rs.)	2,000	1,000
Repairs and maintenance Per year (Rs.)	3,000	2,000
Working capital (Rs.)	10,000	20,000
Income-tax rate	35	35

Should the existing machine be replaced? Assume that I required Rate of return is 10% and the company uses written down value Method of depreciation @ 20% and it has several machines in the 20% block.

9. (a) From the following data, compute the duration of the operating Cycle for each of the two years and comment on the increase / decrease.

Particulars	Year 1	Year 2
Stocks		
Raw materials	Rs. 20,000	Rs. 27,000

Work-in process	14,000	18,000
Finished goods	21,000	24,000
Purchase of raw		
Materials	96,000	1, 35,000
Cost of goods sold	1, 40,000	1, 80,000
Sales	1, 60,000	2, 00,000
Debtors	32,000	50,000
Creditors	16,000	18,000

Assume 360 days per year for computations purpose.

(Or)

(b) What specific strategies can be adapted to slow disbursement of Accounts payable?

10. (a) Expandent Ltd had 50,000 equity shares of Rs. 10 each Outstanding on January 1. The shares are currently being quoted at Par in the market. The company now intends to pay a dividend of Rs. 2 per share for the current calendar year. It belongs to risk loss whose appropriate capitalization rate is 15%. Using Modigliani-miller model and assuming no taxes, ascertain the price Of the company's share at it is likely to prevail at the end of the Year

- i. When dividend is declared, and
- ii. When no dividend is declared.

(Or)

(b) What is stable dividend policy? Why should a firm follow such a Policy?

M.B.A DEGREE EXAMINATION APRIL 2012

Business administration

HUMAN RESOURCE MANAGEEMNT

PART A-(5*5=25)

ANSWER ALL THE QUESTIONS

- 1.(a) What is one key function of human resource management?
(Or)
(b) Discuss about evolution of human resource management?
2. (a) What are the qualitative limitations of human resource planning?
(Or)
(b) Why do we need importance in human resource development standards?
3. (a) How will you develop an effective training program me?
(Or)
(b) Mention various techniques of training?
4. (a) Explain Fredrick Herzberg's two factors theory.
(Or)
(b) Explain career development cycle.
5. (a) Explain the process of performance appraisal.
(Or)
(b) Write about 360° performance appraisal system.

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (a) Describe the human resource planning process.
(Or)
(b) Write about personal policies.
7. (a) Describe multiple goals of Human Resource Development.

(Or)

(b) What are the activities of succession planning?

8. (a) Discuss about critical importance knowledge management in organization.

(Or)

(b) Mention the benefits of a training programme.

9. (a) Explain Maslow's need hierarchical theory

(Or)

(b) Describe various compensation plans.

10. (a) What the benefits of performance appraisal systems.

(Or)

(b) Explain the importance of control process.

M.B.A DEGREE EXAMINATION APRIL 2013

Business administration

HUMAN RESOURCE MANAGEMENT

PART A-(5*5=25)

ANSWER ALL QUESTIONS

1. (a) Describe the role of HR.
(Or)
(b) What is Human Resource Management? Explain the duties and responsibilities of HR managers.
2. (a) What are the various human resources forecasting techniques?
(Or)
(b).What is the internal and external sources of recruitment?
3. (a) What are the types of training?
(Or)
(b) What are the features of executive development?
4. (a) How do the theories of motivation influence the compensation decision?
(Or)
(b) Write on career management framework.
5. (a) What are the elements of a performance management system?
(Or)
(b) Why do employees join trade union?

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (a) Explain computer applications in HRM
(Or)

(b) Supposing you have been appointed HR manager of a newly established organization with more than 1000 employees of different categories outline the policies you would put in place and give your rational for work.

7. (a) what are the various interviewing styles organizations used today? Cite relevant examples.

(Or)

(b) Discuss the sources of recruitment mainly adopted by MNC's today?

8. (a) explain the principles, needs, criteria and level of training evaluation?

(Or)

(b) Elucidate the process of executive development with illustration.

9. (a) explain the factors of individual career planning.

(Or)

(b) Explain the need and importance of training.

10. (a) "collective bargaining is an effective tool for grievance redressal". Explain the process of collective bargaining.

(Or)

(b) Explain the process of performance appraisal and explain any two modern techniques

M.B.A DEGREE EXAMINATION APRIL 2014

Business administration

HUMAN RESOURCE MANAGEMENT

PART A-(5*5=25)

ANSWER ALL THE QUESTIONS

1. (a) Explain shortly the importance of computer based training.

(Or)

(b) Highlight the importance of HR manager in an organization.

2. (a) What are the forecasting techniques involved in human resource planning?

(Or)

(b) State the various stages of employee selection process.

3(a) defines the term employee induction and its benefits.

(Or)

(b) State the objectives of HRM

4(a) define the role of computer technology in HRM

(Or)

(b) Briefly mention the vitality of induction program me for newly recruited staff

5(a) State the motivational theories adapted by organizational to retain the existing work force.

(Or)

(b) What are protégé relationships in HRM?

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (a) Highlight the importance of staff selection in a multinational corporation and the managerial function involved in it. (Or)

(b) “Performance appraisal is a systematic and objective way of judging the relative worth of an employee in performing his job” how can HR manager use performance appraisals as an effective tool to judge the employee performance in an organization.

7(a) enumerate on the job techniques involved evaluating the employee compensation of benefits.

(Or)

(b) Examine the importance of the individual and organizational, perspective on career planning?

8(a) elaborates on the evolution of human resource management, the policies and the process adopted in the business process?

(Or)

(b) Evaluate the strategic role of a HR manager and the challenges encountered in a paradoxical managerial situation.

9(a) explains the concept of career in the concept of career development perpespective. Discuss various individual and organization strategies for career development

(Or)

(b) Discuss the scope and significance of training methods with suitable Illustrations

10(a) examine the importance of organization perpespective on executive development programmes to augment employee welfare

(Or)

(b) Explain the job change and content techniques commonly used in HR strategies

M.B.A DEGREE EXAMINATION APRIL 2015

Business administration

HUMAN RESOURCE MANAGEMENT

PART A-(5*5=25)

ANSWER ALL QUESTIONS

1. (a) What are the roles of a human resource manager in an organization?
(Or)
(b) Define human resource management.
2. (a) Differentiate recruitment and selection.
(Or)
(b) What is socialization?
3. (a) State the different types of training.
(Or)
(b) Define the term knowledge management.
4. (a) what are the different extrinsic motivation tools?
(Or)
(b) Differentiate mentoring with coaching.
5. (a) State the methods of controlling.
(Or)
(b) What is grievance redressal?

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (a) what do you mean by executive development? Discuss the methods of executive development.
(Or)
(b) Discuss the model grievance procedure that is applicable in India. What are the essential prerequisites of a grievance procedure?
7. (a) Explain the individual performance appraisal methods.
(Or)

(b).Describe the evolution of HRM in Indian scenario.

8. (a) why it is important for HR management to evolve from an administrative and operational level to a strategic level?

(Or)

(b) Briefly outline the steps involved in conducting a training program me in a systematic way.

9. (a) Elucidate the different theories of motivation with example.

(Or)

(b) Discuss the process of career management. What are the expected benefits?

10. (a) Enumerate the different methods carried out for performance evaluation.

(Or)

(b) Explain the process of grievance redressal.

(For candidates admitted from 2016 -2017)

M.B.A. DEGREE EXAMINATION, APRIL 2017

Business Administration

HUMAN RESOURCE MANAGEMENT

Time: Three hours

Maximum:75 marks

SECTION A-(10 X 2=20)

Answer ALL questions.

1. State the importance of human Resource Management.
2. List any two roles of human Resource Management.
3. Define human resource planning.
4. What is medical examination?
5. What is training with in industry?
6. What is self-development?
7. What is reward?
8. Explain Career Management.
9. Define Transfer.
10. What is Grievance?

SECTION B- (5X 5+=25)

Answer ALL questions.

11 (a) Explain the objectives of Human resource Management.

Or

(b) Discuss the evolution of HRM.

12. (a) Discuss the importance of Homan resource planning and Explain their relative merits and demerits.

Or

(b)What are the factors to be consider while forecasting human resource requirements.

13. (a) Discuss the various methods of training.

Or

(b) Discuss the executive development programmes.

14. (a) Discuss the various strategies for an effective career management.

Or

(b) Explain the advantages and disadvantage of compensation plan.

15. (a) What are the elements of an effective grievance redressal system? Why it is necessary?

Or

(b) Why is it necessary to make an employee move from one job to another within the organization?

SECTION- (3 X 10 =30)

Answer any THREE questions.

16. What are the qualities and qualifications of a human resource manager?

17. Discuss the merits and demerits of the internal and external sources of recruitment.

18. What is training? Differentiate it from development. Explain the need and basic purpose of training.

19. Critically examine the need hierarchy theory of motivation.

20. What is meant by promotion? Justify the need for employee promotion. Distinguish promotion from transfer.

M.B.A DEGREE EXAMINATION NOVEMBER 2011

Business administration

HUMAN RESOURCE MANAGEMENT

PART A-(5*5=25)

1. (a) Describe the factors which led to the emergence of human resource theory.

(Or)

(b) What are the objectives of human resource management?

2. (a) explain the concepts of human resource planning.

(Or)

(b) Mention the need for public intervention in human resource planning.

3. (a) How will you design a training program me for hospital staff/

(Or)

(b) Give a brief note on employee?

4. (a) What are the potential attribution that determine the quality of an employee?

(Or)

(b)Mention the motivational techniques in human resource development practice.

5. (a) what are the methods of performance evaluation?

(Or)

(b) Give a brief note on grievance redressed.

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (a) what are the approaches to human resource management?

(Or)

(b) How will you improve effectiveness for human resource policy at the macro level?

7. (a) Write the steps in selection process.

(Or)

(b) What is personnel manual and how it is designed?

8. (a) what are the benefits of training.

(Or)

(b) What are the principles of training?

9. (a) Give a brief note on relationship between incentive and motivation.

(Or)

(b) Explain Vroom's expectancy theory.

10. (a) how will you develop a performance appraisal system?

(Or)

(b) Describe various methods of control.

M.B.A DEGREE EXAMINATION NOVEMBER 2015

Business administration

HUMAN RESOURCE MANAGEMENT

PART A-(5*5=25)

ANSWER ALL QUESTIONS

1. (A) Discuss the uses of computers in HRM department.
(Or)
(B) Illustrate the structure of HRM department in Seafood Company.
2. (A) Discuss the importance of Human Resource planning.
(Or)
(B).Explain the components of internal sources of recruitment.
3. (A) Outline the objectives of training.
(Or)
(B).Describe the advantages of sensitivity training.
4. (A) Explain the process of motivation.
(Or)
(B).List out the role of a mentor in the organization.
5. (A) Write a brief note on causes of grievances.
(Or)
(B) List out the steps involved in controlling process.

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6. (A) Basic application of computer knowledge is mandatory for a HR manager”-Discuss.
(Or)
(B) Explain the recent trends and issues on Human Resource Management.
7. (A) Highlight the need and importance of socializing the employee into the organization.
(Or)

(B) Explain the types and importance of induction in IT industry.

8. (A) Write a detailed note on off the job training.

(Or)

(B) As a HR manager how do you plan for conducting the executive development program in the organization?

9. (A) Discuss the Herzberg's two factors theory.

(Or)

(B) Write a short note on:

- Career path
- Career Development Program

10. (A) Elucidate the necessity of Gender sensitization in the organization.

(Or)

(B) Explain the various types of modern performance evaluation technique.

(For candidates admitted from 2008-2009 onwards)

M.BA DEGREE EXAMINATION, APRIL 2013.

Business administration

MARKETING MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. (a) Discuss the function of marketing.

Or

- (b) Explain the step in marketing research.

2. (a) Discuss different types of packages.

Or

- (b) Describe the procedure involved in fixing a price for a product.

- 3 (a) How will you measure advertisement effectiveness?

Or

- (b) Distinguish between publicity and public relations.

4. (a) what are the important function of various channels ?

Or

- (b) How can logistics be used to gain critical customer service advantage ?

Or

5. (a) Discuss different methods of direct marketing.

Or

- (b) What are effective strategies of business organization?

SECTION-B (5X10=50)

Answer All Questions

6 (a) “Marketing begins and ends with the consumer”-discuss.

Or

(b) What could happen if a firm does not analyze its macro and microenvironment thoroughly? Explain

7. (a) Discuss different method with which the product mix could be altered.

Or

(b) “Theoreticians and practitioners in the area of pricing never seem to see eye-to-eye” discuss

8. (a) Explain the different method of controlling salesmen.

Or

(b) Examine the merits and demerits of sales promotion tools.

9. (a) What factor influence the selection of channel for distribution of cosmetics explain.

Or

(b) Explain the function of transport in marketing of goods.

10. (a) Discuss different types of tools for competitive of product.

Or

(b) Enumerate the laws which help to protect consumers in India.

(For candidates admitted from 2008-2009 onwards)

M.BA DEGREE EXAMINATION, APRIL 2014.

Business administration

MARKETING MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. (a) How will you implement a marketing program me?

Or

- (b) Explain the significance of segmentation in service industry.

2. (a) What is the need for distribution cost analysis?

Or

- (b) How are consumers classified for a new product?

3. (a) What is promotion mix? Describe its elements.

Or

- (b) Advertising is wasteful. Do you agree? Give reasons.

4. (a) compare the merits and demerits of various modes of transports.

Or

- (b) Why many of the large scale manufacturers do not prefer direct selling?

5. (a) What is database marketing? How can it be used to strengthen the sales of cosmetic products?

Or

- (b) What are the major factors that have contributed to growth in direct marketing?

SECTION-B (5X10=50)

Answer All Questions

6. (a) Discuss the importance of market segmentation in developing a marketing strategy.
Or
(b) Explain the factors affecting marketing environment.
7. (a) Explain the different concepts of a product.
Or
(b) Under what circumstances would you recommend price discounts against similar price reduction? Illustrate with examples how sales promotion can be used as a tool for product positioning
8. (a) Explain factors that should be considered in the choice of advertising media.
Or
(b) Explain the process of personal selling.
9. (a) Explain the choices available to manufactures as regards channel of distribution and indicate the criteria of selection generally used.
Or
(b) Distribution management is a key to economic development – discuss.
10. (a) In India context, which are the most appropriate media for reaching out the target markets? Examine.
Or
(b) Explain the scenario of consumerism and consumer protection in India.

(for candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL, 2013

Business Administration- Major

OPERATION RESEARCH

Time: 3hrs

Maximum: 75 Marks

PART-A (5*5=25)

Answer ALL questions

1. (a) Define operations research. Discuss its scope.
(or)

(b) To maintain good health, a person must fulfill certain minimum daily requirements of carbohydrates, proteins and vitamins. If the person's diet consists of only two food items I and II whose price and nutrient contents are given below, find out what combination of the two food items will satisfy the daily requirements of the essential nutrients on a least cost basis.

We denote two food items, as X1 and X2 . The price and nutrient contents of the food items are given in the following table:

Protein	5	5	20
Vitamin	3	8	14

2. (a) Describe the steps involved in vogal approximation method (VAM).
(or)

(b) Describe the steps involved in solving assignment problem by Hungarian method.

3. (a) The annual demand for an item is 3200 parts. The unit cost is Rs.6 and the inventory carrying charges are estimated as 24% per annum. If the cost of one procurement is Rs.150, find:
- (i) Economic order quantity
 - (ii) Time between two consecutive orders.
 - (iii) Number of orders per day.
 - (iv) The optimal cost.
- (or)

(b) Find the optimum solution to the following problem.

I	3	4	6	8	8	20
II	2	10	1	5	30	30
III	7	11	20	40	15	15
IV	2	1	9	14	18	13
	40	6	8	18	6	

4. (a) Explain the decision model.

(or)

(b) Construct the network for the following activity data:

Activity	Preceded by	Activity	Preceded by
A	---	---	---
B	---	H	F
C	B	I	H
D	A	J	I
E	C	K	D,E,G,J
F	C	L	I
G	F	M	K,L

5. (a) A repair shop is manned by a single worker. Customers arrive at the rate of 30 per hour. Time required providing service is exponentially distributed with mean of 100 seconds. Find the mean waiting time of a customer, needing repair facility in the queue.

(or)

(b) Explain Markov chains in detail.

PART-B (5*10=50)

Answer ALL questions.

6. (a) A firm manufactures two products A and B on which the profits earned per unit are Rs.3 and Rs.4 respectively. Each product is processed on two machines M1 and M2. Product A requires one minute of processing time on M1 and two minutes of processing on M2 while processing of B requires one minute on M1 and one minute on M2. Machine M1 is available for not more than 7 hours 30 minutes while machine while

machine M2 is available for 10 hours during any working day. Find the number of units of product A and B need to be manufactured to get maximum profit. Formulate the above as a LPP and solve by graphical method.

(or)

(b) A person requires 10,12 and 12 units of chemicals A,B and C respectively for herbal garden. A liquid product contains 5,2 and 1 units of A,B and C respectively per jar. A dry product contains 1,2 and 4 units of A,B, and C per cartoon. If the liquid products sells for Rs.3 per jar and dry product sells for Rs.2 per cartoon, how many of each should be purchased to minimize the cost and meet the requirements.

7. (a) Solve the following cost-minimizing transportation problem.

	D1	D2	D3	D4	D5	D6	Available
O1	2	1	3	3	2	5	50
O2	3	2	2	4	3	4	40
O3	3	5	4	2	4	1	60
O4	4	2	2	1	2	2	30
Required	30	50	20	40	30	10	180

(or)

(b) Assign three jobs on three machines for following cost matrix.

	M1	M2	M3
J1	RS.14	RS.12	RS.16
J2	RS.11	RS.17	RS.21
J3	RS.20	RS.8	RS.7

8.(a)The demand of bearing ,produced by a company,is uniform at 25units per day.It is estimated that each time a production is set,the company incurs Rs.60 as fixed cost.Production cost is Rs.4 and carrying cost is Re.1per unit per day.If the shortage cost is Rs.6 per bearing per day,find the frequency of production run and the optimal production size.

(or)

(b)What is EOQ?What are the basic assumptions of the model?Explain the advantages and disadvantages of inventory.

9.(a)Explain the difference between PERT and CPM.

(or)

(b)The following table gives the activities in a construction project and other relevant information.

Activity	Preceding activity	Normal Time(days)	Crash Time(days)	Normal Cost(Rs)	Crash Cost(Rs)
1-2	-	20	17	600	720
1-3	-	25	25	200	200
2-3	1 - 2	10	8	300	440
2-4	1 - 2	12	6	400	700
3-4	1 -3,2-3	5	2	300	420
4-5	2-4,3-4	10	5	300	600

- (i) Draw activity network of the project.
- (ii) Find total float and free float of each activity.

10.(a)Arrival at a telephone booth are considered are to be Poission.with an average time of 10minutes between one arrival and next.The length of phone call assumed to be distributed exponentially with mean 3minutes then

- (i)What is the probability that a person arriving at the booth will have to wait?
- (ii)What is the average length of the queues that form time to time.

(or)

(b) Write a note on Ken Lal and Lee's notation for the identification of queues.

(for candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2015.

BUSINESS ADMINISTRATION

OPERATIONS RESEARCH

Time : 3hrs
marks

Maximum : 75

PART-A (5*5=25)

Answer ALL questions:-

1. (a) Explain the features of operations research.

(or)

- (b) List the scope of operations research.

2. (a) What are the limitations of linear programming methods?

(or)

- (b) Explain the modified distribution method for solving a given transportation problem.

3. (a) Explain the various applications of network analysis.

(or)

- (b) Distinguish between PERT and CPM.

4. (a) Discuss the steps involved in constructing a PERT network.

(or)

- (b) Illustrate "Decision trees" with suitable example.

5. (a) Write a note on queue, queuing systems and the applications of queuing models.

(or)

- (b) Consumer arrival at an ATM booth is considered to be Poisson, with an average time of 10 minutes between one arrival and next. The

length of ATM service is assumed to be distributed exponentially with mean 3 minutes then .

- (i) What is the probability that a person arriving at the booth will have to wait?
(ii) What is the average length of the queues that form from time to time?

PART-B (5*10=50)

Answer ALL questions.

6. (a) Discuss the phases in operations research.

(or)

(b) A company makes two products (X and Y) using two machines (A and B). Each unit of X that is produced requires 50 minutes processing time on machine A and 30 minutes processing time on machine B. Each unit of Y that is produced requires 24 minutes processing time on machine A and 33 minutes processing time on machine B.

At the start of the current week there are 30 units of X and 90 units of Y in stock. Available processing time on machine A is forecast to be 40 hours and on machine B is forecast to be 35 hours.

The demand for X in the current week is forecast to be 75 units and for Y is forecast to be 95 units. Company policy is to maximize the combined sum of the units of X and the units of Y in stock at the end of the week.

- (i) Formulate the problem of deciding how much of each product to make in the current week as a linear program.
(ii) Solve this linear program graphically.
7. (a) A company has a team of four salesmen and there are four districts where the company wants to start its business. After taking into account the capabilities of salesman and the nature of districts, the company estimates that the profit per day in rupees for each salesman in each district is as below:

	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

Find the assignment of salesmen to various districts which will yield maximum profit.

(or)

(b) An individual wishes to invest Rs.5000 over the next year in two types of investment: investment A yields 5% and investment B yields 8%. Market research recommends an allocation of at least 25% in A and 50% in B. Moreover investments in A should be at least half the investment in B. How should the fund be allocated to the two investments?

8. (a) Lubecar specializes in fast automobile oil change. The garage buys car oil in bulk at Rs.3 per gallon discounted to Rs.2.5 per gallon if the order quantity is more than 1000 gallons. The garage services approximately 150 cars per day and each oil change takes 1.25 gallons. Lubecar stores bulk oil at the cost of .03 p per gallon per day. Also, the cost of

placing an order is Rs.20 there is a 2 day lead time for delivery, determine the optional inventory policy.

(or)

(b) Find the feasible solution of the following transportation problem using north-west corner method:

		W1	W2	W3	W4	Supply
Factory	F1	14	25	45	5	6
	F2	65	25	35	55	8
	F3	35	3	65	16	15
Requirement	4	7	6	13	30	

9. (a) The following table gives data on normal time and cost and crash time and cost for a project.

- Draw the network and identify the critical path.
- What is the normal project duration and associated cost?
- Find out total float for each activity.
- Crash the relevant activities systematically and determine the optimum project time and cost

Activity	Normal		Crash	
	Time (week)	cost (Rs)	Time (week)	cost (Rs)
1	3	300	2	400
2-3	3	30	3	30
2-4	7	420	5	580
2-5	9	720	7	810
3-5	5	250	4	300
4-5	0	0	0	0
5-6	6	320	4	410
6-7	4	400	3	470
6-8	13	780	10	900
7-8	10	1000	9	1200
		4220		

Indirect costs are Rs.50 per week.

(or)

(b) Write a detailed note on the different types of float.

10. (a) At a telephone booth, arrivals are assumed to follow Poisson distribution with average time of 10 minutes between two calls. The average length of a telephone call is 4 minutes and it is assumed to be exponentially distributed.

Find:

- (i) Average number of calls (customers) in the system.
- (ii) Average number of calls waiting to be served.
- (iii) Average time a call spends in the system.
- (iv) Average waiting time of a call before being served.
- (v) Fraction of time during which booth is empty.
- (vi) Probability of at least one customer in the booth.
- (vii) Probability of more than three calls in the system.

(or)

- (b) Discuss the characteristics of a game. Explain briefly the application of game theory.

(For candidates admitted from 2008-2009 onwards)

M.BA DEGREE EXAMINATION, APRIL 2014.**Business administration****OPERATIONS RESEARCH****Time: Three hours****Maximum: 75 marks****SECTION-A (5×5=25)****Answer All Questions**

1. (a) Explain the scope of OR.

(OR)

(b) ABC Company is developing a low-calorie high protein diet. It should contain at least 4000 units of vitamins and 1400 calories. Two foods A and B are available at a cost of Rs.4 and Rs.3 per unit respectively. One unit of A contains 200 units of vitamins and 40 units of calories. One unit of B contains 100 units of vitamins and 60 units of calories. What is the combination of foods to be used to have least cost. Formulate the above problem into an LPP.

2. (a) Explain the procedure to perform sensitivity analysis.

(OR)

(b) Give the algorithm of Gomary's cutting plane model.

3. (a) What is Float? Explain its types.

(OR)

(b) Draw the network diagram for the following project

Activity: A B C D E F G H I

Immediate predecessor: - - - A - D B, C, E F D G, H

4. (a) Explain The concept of decision tree with a diagram

(OR)

(b) Solve the following Game problem:

	W	X	Y	Z
A	8	10	9	14
B	10	11	8	12
C	13	12	14	13

5. (a) What are the managerial applications of queuing theory?

(or)

(b) In a railway marshalling yard, goods train arrive at a rate of 30 trains per day. Assuming that inter arrival time follows an exponential distribution and the service time is assumed to be exponentially distributed with a mean of 36 minutes.

(i)What is the probability that queue size exceeds 10?

(ii)Find the Mean Queue Size.

(iii)What is the possibility that a train can enter the station directly?

If the input of trains increases to an average of 33per day,what will be the change in the above three questions?

SECTION-B (5X10=50)

Answer All Questions

6 (a) Solve the following LPP.

Maximise $z=10x_1+6x_2+4x_3$

Subject to $x_1+ x_2+ x_3\leq 100$

$10x_1+4x_2+5x_3\leq 600$

$2x_1+2x_2+6x_3\leq 300$

$x_1+x_2+x_3\geq 0$

Or

(b) Explain the application of LINDO package in solving an LPP.

7. (a) Find an optimum solution for the following Transport Problem:

		Destination				Available
		P	Q	R	S	
Origin	A	11	8	5	7	220
	B	15	4	13	9	150
	C	12	16	11	13	80
	Required	70	120	170	90	

Or

(b)Solve the following Assignment Problem:

		Job				
		R1	R2	R3	R4	R5
S1		2	9	2	7	1
S2		6	8	7	6	1

Machine	S3	4	6	5	3	1
	S4	4	2	7	3	1
	S5	5	3	9	5	1

8. (a) For the following project consisting of 8 activities, draw a network diagram and find critical path, expected duration and variance for each activity:

Activity	Estimated duration(Weeks)		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	7
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15
6-7	1	2	3

- (i) What is the probability to complete the project 4 days earlier?
- (ii) What is the probability to complete the project 4 days later?

Or

(b) A purchase Manager has decided to place order for a minimum quantity of 1000 numbers of a particular item in order to get a discount of 10%. From the past records, it was found out that in the last year, 8 orders each size of 400 units were placed. Given the ordering cost = Rs.600 per order, inventory carrying cost of 40% of the inventory value and the price of the item of Rs.500 per unit. Is the purchase manager justified in his decision? What is the effect of his decision too the company?

9. (a) In a large maintenance department, fitters draw tools from the stores department which is at present staffed by one stores man. The company wants to know if the employment of a stores labourer additionally would be worthwhile. On investigation, it is found that:

- (i) A simple queue exists.
- (ii) Fitters cost Rs.10 per hour.
- (iii) Storesman costs Rs.8 per hour and can deal with 10 fitters on an average per hour.

- (iv) A labourer could be employed at Rs.7per hour and would increase the capacity of the stores to 12per hour.
- (v) On an average 8 fitters visit the stores per hour.
- (vi) Suggest whether to appoint a labourer or not.

Or

(b) A Coffee shop owner keeps sale of coffee.Previous experience indicates the daily demand as given below:

Daily Demand:	0	10	20	30	40	50
Probability :	.01	.15	.20	.50	.10	.04

Consider the following sequence of random numbers:

68 78 39 51 46 67 27 24 18 59

Stimulate the demand for the next 10days.Find out the daily average demand for coffee on the basis of the stimulated data.

10. (a) A Bank has to choose anyone of the following as developed by the Relationship Manager.The amount of estimated amount of loan to the borrowers and the estimated revenue there from are given below:

Scheme	Revenue		
	Estimated amount of Loan(Rs.in crores)		
	200	100	20
Personal Loan	45	30	35
Loan	50	40	42
Pursuing Loan	65	40	25

Suggest the loan scheme to be adopted using

- (i) Maximum Criterion
- (ii) Minimax Criterion
- (iii) Maximax Criterion and
- (iv) Laplace Criterion.

Or

(b) Solve the following game problem using graphical method:

		Competitor		
		A	B	C
Company	I	6	7	15
	II	20	12	10

S.NO:4871

P8MBA8

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2012

Business Administration

PRODUCTION MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. A) Substantiate the need for demand forecasting for an effective production.

Or

b) Write down any two types of production systems.

2. A) what are the difficulties in capacity planning?

Or

b) State the issues in the distribution of services.

3. A) Highlight the features of process layout.

Or

b) Bring out the steps in the work force planning.

4. a) Describe the concept of TQM.

Or

b) What are basis types of maintenance in a manufacturing concern?

5. a) What are the limitations of a large scale projects?

Or

b) Identify possibilities of introducing flexible manufacturing systems.

SECTION-B (5X10=50)

Answer All Questions

6. a) “ The fast growing economy invites strategic planning decision for production”- Discuss.

Or

b) Explain the approaches of production function.

7. a) Describe the factors involved in the location of a plant for any core product.

Or

b) Do you believe that the distribution of services will be in the same direction of distribution of products?

8. a) Analyze the steps in production planning and control.

Or

b) Explain the important levels of inventory management.

9. a) Discuss the functions of a quality circle a large manufacturing concern.

Or

b) Discuss the prevailing certifications to qualitative production.

10 .a) How will you establish an effective scheduling systems?

Or

b) What are the problems and prospects in introduction of world class manufacturing?

S.NO:3510

P8MBA8

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2013

Business Administration

PRODUCTION MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. a) Discuss the types of production systems.

Or

b) What are the elements of production planning and control?

2. a) Discuss the various aspects of product design and analysis.

Or

b) Explain the product development process.

3. a) What are the factors influence the process selection?

Or

b) Explain the functions of the inventory control.

4. a) What are the objectives of quality control?

Or

b) What are control charts? Explain.

5. a) Discuss the objectives of industrial scheduling system?

Or

b) Discuss the impact of globalization in production management.

SECTION-B (5×10=50)

Answer All Questions

6. A) Explain the techniques of production system.

Or

b) What are the functions of production planning?

7. A) Point out the factors that affect productivity.

Or

b) Discuss the various techniques of inventory control.

8. A) what are the advantages and disadvantages of product layout?

Or

b) Discuss the various factors influencing the plant location.

9. A) Explain the meaning, objectives and advantages of quality control system.

Or

b) Explain the advantages of quality control.

10. A) what do you mean by flexible manufacturing systems? Discuss its merits.

Or

b) What are the attributes of world class manufacturing?

S.NO:4502

P8MBA8

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2014

Business Administration

PRODUCTION MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. a) Define the term production system. Explain its significance.

Or

b) Describe the various types of the production system.

2. A) Illustrate product design with suitable examples.

Or

b) Write short notes on capacity planning.

3. A) How layouts are classified? Explain.

Or

b) Discuss the steps in process planning.

4. A) Explain the concept and functions of quality circles.

Or

b) What is quality control? Explain.

5. A) Discuss the objectives of industrial scheduling system.

Or

b) Explain the production economies of large scale projects.

SECTION-B (5×10=50)

Answer All Questions

6. a) Discuss the objectives of production planning.

Or

b) Explain the factors that affect demand forecasting.

7. a) Describe the steps involved in new development.

Or

b) Discuss the various factors influencing plant location.

8. a) Explain the various techniques of inventory control.

Or

b) What are the advantages and disadvantages of process layout?

9. a) What is a quality system? Discuss the for controlling quality.

Or

b) Explain the classification of quality techniques.

10.a) What do you mean by flexible manufacturing systems? Discuss its merits.

Or

b) Discuss the impact of globalization production management.

S.NO:3003

P8MBA8

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2015

Business Administration

PRODUCTION MANAGEMENT

Time: Three hours

maximum: 75 marks

SECTION-A (5×5=25)

Answer All Questions

1. a) Write a note on project control.

Or

b) What are continuous and intermittent processes? Give examples.

2. A) Explain the principles of facility layout.

Or

b) Name and discuss in brief four types of manufacturing layouts.

3. A) what is production capacity? How it is measured.

Or

b) What is inventory? Why we need a control it?

4. A) Explain salient features of project management.

Or

b) Explain salient features of maintenance and its importance.

5. A) what are importances of production function with an suitable examples?

Or

b) Explain the benefits of using external sources in developing world class manufacturing.

SECTION-B (5×10=50)

Answer All Questions

6. a) what is forecasting? Explain its necessity in planning of various organization functions.

Or

b) What are the short ranges and long range forecasts in production management?

7. a) Discuss two types of process design

- i. Product focused and
- ii. Process focused

Or

b) Elucidate how Japanese have successfully proved themselves as world class manufacturers in various business activities.

8. A) Competition leads to quality improvements and cost reduction. Explain with examples.

Or

b) Discuss the objectives of a good manufacturing plant layout.

9. A) Give example that have process and product layout and explain by diagram the two layouts.

Or

b) Bring out the difference in inspection. Quality control and quality assurance.

10. A) Explain the benefit of using external sources in developing world class manufacturing.

Or

b) What is facility location? What factors affecting location decision?

S.No 4875

P8MBA12

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2012

Time: Three hours

Business Administration

maximum: 75 marks

Research Methodology

SECTION-A (5×5=25)

Answer All Questions

1. (A) Define research. How will you identify a research problem.

(Or)

- (B) Explain the significance of research design.

2. (A) What is Sampling? Explain its advantages.

(Or)

- (B) Illustrate Probability sampling with suitable examples.

3. (A) Define the term 'Data'. What are its sources?

(Or)

- (B) What is meant by hypothesis? Explain its characteristics.

4. (A) Write a note on parametric tests.

(Or)

- (B) Write the importance of Chi-square test.

5. (A) What are the different steps involved in writing a research report?

(Or)

- (B) Point out the precautions for writing a research report.

SECTION-B (5X10=50)

Answer All Questions

6. (A) Explain the steps in research process elaborately.

(Or)

(B) Explain the different types of research design with suitable examples.

7. (A) Explain the various scaling techniques in detail.

(Or)

(B) Explain the characteristics of sound measurement tool.

8. (A) Write short notes on coding and tabulation.

(Or)

(B) Discuss the various tests used for testing the hypothesis.

9. (A) Outline the differences between parametric and non-parametric tests.

(Or)

(B) Explain the advantages and limitations of rank order correlation

10. (A) Elaborately discuss the layout of a report.

(Or)

(B) Specify the uses of graphical representation of results.

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2013

Time: Three hours

Business Administration

maximum: 75 marks

Research Methodology

SECTION-A (5×5=25)

Answer All Questions

1. (A) what is research? Explain its types.

(Or)

(B) What are the objectives of research?

2. (A) what are the different types of scaling techniques?

(Or)

(B) What do you mean by Probability sampling?

3. (A) what do you mean by secondary data? Explain its merits and demerits.

(Or)

(B) Write short notes on coding.

4. (A) Explain the merits of non parametric tests.

(Or)

(B) Write a note on rank order correlation.

5. (A) what are the contents of a research report?

(Or)

(B) Why research reports are important?

SECTION-B (5X10=50)

Answer All Questions

6. (A) Discuss the criteria of good research

(Or)

(B) Explain the different methods of collecting data

7. (A) Discuss the O found measurement

(Or)

(B) Draft a questionnaire for you proposed research topic.

8. (A) Discuss the various tests used for testing the hypothesis.

(Or)

(B) What are generally accepted principles of tabulation?

9. (A) Explain any two non-parametric tests in detail.

(Or)

(B) Explain the significance of chi-square test.

10. (A) what are the points to be kept in mind while writing a research report

(Or)

(B) Enumerate the layout of a report elaborately.

S.NO 4506

P8MBA12

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2014

Time: 3hours

Business Administration

Maximum: 75Mark

Research Methodology

SECTION-A (5×5=25)

Answer All Questions

1. (a) What do you mean by research? Explain its significance in modern times.
(Or)
(B) Define and Illustrate null and alternative hypothesis.
2. (A) Explain different source of error in measurement.
(Or)
(B) Distinguish between simple random sampling and complex random sampling designs.
3. (A) Discuss interview as a technique of data collection
(Or)
(B) Narrate the features of a good table.
4. (A) briefly describe the important parametric tests used in the context of testing hypothesis.
(Or)
(B) Narrate the advantages and limitations of using non-parametric tests.
5. (A) “Interpretation is a fundamental component of research process”-Explain
(Or)
(B) Explain the significance of research report.

SECTION-B (5X10=50)

Answer All Questions

6. (A) briefly describe the different steps involved in a research process?

(Or)

(B) “Research design in exploratory studies must be flexible but in descriptive studies, it must minimize bias and maximize flexibility”- Discuss.

7. (A) Explain the features of any two techniques of your choice.

(Or)

(B) What do you mean by sample design? What are points should be taken into consideration a researcher in developing a sample design.

8. (A) Enumerate the different methods of collecting data.

(Or)

(B) Explain how you would work out following statistical measures often used in research.

- Arithmetic Average
- Regression Equation of x and y.

9. (A) Explain the features of any two parametric tests of your choice.

(Or)

(B) A die is thrown 132 times with the following results.

Number turned up: 1 2 3 4 5 6

Frequency : 16 20 25 14 29 28

Is the die unbiased?

10. (A) Give a detailed note on bibliography and its importance in the context of research report.

(Or)

(B) Describe in detail, the layout of a research report.

S.No 3007

P8MBA12

(For candidates admitted from 2008-2009 onwards)

M.B.A. Degree Examination, April 2015

Time: Three hours

Business Administration

maximum: 75 marks

Research Methodology

SECTION-A (5×5=25)

Answer All Questions

1. (A) What is research design? Explain its significance?

(Or)

(B) What is meant by testing of hypothesis? Draw a flowchart for executing Hypothesis testing procedure with a suitable example.

2. (A) what is meant by measurement in research? Explain its source and characteristics.

(Or)

(B) Describe the steps in sample design.

3. (A) Write the details and evaluation of experimentation

(Or)

(B) Discuss briefly about cross tabulation.

4. (A) Explain briefly about assumptions

(Or)

(B) Discuss briefly about u test and sign test.

5. (A) Explain briefly about preparatory items in presenting reports

(Or)

(B) What are the preparations to be made in oral presentation? Explain briefly

SECTION-B (5X10=50)

Answer All Questions

6. (A) Describe some of the important research designs used in experimental hypothesis testing research study.

(Or)

(B) Explain and illustrate the procedure of selecting a random sample.

7. (A) what is the meaning of measurement in research? What difference does it make whether we measure in terms of a nominal ordinal, interval or ratio scale? Explain giving examples.

(Or)

(B) Discuss the relative merits and demerits of

- Rating vs. ranking scales.
- Summated vs. cumulative scales.
- Scalogram analysis vs. factor analysis

8. (A) Discuss interview as a technique of data collection.

(Or)

(B) What are the guiding considerations in the construction of questionnaire? Explain

9. (A) The theory predicts the proportion of beans in the four groups A, B, C and D should be 9:3:3:1 In an experiment among 1600beans the number in the four groups were 882,313,287 and 118 Does the experimental result support the theory? Apply χ^2 test.

(Or)

(B) Give you understanding of non-parametric or distribution free methods explaining their important characteristics

10. (A) Describe, in brief the layout of a research report, covering all relevant points.

(Or)

(B) Write a short note on 'Documentation' in the context of a research report.

S.NO.4885

P8MBA3EC1

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION ,APRIL 2011

Part III - BUSINESS ADMINISTRATION - Elective

ADVERTISING AND SALES PROMOTION

TIME: Three hours

Maximum: 75 marks

PART A-(5*5=25)

Answers ALL Questions.

1. (a) Emphasise the role of advertising in the marketing process.
Or
(b) Advertising is communication” To whom and to what extent?
2. (a) How primary” and ‘selective” can be simulated and sustained?
Or
(b) Explain the factors influencing the determination of target audience.
3. (a) What are the pre-requisites of Campaign planning?
Or
(b) Pick out an advertisement which impresses you very much and specify the “recognition” and “recall” features of that advertisement.
4. (a) Evaluate the role of electronic media in advertising.
Or
(b) How advertisement influencing consumer behavior?
5. (a) State the merits and limitations of sales promotion.
Or
(b) Why there is a need to evaluate sales promotion strategies continuously?

PART A-(10*5=50)

Answers ALL Questions.

6. (a) Discuss the theory of cognitive dissonance . what advertising agencies have to draw from this theory.

Or

(b) Explain two steps flow of communication. Where and when advertising strategies avail this facilities?

7. (a) Build an advertising programme for the electronic two wheelers for which the demand is declining.

Or

(b) Describe the procedure for market positioning.

8. (a) Explain the composition of an advertising organization of a company manufacturing and marketing PMCGs throughout India.

Or

(b) Explain the factors influencing the advertising budget of an organization.

9. (a) How would you apprise the effectiveness of an advertising agency?

Or

(b) Explain the impact of different sales promotion techniques.

Case study:

10. You are drafting an advertisement copy for the cigarette major ITC to popularize the launching of two brands – one to attract low end consumer and the other one a premium variety targeting students community. The copy is intended for press medium. As a consultant, what legal, ethical and social aspects of advertising would you consider to popularize both the new brands in the Indian market?

S,NO.4529

P 8 MBA 4 EA 4

(For candidates admitted from 2008-2009 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2014.

Business Administration- Elective

ADVERTISING AND SALES PROMOTION

Time: Three hours

Maximum: 75 marks

PART A (5x5=25)

Answer all questions.

1. (a) Explain the different types of consumer contests.
Or
(b) What is sales promotion? Discuss its significance.
2. (a) How do you appraise the sales agency?
Or
(b) What is campaign advertising? Why is it needed?
3. (a) Discuss the rationale of testing the opinion of consumers.
Or
(b) What is aptitude test? Where do you use this test? Enumerate its limitations.
4. (a) What do you know about logo? Enumerate its significance.
Or
(b) What is budgeting? What are its essentials?
5. (a) Describe the steps involved in the flow of communication.
Or
(b) Outline briefly the social aspects of advertising.

PART B-(5x10=50)

Answer all questions.

- 6.(a) What do you know about Wilbur schramm's model? Enumerate its significance and drawbacks.
Or
(b) Elucidate briefly about the Theory of cognitive dissonance.

7.(a) Outline briefly about the simulation primary and selective demand.

Or

(b) Describe the steps involved in the determination of target audience.

8.(a) Describe the different methods of sales promotion.

Or

(b) Explain briefly the evaluation of different promotional strategies.

9.(a) How does a company's financial position affect the management's decision to use advertising for the purpose of sales?

Or

(b) Explain the qualities if a good advertisement media.

10. (a) "The sales budget is the pivot of budgetary control"- Discuss.

Or

(b) Write short note on

- (i) Advertising organization
- (ii) Experimental desing
- (iii) Layout.

(For CANDIDATES ADMITTED FROM 2008-2009 ONWARDS)

M.B.A DEGREE EXAMINATION, April-2012.

BUSINESS ADMINISTRATION

BUSINESS LAW

TIME : THREE HOURS

MAXIMUM:75MARKS

Part-A (5 x 5 = 25)

1. (a) When does an offer come to an end?
Or
(b) What are the necessities? When is a minor liable on a contract of necessities?
2. (a) Distinguish between a sale and a hire purchase agreement?
Or
(b) State the provision of the partnership act regarding expulsion of a partner.
3. (a) Define bill of exchange? What are the essential elements of a bill of exchange?
Or
(b) Enumerate the important rules of agency.
4. (a) A promoter stands in a fiduciary relation towards the company he promotes - elucidate.
Or
(b) Bring out the exceptions to the doctrine of indoor management.
5. (a) What do you understand by proxy? What are the statutory provisions regarding proxies?
Or
(b) What are the exceptions to the rule in *toss vs. Harbottle* principle of majority rules?

Part- B (5 x 10 = 50)

6. (a) Explain the legal aspects relating to communication of offer, acceptance and revocation.
When an offer does come to an end.
Or
(b) Explain the law relating to validity of contracts by minors?
7. (a) Elaborate the various implied conditions in a contract of sale.
Or
(b) Explain the various models of reconstitution of a partnership firm?
8. (a) What is meant by negotiation? How is it affected? Why is it better to take a negotiable instrument under an endorsement than under an assignment?
Or
(b) Describe the position of a principal and his agent in relation to third parties?
9. (a) How is a company formed under the company act?
Or
(b) Elaborate the consequences of misstatement in a prospectus.
10. (a) Explain the provision of the companies act 1956 regarding managerial remuneration?

Or

(b) Explain the provisions of the company act 1956 applicable to creditors voluntary winding up ?

(For CANDIDATES ADMITTED FROM 2008-2009 ONWARDS)

M.B.A DEGREE EXAMINATION, April-2015

BUSINESS ADMINISTRATION

BUSINESS LAW

TIME : THREE HOURS

MAXIMUM:75 MARKS

Part-A (5 x 5 = 25)

1. A). Write short notes on unenforceable contract?

(OR)

B). Explain what is meant by

i). Lapse of an offer and

ii). A counter – offer.

2. A). Define partnership and bring out the essential elements of a partnership.

(OR)

B). Give an outline of the medical insurance.

3. A). What is negotiable instrument ? state its characteristics.

(OR)

B). When can the payment of the cheque be refused by a bank?

4. A). State the procedure for alteration of the objects clause in the memorandum of association.

(OR)

B). Define share. What are the different kinds of shares which a company may issue?

5. A). How an auditor of a company is appointed? What are his qualifications?

(OR)

B). Discuss the scope of the doctrine of indoor management

PART - B

6. A). Where a party to a contract refuses altogether to perform or is disabled from performing his part of it, the other party has a right to rescind it. Discuss fully this statement in the light of the provisions of the Indian Contract Act, 1872.

(OR)

B). Quasi – Contract rest on the ground of equal that a person shall not be allowed to enter himself unjustly at the expenses of another, Explain.

7. A). How is price fixed in a contract of sale? If price is not determined by a parties, what price , if any is the buyer liable to pay?

(OR)

B). Discuss the powers of employee's insurance court under the employees' State insurance Act 1948. What matters can this can decide?

8. A). Define 'endorsement'. Explain with suitable illustrations the different types endorsements. Also state the significance each.

(OR)

B). What remedies are available to the principal against the agent in the event of the agent failing to carry out the directions of the principal?

9. A). How is a company formed under the companies Act, 1956? Enumerate the various documents to be filled with the register.

(OR)

B). Discuss the relationship between the Articles and the memorandum of association of a company

10. A). What are the provisions of the companies Act,1956 which particularly relate to the convening and holding of a general meeting of a company on requisition?

(OR)

B). Describe the procedure for effecting transfer of shares. Can the directors of a public company refuse to register a transfer of shares? Give reasons to supports your arguments.

(For CANDIDATES ADMITTED FROM 2008-2009 ONWARDS)

M.B.A DEGREE EXAMINATION, NOVEMBER-2013

BUSINESS ADMINISTRATION

BUSINESS LAW

**TIME : THREE HOURS
MARKS**

MAXIMUM:75

Part-A (5 x 5 = 25)

1. (a) What are the difference between coercion and undue influence ?

Or

(b) Distinguish between a wagering agreement and a contingent contract?

2. (a) What are the various types of goods ?

Or

(b) What are the different types of partners?

3. (a) What is bill of exchange? What are the essential elements of a bill of exchange?

Or

(b) Why is it important to determine the maturity of a negotiable instrument? State briefly the rules for determining the maturity?

4. (a) Define a company? How does it differ from partnership firm?

Or

(b) Examine the fiduciary position of the promoter of a company?

5. (a) what are the rights of auditors of a company?

Or

(b) What are the consequences of winding up of a company ?

Part- B (5 x 10 = 50)

6. (a) Elaborate the legal rules regarding consideration ?

Or

(b) Explain the different kinds of quasi contracts?

7. (a) Distinguish between sale and agreement to sell ?

Or

(b) Examine the procedure for registration of a firm? What are the effects of non-registration of a firm?

8. (a) Elaborate the various modes of termination of agency?

or

(b). Explain the privileges of a holder in due course?

9. (a) Explain rules regarding directors remuneration as laid down in the companies act 1956 ?

or

(b). What are the features of debentures? Explain its types ?

10. (a). Elaborate requisites of a valid meetings ?

Or

(b). Explain the consequences of a winding up a company ?

(For CANDIDATES ADMITTED FROM 2008-2009 ONWARDS)

M.B.A DEGREE EXAMINATION, NOVEMBER 2015

BUSINESS ADMINISTRATION

BUSINESS LAW

TIME : THREE HOURS

MAXIMUM:75 MARKS

Part-A (5 x 5 = 25)

1.(a) What is an offer? State the rules of a valid offer.

(or)

(b) State briefly the law relating to competence of parties to a contract.

2.(a) distinguish between a sale and a hire purchase agreement.

(or)

(b) what are the rights and liabilities of a minor who has been admitted to the benefit of partnership?

3. (a) what is a protest? What should be the contents of protest?

(or)

(b) what is a cheque? What are its requisites?

4.(a) what is articles of association? How ca they be altered?

(or)

(b) define debenture. Discuss the different kinds of debentures.

5.(a) what is a statutory meeting? What are its contents?

(or)

(b) write short notes on

(I) Financial books

(ii) Statutory books

Part- B (5 x 10 = 50)

6. (a) Explain the term consideration and state the expectations to the rule: 'No consideration, no contract'.
(or)

(b) Explain 'breach of contract' as a mode of discharge of contract.

7. (a) what are the different kinds of benefits to which injured persons are entitled under the employee's state insurance act 1948.

(or)

(b) write notes on

(i) Goods

(ii) Document of title of goods

(iii) Earnest

(iv) Stipulations as to time.

8. (a) X owes Y Rs. 2000 and makes a promissory note for the amount payable to Y. X dies and the note is subsequently found amongst his papers. Can Y sue on the note even if it was later on delivered to him?

(or)

(b) Explain the conditions to be fulfilled for panel action for dishonor of a cheque on account of insufficiency of funds.

9. (a) "The doctrine of ultra virus is an illusory protection to the shareholders and the a pit full for third parties." Discuss.

(or)

(b) Has the company power to issue shares at a discount? If so, when and under what conditions?

10. (a) What do you understand by a quorum? Must a quorum be present throughout a meeting? What is the procedure if a quorum is never formed?

(or)

(b) State the provisions of the Companies Act relating to the preparation, authentication, circulation, adoption and filing of the annual accounts of a company.

S.NO. 1523

P 8 MBA 4 EA 4

M. B. A DEGREE EXAMINATION, NOVEMBER 2013

BUSINESS ADMINISTRATION- ELECTIVE

BUSINESS TO BUSINESS MARKETING

**TIME: Three Hours
MARKS**

MAXIMUM:75

PART A (5*5=25)

ANSWER ALL THE QUESTION

1. (a) What do you mean by industrial marketing
OR
(b) Briefly explain the scope of business to business marketing
2. (a) Briefly explain the concept of industrial segmentation
OR
(b) What are the basic steps involved in industrial marketing research
3. (a) What are the various levels of industrial products?
OR
(b) Give a short notes on product line planning
4. (a) What are the various pricing in policies industrial marketing?
OR
(b) Give a short note on industrial product promotion.
5. (a) What is mean by product-market management in industrial marketing
OR
(b) What is the significance of strategy evolution in industrial marketing?

PART B (5*10=50)

ANSWER ALL QUESTION

6. (a) Explain the problems and challenges in industrial marketing.
OR
(b) critically analyze the current trends in industrial marketing in india.
7. (a) Discuss various demand concept for industrial products with examples.
OR
(b) What are the components of industrial marketing research? Explain in detail.

8. (a) Discuss various stages in the new product development in industrial marketing.
OR
(b) Explain various strategies that are suitable in each stages of industrial product life cycle with example
9. (a) Discuss the advantages and problems of various media of advertising industrial products
OR
(b) Explain the functions of channel members in industrial marketing
10. (a) Explain the steps involved in implementation of strategies effectively.
OR
(b) Critically analyze the barriers in developing and evaluating the strategies in industrial marketing.

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2013

Business Administration –Elective

CONSUMER BEHAVIOUR

Time : Three Hours

Maximum : 75 marks

PART-A

1.(a) Explain the concept of marketing segmentation

Or

(b) What are the factors influencing consumer behavior?

2. (a) “The personality traits and attitudes are important guides to consumer behavior” Discuss.

Or

(b) Discuss the various determinations of learning.

3. (a) Explain how social class influence consumer behavior.

Or

(b) Define sub-culture. How it affects consumer behavior.

4. (a) Discuss the vital functions of innovation.

Or

(b) Discuss various purchase decisions.

5. (a) Explain societal marketing concept in detail.

Or

(b) Discuss the need for consumer education in India.

PART-B

Answer ALL questions.

6. (a) Discuss the applications of consumer behaviour principles to strategic marketing.

Or

(b) “Market segmentation is very useful for effective marketing of any product”. Discuss.

7. (a) Explain various ways of arousal of motive in Human beings with examples of ads.

Or

(b) Discuss the role of psychographics in consumer behavior.

8. (a) What is the social class mobility? Discuss various types of mobilities and the effect thereof.

Or

(b) Explain different types of groups. How do consumer related groups influence consumer behavior?

9. (a) Explain the process of diffusion of innovation.

Or

(b) Explain how consumer complaints can be a useful asset for a business organization.

10. Case study:

Select a brand preferably from consumer packaged goods category. Suggest how would you evaluate the strengths and weakness of the brand relative to competition. Can you use multi-attribute approach for measuring attitude? What are the major strategies that could be employed to shift the attitude in your favour?

(For the candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2011.

Business Administration

FINANCIAL SERVICES

Time : Three hours

Maximum :75 marks

PART A-(5 X 5 =25)

Answer ALL questions.

1. (a) Distinguish between an operating lease and a finance lease.

Or

- (b) Explain the origin, meaning and characteristics of factoring.

2. (a) Explain about the equity instruments in Indian capital market.

Or

- (b) Define capital policy and its impact.

3. (a) Explain the process of leasing.

Or

- (b) Explain the various functions of factoring.

4. (a) What do you mean by convertible instruments?

Or

- (b) Write a short note on investment policy.

5. (a) What do you understand by Capital market?

Or

- (b) Explain the types and advantage of factoring.

PART B-(5 x 10 =50)

Answer ALL questions.

6. (a) Discuss the problems and prospects of leasing industry in India.

Or

(b) Distinguish between factoring and forfeiting. Also discuss the problem areas in factoring and forfeiting.

7. (a) List and explain the roll of issues manager in Indian capital market.

Or

(b) Describe the various strategic issues in the management of financial intermediaries.

8. (a) Explain the concept of leasing and accounting principles related to leasing.

Or

(b) State the mechanism involved in a factory in a factory transctions. What steps are taken by the buyers the seller and the factor to complete a factory transaction.

9. (a) Give critical appraisal of financial engineering and its problems.

Or

(b) Discuss the feature and importance of credit policy.

10. (a) Explain the role and function of stock exchange in the capital market.

Or

(b) What are future challenges with respect to factoring b business in India?

(For candidates admitted from 2008-2009 on words)

M. B. A DEGREE EXAMINATION, APRIL 2012.

Business Administration-Elective

FINANCIAL SERVICES

Time :3 hours

maximum:75marks

PART A-(5 X5=25)

Answer all questions.

1.(a)Define 'Leasing' what are the different types of leases?

(or)

(b) write a note on international leasing.

2. (a) what you meant by consumer credit? Illustrate.

(or)

(b)explain the concept of hire purchase system?

3. (a)explain the concept of 'bill discounting' with suitable example.

(or)

(b)Define 'factoring' explain its types.

4. (a)write a note on the debt convertible instruments.

(or)

(b) what is 'financial engineering'?

5. (a)what are financial intermediaries? Explain.

(or)

(b) briefly explain the following:

(a) capital policy

(b) liquidity policy

PART B-(5x10=50 marks)

6. (a) discuss the legal and tax aspects of leasing.

(or)

(b)how lease accounting is done? Explain.

7. (a) bring out the differences between hire purchase and leasing

(or)

(b) How hire purchase proposals are evaluated? Explain.

8. (a) discuss the different forms of bill discounting

(or)

(b) differentiate bill discounting from factoring.

9. (a) discuss the money market instruments in detail

(or)

(b) how fund are raised from international capital market? Discuss.

10. case study:

ABC construction Co.Ltd need to acquire the use of the construction equipment for their construction business and are considering either to buy or lease the equipment. it costs are Rs.6,00,000 and is subject to straight line method of depreciation to a Rs., 3,00,000 salvage value at the end of years. In contrast, the lease rent is Rs. 2,00,000 per year to be paid at the end of year for four years. The company can raise the debt at The company is in 50% tax bracket. Should be lease or the equipment?

(For candidates admitted from 2008-2009 onwards)

M. B. A DEGREE EXAMINATION, APRIL 2015.

Business Administration-Elective

FINANCIAL SERVICES

Time : 3 hours

maximum:75marks

PART A-(5 X 5 = 25)

Answer ALL questions.

1. (a) Distinguish between the merchant banking and investment banking.

Or

(b) Distinguish between leasing and loan finance

2. (a) Differentiate hire purchase financing from installment system.

Or

(b) How does the financial system help the economic development?

3. (a) write a brief note on the contents of a factoring agreements.

Or

(b) Explain the mechanism of factoring.

4. (a) What are the needs of a financial market in an economy?

Or

(b) Define the term financial services and explain its characteristics.

5. (a) How can issue of capital be priced?

Or

(b) What are the main elements of the regulations relating to prohibition on insider trading?

PART B- (5 x 10 = 50)

Answer ALL questions.

6. (a) Explain the role of SEBI in the primary market development in India.

Or

(a) Describe the statement of Indian financial system with helper of substitute diagram.

Or

7. (a) Elucidate briefly the accounting aspects of lease financing.

Or

(b) Describe the legal and tax aspects of hire purchase system in India.

8. Discuss the factoring services in the Indian context.

Or

(b) What is bills discounting? Discuss the forms of bills discounting.

Or

9. (a) How do you assess the money markets? State its strength and weaknesses.

Or

(b) Elucidate the strategic issues in the management of financial intermediaries.

10. A machine is available for Rs. 10 lakhs. A company, which wants to avail its services through leasing seeks your advice. What would be your advice if

(a) Leaser require an annual lease rental of Rs.1,75,000

(b) The tax rate of the company is 35%

(c) The company (alternatively) borrows at the appropriate cost of capital which is 15% and

(d) The asset purchased will be depreciated WDV method @ 25%.

FINANCIAL SERVICES

PART-A

1.a) Differentiate between finance lease and operating lease.

OR

b)Is international lease different from cross_ border lease? Explain your answer.

2. a)What do you mean by consumer credit?

OR

b)Explain the concept of hire purchases system.

3. a)Explain the concept of Bill discounting with suitable examples .

OR

b)Differentiate factoring from forfeiting.

4.a)write a note on the debt convertible instruments .

OR

b)what is financial engineering?

5.a)what are financial intermediaries?explain.

OR

b)write short note on the following

i)credit policy

ii)Investment policy .

PART B-(5*10=50)

6.a)Discuss the legal and tax aspects of leasing.

OR

b)How lease accounting is done? Explain

7.a)Bring out the difference between Hire purchase and leasing.

OR

b)How hire purchase proposals are evaluated ?Explain

8 .a)Discuss the different forms of bill discounting.

OR

b)What is factoring ?Discuss about the prospectus of factoring in the Indian context .

9. a) Comment on the growth of capital market in India .

OR

b)How do you evaluate a company for equity investment purposes?

10.a)Discuss elaborately about the various problems and prospectus of financial services in the India context citing suitable examples.

MBA DEGREE EXAMINATION , NOVEMBER 2013 .

BUSINESS ADMINISTRATION – ELECTIVE

FINANCIAL SERVICES .

Time : Three hour

maximum : 75 marks

PART –A

1. (a) Define ‘Leasing Differentiate between bipartite lease and tripartite lease .

OR

(b) Write a note on international leasing .

2. (a) Discuss the characteristics of consumer credit ?

OR

(b) Explain the concept of hire purchase system ?

3. (a) Explain the concept of ‘ bill discounting ‘ with suitable examples .

OR

(b) Explain the different forms of bill discounting .

4. (a) Explain the concept of credit rating . what are its functions and significance? also explain the process of credit rating .

OR

(b) How financial instruments are classified ?

5. (a) What is issue management ?

OR

(b) Explain the various types of issues

PART –B (5*10=50)

- 6 . (a) Define leasing . What are its essential elements ? Discuss briefly the significance and limitations of leasing .

Or

(b) Briefly discuss the income tax implications of lease transactions from the lessor's and lessee's point of view.

7. (a) Compare and contrast leasing and 'Hire purchasing'. Why do companies go for leasing of assets? Explain

OR

(b) Discuss the characteristics of hire purchase system.

8. (a) Discuss the different types of factoring.

OR

(b) Distinguish between factoring and forfeiting.

9. (a) Discuss the limitations of financial system in India.

OR

(b) describe the growth and development of capital markets in India.

10. Case study :

XYZ Ltd. is in the business of manufacturing steel utensils. The firm is planning to diversify and add a new product line. The firm either can buy the required machinery or get it on lease. The machine can be purchased for RS .15,00,000. It is expected to have a useful life of 5 years with salvage value of RS .1,00,000 after the expiry of 5 years. The purchase can be financed by 20 percent loan repayable in 5 equal annual installments (inclusive of interest) becoming due at the end of each year. Alternatively, the machine can be taken.

OR

10. case study :

from the following data find :

(a) If the prevailing risk free rate is 6% , which portfolio is the best ?

(b) what is the expected rate , when the standard deviation is 4%

Portfolio	Expected Return	Standard Deviation
1	8%	3%
2	10%	6%

3	13%	8%
4	17%	13%
5	20%	18%

Use Single Index Method .

S.NO.3526

P8MBA3EC3

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2013

Business Administration- ELECTIVE

LEADERSHIP AND CHANGE MANAGEMENT

Time : Three hours

Maximum : 75

PART A (5*5=25)

ANSWER ALL QUESTION

1. (a) Explain the nature and scope of change management
OR
(b) What are the environmental and internal determinants of change.
2. (a) What are the barriers to organizational change.
OR
(b) Discuss the strategies to deal with resistance to change.
3. (a) Discuss the different type of culture and change process.
OR
(b) Write short note on corporate reorganization
4. (a) Discuss the behavioral implication of change
OR
(b) Write note on ambiguity management.
5. (a) Explain about structural intervention strategy
OR
(b) Discuss the different type of leadership styles

PART B- (5*10=50)

ANSWRE ALL QUESTION

6. (a) What are the reason for the failure of implementation of change intervention? What could be remedy for such an instance?
OR
(b) Discuss the various type of change in detail

7. (a) Explain the role of chief implementor to change
OR
(b) Discuss the importance of social and organizational cultural in bringing about change
8. (a) Examine the recent trends in organizational resistance existing among groups.
OR
(b) Explain the approaches to evaluate change
9. (a) discuss the concept of total quality management and its relevance in bringing change in an organisation
OR
(b) Explain the different function and reaction to change.
10. (a) Discuss any two leadership models with examples.
OR
(b) Discuss the challenges of change management

S.NO.3019

P8MBA3EC3

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2015

Business Administration- ELECTIVE

LEADERSHIP AND CHANGE MANAGEMENT

Time : three hours

Maximum : 75

PART A (5*5=25)

ANSWER ALL QUESTION

1. (a) Discuss the nature and type of leadership for management.
OR
(b) Explain the different type of change in an organization
2. (a) List and explain the model of diagnosing organizational groups
OR
(b) Why do people rethinking resistance to organizational change ? Explain.
3. (a) Explain the various steps in corporate reorganization.
OR
(b) Describe practical contexts of political issues arising from change.
4. State the important concept of resigned behavioural compliance.
OR
(b) Explain the paradoxical positive and negative function of resistance.
5. (a) Explain the role of leadership in change process.
OR
(b) Discuss advantage and limitation of associated leadership models.

PART B- (5*10=50)

ANSWER ALL QUESTION

6. (a) List out various types of change and explain incremental and directive change and levers with suitable examples.
OR
(b) What is organizational change? Explain the significance of organizational change

7. (a) Present an account on how you would align structure, system and resources while institutionalize change
OR
(b) List out various factor in resistance to change with suitable example
8. (a) What are the strategies for sustaining the organizational culture?
OR
(b) Describe few of the process of planned change strategies to bring in organizational change
9. (a) How strategically downsizing can be executed and what are the alternatives?
OR
(b) Explain in detail the model of organizational change.
10. (a) Describe the role of an internal change agent and its significance. Discuss the skills required for successful change agent.
OR
(b) Discuss the organizational implication in technological changes.

S.NO.3526

P8MBA3EC3

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2013

Business Administration- ELECTIVE

LEADERSHIP AND CHANGE MANAGEMENT

Time : Three hours

Maximum : 75

PART A (5*5=25)

ANSWER ALL QUESTION

1. (a) Explain the nature and scope of change management
OR
(b) What are the environmental and internal determinants of change.
2. (a) What are the barriers to organizational change.
OR
(b) Discuss the strategies to deal with resistance to change.
3. (a) Discuss the different type of culture and change process.
OR
(b) Write short note on corporate reorganization
4. (a) Discuss the behavioral implication of change
OR
(b) Write note on ambiguity management.
5. (a) Explain about structural intervention strategy
OR
(b) Discuss the different type of leadership styles

PART B- (5*10=50)
ANSWRE ALL QUESTION

6. (a) What are the reason for the failure of implementation of change intervention? What could be remedy for such an instance?

OR

- (b) Discuss the various type of change in detail

7. (a) Explain the role of chief implementor to change

OR

- (b) Discuss the importance of social and organizational cultural in bringing about change

8. (a) Examine the recent trends in organizational resistance existing among groups.

OR

- (b) Explain the approaches to evaluate change

9. (a) discuss the concept of total quality management and its relevance in bringing change in an organisation

OR

- (b) Explain the different function and reaction to change.

10. (a) Discuss any two leadership models with examples.

OR

- (b) Discuss the challenges of change management

S.NO.3019

P8MBA3EC3

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2015

Business Administration- ELECTIVE

LEADERSHIP AND CHANGE MANAGEMENT

Time : three hours

Maximum : 75

PART A (5*5=25)

ANSWER ALL QUESTION

1. (a) Discuss the nature and type of leadership for management.
OR
(b) Explain the different type of change in an organization
2. (a) List and explain the model of diagnosing organizational groups
OR
(b) Why do people rethinking resistance to organizational change ? Explain.
3. (a) Explain the various steps in corporate reorganization.
OR
(b) Describe practical contexts of political issues arising from change.
4. (a) State the important concept of resigned behavioural compliance.
OR
(b) Explain the paradoxical positive and negative function of resistance.
5. (a) Explain the role of leadership in change process.
OR
(b) Discuss advantage and limitation of associated leadership models.

PART B- (5*10=50)

ANSWER ALL QUESTION

6. (a) List out various types of change and explain incremental and directive change and levers with suitable examples.
OR

(b) What is organizational change? Explain the significance of organizational change

7. (a) Present an account on how you would align structure, system and resources while institutionalize change

OR

(b) List out various factor in resistance to change with suitable example

8. (a) What are the strategies for sustaining the organizational culture?

OR

(b) Describe few of the process of planned change strategies to bring in organizational change

9. (a) How strategically downsizing can be executed and what are the alternatives?

OR

(b) Explain in detail the model of organizational change.

10. (a) Describe the role of an internal change agent and its significance. Discuss the skills required for successful change agent.

OR

(b) Discuss the organizational implication in technological changes.

S.NO.4878

P8MBA15

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2012

BUSINESS ADMINISTRATION

MANAGEMENT INFORMATION SYSTEM

TIME: Three hours

Maximum: 75 marks

PART A-(15*5=25)

Answers ALL Questions.

1. (a) Discuss components of Information systems.
Or
(b) Write a short note on marketing information systems .
2. (a) Explain Executive information systems .
Or
(b) what do you mean by strategies roles of information systems?
3. (a) Explain computer Aided planning Tools.
Or
(b) what is Artificial Intelligence Technology?
4. (a) what do you mean by enterprise wide systems with an example?
Or
(b) write a note on information Resource management
5. (a) Discuss recent trends in technology and application.
Or
(b) Explain Transaction processing systems.

PART B – (5*10=50)

Answers ALL questions

6. (a) Explain the needs and fundamentals of information systems in business .
Or
(b) Discuss the management information needs and communication links for accounting
And inventory control systems. with neat sketch.
7. (a) what are the main objectives of MIS in organization? Discuss in detail about responsibilities Of data processing group in an organization.
Or
(b) Describe in detail the re engineering Business processes improving Business quality.
8. (a) List and explain the Business systems planning.
Or
(b) Describe various computer aided planning tools and its advantages.
9. (a) Explain security and ethical challenges for information systems controls.
Or
(b) Elucidate the term financial information systems and give its Advantages and disadvantages
With a real time example.

Case study:

Even with strong security. E- Business risk is a fact of life is today interconnected business world. So, the fundamentals problems with managing this new form business risk. say IT managers, is That there are no matrices and so standards to ensure the level of risk. Nevertheless, all Business managers need to realize that those bits and bytes they call just data are really the Importation's lifeblood .and they must get their area around the ultimate cost to the business If has data were lost, stolen or altered. We need model to make where E-business risk a rapped in the cost of doing business-like

Automobiles that transfer regulatory costs to the consumers “says Frank Reader who chairs both the Computer system security and privacy advisory board at the U.S Department of Commerce And the center for Internet security in Beheads Maryland.

Quantifying risk calls for statics and bench marker. Things that are salary lacking in this new area of E-business . says Paul Raine's. head of global information risk management at Barleys capital. the investment divisions of Barleys Group in London. 'Most risk models so far have been

qualitative. Define your risk for theft, disaster, hacking .then you evaluate your site against these risks 'Raine's says

But recently the International organization for standardization approved a security standard that grew out of one used in Britain this new standard includes a certification program in the areas of policy , asset classification, allocation of security resources and responsibilities , system and network security , government compliance, physical security, employee training and awareness and access controls.

Now, visa international and American express or throwing there weight into security standards by making them mandatory for their electronic merchants. their requirements are a little broader

encompassing mostly server side credit card processing and storage, access controls and encryption analysts say these effort will go a long way toward setting up future risk frame works in the business to –customer market.

“ I consider the reach of visa much stronger than may government agency or security company.

Because credit companies can say “If you don’t failure our security policies ,you can’t process our Rewards says Pete Lindstrom, an analyst at baton based Hurwitz Group

The importance of E-business security standards in the audit community has been helpful in Driving the message of E-business risk up to top company executives and boards of directors .for example Jackie Wagner ,general auditor at general motors corp. attended a security association meeting last April and brought along the chairmen of G.M audit committee,dennis weatheratone

Returned to GM he brought the automaker CIO into the heard room to update the board of directors on system security.

The audit committee and the board asked a lot of questions. All were about our level of risk and how were addressing it, “says, Wagner (Specialty the notes ,the board asked how GM drives accountability beyond the IT organization in managing exposure to risk .) Wagner says the board was happy with GM,s security control on the E-business system.

The audit hired Glenn Yauch, a deloitte and touché LIP. Consultant then stationed at GM. And placed him as director of GM,s E- business.yauch then launched a series of company-wide

conference about risk.”I pulled together resources from GM audit services and mixed them with technical consultants.

We put every risk we could think of on a board and created areas of risk. “he says.

These areas include:

- E- business strategy: Allignments with Existing strategy and marketing channels, Marketplace and opportunity strengths ; Stakeholders (suppliers,customers,trading Partners) and sponership
- Business policy: regulations and customer Data privacy.
- End- to-end process/transactions flow.
- Data management Integrity, availability And confidentiality of data stored in database And in customer relationship management systems.
- Infrastructure : servere ,firewalls, Operating systems.routers and applications.

Yauch adds “once we put this List together, We found this framework was flexible enough to Evaluate e- business risk management issues in Where business units as they rolled out E-business Motivatives”.

Questions:

- a) What should a business do about measuring and managing E-business risk?
- b) Do you agree with what visa and American Express are requiring of merchants that Use their electronic credit card systems? Why or why not?
- c) How useful is GM,s framework of areas of risk to any company,s management of risk to any company,s management of E- business risk Explain.

(For candidate admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2014

Business Administration –Major

Time: Three Hours

Maximum :75 marks

SECTION- A – (5*5=25 Marks)

Answer ALL questions.

1. (a) What are the features of an operation support system?
OR
(b) Mobile technology is a boon for a business enterprise today- 'Elucidate
2. (a) What are the sources of data meant for the marketing information system ?
OR
(b) Bring out the essential of an effective accounting information system?
3. (a) Emphasize the need for building up an effective executive information system?
(OR)
(b) What is artificial intelligence? What is its role in managerial decision making
4. (a) Bring out significance of business process reengineering in the present day business environment?
OR
(b) What is meant by E-commerce? How far it will be helpful to a company for improving its market share ?
5. (a) What are the important points to be considered while undertaking information system planning ?
OR
(b) What are the procedural controls to be employed for proper management of information system?

SECTION B-(5*10=50)

ANSWER ALL QUESTION

6. (a) Emphasis the need for information system in a modern business. What are the fundamental of information system?

OR

(b) Elaborate the technology trends and its application in the global business scenario?

7. (a) Explain the role of human resource information system in a business concern?

OR

(b) Explain the various elements of the finance information system?

8. (a) What are the components of decision support system? What are essential prerequisites for building a sound decision support system?

OR

(b) Explain the important issues to be addressed by a company while installing and ultimate its management information system.

9. (a) A sound information system helps a company for managing competition cutting cost a improving profitability- Elaborate

OR

(b) The concept of virtual company is yet to get popularity in india- What are the reasons?

10. (a) Explain the challenges involved in the process of information resources management?

OR

(b) What are the various form of computer crimes? Suggest any two steps to be taken by a company for minimizing their impact efficient working of its management

(For candidate admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2015

Business Administration –Major

MANAGEMENT INFORMATION SYSTEM

Time: Three Hours

Maximum :75 marks

SECTION A – (5*5=25 Marks)

Answer ALL questions.

1. (a) What is an operation support system? What are its uses?
OR
(b) What are the resources needed for an information system?
2. (a) State the basic concepts and technologies of business information system.
OR
(b) Why do we need transaction processing system?
3. (a) What are expert systems? What are its applications?
OR
(b) What is database management ? What are its requirements?
4. (a) How does MIS help knowledge management?
OR
(b) What are the features of an enterprise wide system?
5. (a) Explain briefly about IS?
OR
(b) Describe about computer aided planning tools

SECTION B – (5*10=50 Marks)

Answer ALL questions

6. (a) Explain the concepts and evolution of management support system?
OR
(b) Analyze the trends in technology and its application on MIS?
- (a) Explain the essential elements and salient features of human resources information systems?
OR
(b) Describe the features and function of accounting information system?
7. (a) Explain the challenges faced by the information managers in change of MIS?
OR
(b) Write an essay on Data mining and Database management?
8. (a) Explain how MIS help in breaking business barriers.
OR
(b) Explain the features of and function of a virtual company?
9. (a) Explain the privacy issues in MIS?
OR
(b) What is IS planning? What are its essentials? Describe its steps.

(For candidate admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2013.

Business Administration –Major

MANAGEMENT INFORMATION SYSTEM

Time: Three Hours

Maximum :75 marks

SECTION A – (5*5=25 Marks)

Answer ALL questions.

1. (a) Briefly explain various components of information system?
OR
(b) What is meant by management support system?
2. (a) What is meant by marketing information system?
OR
(b) Give a short note on accounting information system
3. (a) What is meant by expert system of an organization
OR
(b) What are the components of executive information system
4. (a) What do you mean by business process reengineering?
OR
(b) What are the challenges of strategic information system?
5. (a) What is meant by strategic information management?
OR
(b) Give a short note on information procedural controls

SECTION B – (5*10=50 Marks)

Answer ALL questions

6. (a) Explain various classification of information systems in detail?
OR

(b) Discuss the trends in technology and application of the management information system?

7. (a) Discuss in detail various components of transaction processing system of an organization?

OR

(b) Explain the components of human resources information system

8. (a) Give a detailed account on artificial intelligence technologies?

OR

(b) Distinguish and differentiate DSS and MIS?

9. (a) What are the barriers and problems in creating a virtual company? Explain with examples?

OR

(b) Give a detailed account on various E- Business applications with examples

10. (a) Explain various components Information Resource Management?

OR

(b) Explain various information system control of an organization with examples?

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION ,APRIL 2012

Part III - BUSINESS ADMINISTION - Elective

ORGANIZATION DEVELOPMENT

TIME: Three hours

Maximum: 75 marks

PART A-(5*5=25)

Answers ALL Questions.

1.(a) What is OD and why to study OD?

Or

(b) Explain action research model of planned change

2.(a) Bring out the importance of diagnosis in OD.

Or

(b) How to manage OD programs ? explain

3.(a) What results can be expected from OD interventions?

Or

(b) What is role analysis technique? Explain

4.(a) "Organization characteristics can act as a barrier for the implementation of OD activities".

Discuss

Or

(b) What are the factors influencing the choice of an OD intervention?

5.(a) How to determine the depth of intervention. Explain

Or

(b) What are the ethical issues in OD practice?

PART B-(5*10=50)

Answers ALL Questions.

6(a) Enumerate the historical perspectives of OD.

Or

(b) What is the role of OD practitioner in bringing out a change in organization?

7(a) Explain action research model of OD as a problem – solving approach.

Or

(b) How to collect and analyze diagnostic information?

8(a) Write short notes on,

- I. Process consultation intervention.
- II. Gestalt approach to team building.

Or

(b) Explain grid organization development in OD.

9(a) “Evaluation is the most crucial phase in the management of OD program” – Discuss

Or

(b) Briefly discuss the impact of OD in organization performance and effectiveness.

10. Case study:

A manufacturing company situated in north India employing approximately 400 employees are experiencing rapid growth through its success strategies and through a series of acquisition. The leadership team has doubled and the next level of management has tripled with further increased expected to support overall growth of the company. The key challenges currently faced by the company are,

- I. The need to develop critical competencies of the senior level of leadership.
- II. Address a gap in the leadership pipeline of the management level.
- III. Create a performance-driven culture that supports accelerated growth of the organization.

Suggest a multi-level, comprehensive approach to Leadership and Talent Development by offering the futuristic approach to developing leaders.

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION ,NOVEMBER 2012

Part III - BUSINESS ADMINISTION - Elective

ORGANIZATION DEVELOPMENT

TIME: Three hours

Maximum: 75 marks

PART A-(5*5=25)

Answers ALL Questions.

1.(a) Why study of DO is considered as essential?

Or

(b) When and how to use action research model of planning change.

2.(a) Bring out the importance of diagnosis in OD.

Or

(b) How to develop process intervention skills?

3.(a) What is employee empowerment programme?

Or

(b) what are the pitfalls in role analysis technique?

4(a) How organization characteristics do act as a barrier for the implementation of OD activities.

Or

(b) How to select an intervention strategy?

5(a) How to determine the depth of OD intervention process? Explain.

Or

(b) How to meet the ethical issues in OD practice?

PART B-(10*5=50)

Answers ALL Questions.

6.(a) Examine the historical perspectives of OD and its current status in India

Or

(b) What is the role of OD practitioner in bringing out a change in organization?

7(a) Explain action research model of OD as a problem-solving approach.

Or

(b) How to collect and analyze diagnostic information?

8.(a) Write short note on,

- I. Process consultation intervention
- II. Gestalt approach to team building.

Or

(b) Explain grid organization development in detail.

9(a) “Evaluation is the most crucial phase in the management of OD program” – Discuss

Or

(b) Briefly discuss the impact of OD on organizational performance and effectiveness.

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- I. The need to develop critical competencies of the senior level of leadership.
- II. Address a gap in the leadership pipeline of the management level.
- III. Create a performance-driven culture that supports accelerated growth of the organization.

Suggest a multi-level, comprehensive approach to Leadership and Talent Development by offering the futuristic approach to developing leaders.

S.NO.6356

P8MBA3EC1

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION ,NOVEMBER 2013

Part III - BUSINESS ADMINISTION - Elective

ORGANIZATION DEVELOPMENT

TIME: Three hours

Maximum: 75 marks

PART A-(5*5=25)

Answers ALL Questions.

1.(a) What are the nature of OD?

Or

(b) Explain about inter-group dynamics.

2.(a) Explain the diagnostic components of OD.

Or

(b) What are the features of action research?

3.(a) Explain interpersonal interventions.

Or

(b) Explain comprehensive interventions.

4.(a) Describe conditions for failure in OD efforts.

Or

(b) Narrate the impact of OD.

5.(a) Explain issues in OD.

Or

(b) Discuss mechanistic system.

PART B-(10*5=50)

Answers ALL Questions.

6.(a) Elucidate the scope of OD

Or

(b) Explain the nature of planned change.

7.(a) Describe the process of maintenance components.

Or

(b) Discuss the application of action research in OD.

8.(a) Explain about team interventions.

Or

(b) Explain about structural intervention.

9.(a) Discuss the conditions for success in OD efforts.

Or

(b) Explain the assessment of OD.

10.(a) Explain the issues in consultant – client relationship.

Or

(b) Explain about some Indian experiences in OD.

S.NO.5517

P8MBA3EC1

(For Candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION ,NOVEMBER 2014

Part III - BUSINESS ADMINISTION - Elective

ORGANIZATION DEVELOPMENT

TIME: Three hours

Maximum: 75 marks

PART A-(5*5=25)

Answers ALL Questions.

1.(a) Explain the scope of organization development.

Or

(b) What do you mean by group dynamics?

2. (a) What are the operational components of OD?

Or

(b) State the relationship between action research and organization development.

3. (a) Give a short notes on inter-group intervention.

Or

(b) Briefly explain the team intervention.

4.(a) What are the conditions for success in operation development efforts?

Or

(b) What are the conditions determining future of OD?

5.(a) Briefly explain the issues involved in the organization development.

Or

(b) Give short notes on contingency approach in organization development.

PART B-(10*5=50)

Answers ALL Questions.

6.(a) Discuss the value, beliefs and assumptions of organizational development.

Or

(b) Explain the nature and role of client system in organizational change.

7.(a) Discuss the maintenance components of OD with example.

Or

(b) Discuss the system model of action research.

8. (a) Explain Human process approach to organizational development.

Or

(b) Discuss the various structural intervention

9. (a) Discuss the steps involved in the OD implementation process.

Or

(b) Explain the problem and precaution in assessing the impact of OD in organizational performance.

10. (a) Discuss OD's future in constantly changing organizational, political and economical environment

Or

(b) Discuss recent developments in research on OD.

MBA DEGREE EXAMINATION

APRIL-2010

REWARD MANAGEMENT

P8MBA3EC2

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1(A) Define minimum wage, living wage, and fair wage.

(OR)

(B) Explain the three principal of compensary of management.

2 (A) State the main features of incentives.

(OR)

(B) How to make incentive more effective?

3 (A) Discuss about the concept of dearness allowance.

(OR)

(B) Explain the role of fringe benefits in reward system.

4 (A) State the problems encountered in compensation system of MNCs.

(OR)

(B) What are the objectives of executive compensation system in MNCs?

5 (A) What are the objectives of collective bargaining?

(OR)

(B) Highlight the importance of collective bargaining.

PART B (5*10=50)

ANSWER ALL THE QUESTIONS

6 (A) Describe the subsistence theory of wages and state its criticisms.

(OR)

(B) Explain the various factors taken into consideration while designing a compensation system.

7 (A) Discuss the various causes for wage differentials.

(OR)

(B) Explain the features of group incentive schemes offered in companies.

8 (A) State the time based and medical based fringe benefits provided to the individuals.

(OR)

(B) Describe the fringe benefits related to retirement plans

9 (A) Discuss the approaches to Executive compensation system in MNCs.

(OR)

(B) What are the main cross-national differences in the nature of pay system and practices?

10 (A) Discuss various strategies of collective bargaining.

(OR)

(B) **CASE STUDY**

Sundaram fastener is well known for zero breakdowns, zero accidents and defects. Company did not lose even a single day due to strike. The per-employee productivity is comparable to the in the world.

Discuss the role of industrial relations in productivity.

MBA DEGREE EXAMINATION-NOVEMBER-2009

REWARD MANAGEMENT

P8MBA3EC2

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1 (A) State the question of compensation management.

(OR)

(B) Explain about wage concepts.

2 (A) Explain the concept of profit sharing.

(OR)

(B) Describe the role of financial incentives

3(A) Describe the purpose of voluntary retirement scheme.

(OR)

(B) What is Golden Handshake?

4(A) What are the factors influencing executive compensation systems in MNC?

(OR)

(B) Explain about ESOP.

5 (A) State the conditions for effective collective bargaining.

(OR)

(B) What is the importance of industrial relations?

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6 (A) Describe wage fond theory and state its criticisms.

(OR)

(B) Explain the variables influencing the wage and salary administration.

7 (A) Discuss about the various types of industrial incentive scheme.

(OR)

(B) Discuss the strategic importance of variable pay.

8 (A) Discuss the emergence and growth of dearness allowance concept in India.

(OR)

(B) Describe about the various fringe benefits provided in leading companies.

9 (A) What are the main factors that MNCs' take into account while deciding their employees' salary, allowances and benefits.

(OR)

(B) "Compensation decisions are strategic decisions and play a key role in achieving performance and sustainable competitive advantages for international firms"- Justify the above statement.

10 (A) Discuss the several stages of collective bargaining process.

(OR)

(B) **CASE STUDY**

Good industrial relations help to retain employees, on one hand, and running organization successfully on the other is confirmed by Reliance's sprawling Hazar petrochemicals complex in Gujarat. It was mainly its better industrial relations that resulted in high productivity for the organization and better wages for employees

How is IRs scenario in Indian Industries?

MBA DEGREE EXAMINATION

NOVEMBER-2013

REWARD MANAGEMENT

P8MBA3EC2

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1. (A) Explain about concept of wages.
(OR)
(B) Differentiate between job-based and skill-based pay.
2. (A) What are the types of piece-rate system?
(OR)
(B) Write short notes on individual incentive schemes.
3. (A) Write short notes on Employee stock option plan (ESOP)
(OR)
(B) What are the characteristics of wage system?
4. (A) Bring out the types of Fringe Benefits.
(OR)
(B) Enlighten on essentials of a sound incentive plan.
5. (A) What is the role government in collective bargaining?
(OR)
(B) Discuss on the importance of Industrial Relation.

PART-B(5*10=50)

ANSWER ALL THE QUESTIONS

6. (A) Explain about various theories relating to wages.
(OR)
(B) What are the challenges in fixing remuneration of Employees?
7. (A) Explain methods of wage payment.
(OR)
(B) Enlighten on Pre-requisites of an effective incentive system
8. (A) Bring out the emergence growth of dearness allowance concept in India.
(OR)
(B) Explain about various allowance and fringe benefits paid to industrial employee and integral part of their compensation (GIVE EXAMPLE)
9. (A) Enlighten on the process of Collective Bargaining.

(OR)

(B) Explain Pre-requisites of Collective bargaining.

10. (A) Explain about executive compensation system in Multi- national companies.

(OR)

(B) Bring out emerging trend in industrial relations due to Liberalization, Privatization, and Globalization

MBA DEGREE EXAMINATION NOVEMBER-2014

REWARD MANAGEMENT – P8MBA3EC2

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1 (A) Write a short note on “what if” testing.

(OR)

(B) Give a short on non-financial Reward.

2 (A) Briefly explain the factors Influencing pay level for individual.

(OR)

(B) Distinguish between Reward strategy and business strategy.

(OR)

3 (A) Why should there be a wage policy in India?

(OR)

(B)

4(A) Critically examine the need hierarchy theory of motivation.

(OR)

(B) Bring out the need for compensation system in IT companies.

5(A) Give a short note on Collective Bargaining.

(OR)

(B) Briefly explain the salient features of payment of the bonus act.

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6 (A) Give a detailed account on the factors affecting reward management policy and practices.

(OR)

(B) Discuss new trends in compensation management.

7(A) Differentiate between minimum wage, fair wage and living wage.

(OR)

(B) Explain the determination of inter and intra industry compensation differential.

8(A) What is voluntary retirement scheme? Explain the issues involved in it.

(OR)

(B) Discuss the challenges of compensation design in India.

9 (A) Give a detailed account on Employee stock ownership plan (ESOP).

(OR)

(B) Discuss the major components of an international remuneration system.

10(A) Explain in detail about “collective bargaining are beneficial to both employers and employees”.

(OR)

(B) Are the wage laws relevant in present era of liberalization, privatization and Globalization? Discuss.

MBA DEGREE EXAMINATION NOVEMBER-2015

REWARD MANAGEMENT

P8MBA3EC2

PART-A (5*5=25)

ANSWER ALL THE QUESTIONS

1(A) Explain economic theory related to compensation.

(OR)

(B) Explain the importance of employee's satisfaction.

2(A) Describe the importance of Pay variable.

(OR)

(B) What is group incentive? What is its significance?

3(A) What do you mean by D.A? How is it computed?

(OR)

(B) Explain about golden hand shake scheme.

4(A) What are the special features of executive compensation?

(OR)

(B) What is ESOP? Explain its importance.

5(A) Write short notes on types of collective bargaining.

(OR)

(B) What is productivity settlement? Explain.

PART-B (5*10=50)

ANSWER ALL THE QUESTIONS

6 (A) Explain briefly about wage theories.

(OR)

(B) “The rewards are given based on strengths”-discuss.

7(A) How do you determine inter industry compensation?

8 (A) Explain the role of fringe benefits.

(OR)

(B) Explain about V.R.S.

9(A) Discuss the multinational company’s executive compensation.

(OR)

(B) Discuss the IT company executive compensation.

10(A) Discuss the collective bargaining strategies.

(OR)

(B) Discuss the drawing up 12(3) settlement.

M.B.A DEGREE EXAMINATION, APRIL 2015

Business Administration - Elective

SECURITY ANALYSIS AND PORTFOLIOMANAGEMENT

Time: Three hours

maximum: 75 marks

Part –A (5 x 5 = 25)

Answer All Questions

1. (a) Define 'Investment Management' and give a brief not on Investment management process.
(or)
(b) How is Beta measured?
- 2.(a) What do you mean by systematic risk? And how it is calculated?
(or)
(b) Write a note about Interest Rate Parity.
- 3.(a) Write about profitability ratio.
(or)
(b) What is expected return and how it is calculated?
- 4.(a) A zero coupon bond having face value Rs. 1000 and 3 years to maturity is being sold in the market at a yield to maturity of 6%. Calculate its duration.
(or)
(b) List down some strategies for effective investment management.
5. (a) What are the special features of equity analysis?
(or)
(b) What are the factors to be considered while selecting the portfolio?

PART - B (5 X 10 = 50)

Answer All questions.

6. (a) Discuss why diversification reduces portfolio risk.
(or)

(b) Explain the relationship between risk and return with illustration.

7. (a) Define 'Security Market' and explain the characteristics of a good Security Market.

(or)

(b) What is co-variance? And explain why it is important in portfolio Theory?

8. (a) Discuss in detail the Technical Analysis.

(or)

(b) Briefly discuss the five fundamental factors that influence the risk Premium of an investment.

9. (a) Compare the liquidity of an investment in raw land with that of an Investment in common stock.

(or)

(b) Define primary and secondary market for securities and discuss How they differ.

10. (a) Discuss in detail 'yield to maturity' with suitable examples.

(or)

(b) Explain the shape of the efficient frontier.

M.B.A. DEGREE EXAMINATION, NOVEMBER – 2009

Business Administration

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Time :Three hours

Maximum:75 marks

SECTION A – (5*5=25)

Answer ALL the questions

1. a) Discuss different measures of yield in bond valuation.
(or)
b) Mr.verma recently purchased a bond with a Rs.1000 face value, a 10 percent coupon rate and four years to maturity. The bond made annual interest payments, the first to be received one year from today. Mr.verma paid Rs.1032.40 for the bond. What is the bond's yield –to-maturity?
2. a) Discuss different types of options.
(or)
b) Write a detailed note on index option.
3. a) Discuss the importance of price earning rate in financial analysis.
(or)
b) Mr. Ram lal has invested in xyz chemical the capitalization rate of the company 15 percent and the current dividend Rs.2.00 per share. Calculate the value of company's equity share if the company recorded no growth in dividend.
4. a) Why do we value equity stocks?
(or)
b) What do you mean by company analysis?
5. a) Distinguish security return and portfolio return.
(or)
b) What is beta? Why is beta a better measure of risk than the standard deviation?

SECTION B- (5*10=50)

6. a) Explain in detail the relationship among bond prices, time to maturity and interest rates in the concept of bond valuation.
(or)

- b) Write a detailed note on bond immunization.
7. a) Explain in detail the factors influencing option prices.

(or)

- b) “Economic analysis is the first step in fundamental analysis”-Elaborate.
8. a) Discuss the different approaches to equity stock valuation.
- (or)
- b) What do you mean by index features? Discuss the application of index features.
9. a) “A technical analyst explains that the stock market acts like a barometer rather than a thermometer”- Elaborate.
- (or)
- b) Discuss the rationale for expecting the existence of an efficient capital market and explain random walk hypothesis.

10. Case study:

Consider the following data for a particular sample period.

	Portfolio-p	Market-M
Average return	0.35	0.28
Beta	1.2	1.0
Standard deviation	0.42	0.30
Non-systematic risk	0.18	0

Calculate the following performance measures for the portfolio and the market (a) Sharpe (b) Tray nor and (c) Jenson.

The risk free rate during the period was 6%.

MBA DEGREE EXAMINATION NOV - 2013
BUSINESS ADMINISTRATION
SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

SECTION-A (5*5=25)

Time :Three hours

Maximum:75 marks

Answer ALL questions.

1. a) Explain different kinds of yield

(or)

- b) Explain the feature of bond scoaps

2. a) Explain the concept of equity option

(or)

- b) A bought 100 share of ABT Ltd, at Rs 100 per share, he held the share for 3 years and sold at Rs 160 per share the company paid Rs 12.50 dividend per share in each of the 3 years .what is the total returns earned by A.

3. a) Illustrate price earning ration with an example?

(or)

- b) Ranvir invested in RMC chemical the capitalization rate of the company is 15% and the current dividend is Rs 2 per share calculate is slowly singing with an annual decline rate of 15% in the dividend.

4. a) What are due assumptions in technical analysis.

(or)

- b) What are the limitations of charts?

5. a) What are due portfolio objectives

(or)

- b) Explain and illustrate future contract

SECTION-B- (5*10=50)

6. a) Discuss the factory that determines interest rates.

(or)

b) Explain the nature segmentation theory of terms structure.

7. a) Explain the pricing or equity option with example

(or)

b) Calculate the value of stock from the following using market price Rs60; growth rate of sale 6% and of EPS 9%; dividend pay-out 70% normal capitalisation rate 12%.

8. a) Explain the role of index in the equity valuation?

(or)

b) Explain multiplier model of equity stock valuation

9. a) What are the technical indicators?

(or)

b) How will you test market efficiency?

10. Case study: From the following data find

a) If the prevailing free rate is 6% which portfolio is the best?

(or)

b) What is the expected rate, when due standard deviation is 4%

Portfolio	expected returns	standard deviation
1	8%	3%
2	10%	6%
3	13%	8%
4	17%	13%
5	20%	18%

Use single index method

M.B.A DEGREE EXAMINATION - NOVEMBER - 2014

Business Administration - Elective

Security Analysis Portfolio Management

SECTION - A (5*5=25)

Answer ALL questions:

1. (a) Explain yield to maturity and its significance?

(or)

(b) Write a note on interest rate risk?

2. (a) what is portfolio management? State its objectives?

(or)

(b) What are the factors to be considered in selecting fixed income yielding securities?

(or)

3. (a) Explain valuation of equity under dividend model?

(or)

(b) Explain the role of intrinsic value in the market prices of equity?

4. (a) Discuss the economic indicators to assess the economy?

(or)

(b) Explain the present value approach in the valuation of equity?

5. (a) Explain the implication of industry life cycle?

(or)

(b) What are the assumptions with which technical analysis is made?

SECTION - B- (5*10=50)

Answer ALL questions:

6. (a) what are the technical indicators available to assess the overall market situation?

(or)

(b) Define efficient market hypothesis in each of its form in brief?

7. (a) State the assumptions of capital asset pricing model?

(or)

(b) Explain different types of options?

8. (a) Explain equity valuation under constant growth and multiple growth models?

(or)

(b) Explain the role of ratios in the evaluation of a company?

9. (a) Differentiate between future and options?

(or)

(b) The data are as follows

Year	Stock	Return
1	R	10
1	S	12
2	R	16
2	S	18

(1) What is the expected return on a portfolio made up of 40% R and S?

(2) What is the standard deviation of each stock?

(3) What is the co-variance of R & S?

(4) Determine coefficient of stocks R & S?

(5) What is the portfolio risk made up of 40% R & 60% S?

10. (a) A company paid a dividend of \$3.00 per share during the current year. The earnings and dividends of the company are expected to grow at an annual rate of 10% over the next five years and at the rate of 8% thereafter. Investors expect a rate of 15% on these shares. What is the present value of the stock?

(or)

(b) Explain single index model with an example?

(For candidates admitted from 2008 – 2009 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2015.

Business Administration – Elective

STRATEGIC COST MANAGEMENT

Time : Three hours

Maximum : 75 marks

SECTION A – (5 x 5 = 25)

Answer ALL questions.

1. (a) Distinguish between standard cost and estimated cost.
(or)
(b) Define balance score card. What is its purpose?
2. (a) Explain Kaizen- costing in detail.
(or)
(b) Describe value engineering.
3. (a) What is an activity-based approach to design a costing system?
(or)
(b) What are the benefits of activity-based costing?
4. (a) Distinguish between prevention costs and appraisal costs.
(or)
(b) Describe the term continuous quality improvements.
5. (a) Discuss the strategic value of information in TQM.
(or)
(b) Discuss the benefits and limitations of Reengineering.

SECTION B – (5 x 10 = 50)

Answer ALL questions.

6. (a) What is strategic cost accounting? Explain how it can provide information to senior managers in achieving their corporate objectives.
(or)
- (b) Discuss how learning curve techniques may be used in setting standards for control.
7. (a) Explain the essential elements needed to arrive at a Target cost.
(or)
- (b) In which stage of the total life cycle of a product is target costing most applicable? Explain.
8. (a) “Activity-based costing is the wave of the future. All companies should adopt it”. Do you agree? Explain.
(or)
- (b) Why are conventional product costing systems more likely to distort product costs in highly automated plants?
9. (a) Are direct materials and direct labour costs always relevant? Explain.
(or)
- (b) Quality engineering, quality, statistical process control and supplier certification are what kinds of quality cost? Explain.
10. (a) Discuss the benefits and limitations of Reengineering.
(or)
- (b) Define balance score card. What is its purpose?
-

(For candidates admitted from 2008 – 2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2012

Business administration – Elective

STRATEGIC COST MANAGEMENT

Time : Three hours

Maximum : 75 marks

Section A – (5*5= 25)

Answer ALL questions.

1. (a) Define the terms job costing and process costing.
(OR)
(b) Explain the significance of cost volume profit analysis.
2. (a) What do you mean by target costing?
(OR)
(b) Explain the cost driver concept.
3. (a) Explain the term activity based costing.
(OR)
(b) What are the drawbacks of conventional costing system?
4. (a) What do you mean by cost of quality?
(OR)
(b) Write short notes on failure costs.
5. (a) What are the objective of maintaining quality?
(OR)
(b) Explain the concept of just - in - time. What are its features?

Section B – (5*10 = 50)

Answer ALL questions.

6. (a) How cost effectiveness becomes a source of competitive advantage?
Explain.

(OR)

- (b) Discuss its features of process costing.

7. (a) Write a detailed note on value analysis.

(OR)

- (b) Explain the significance of profit variance analysis in cost Management.

8. (a) Discuss the origin and development of Activity based costing.

(OR)

- (b) Discuss the benefits and features of ABC.

9. (a) How cost of quality is analyzed and measured?

(OR)

- (b) Discuss the concept and characteristics of control charts.

10. (a) Case study:

A product is finally obtained after it passes through three distinct

11. Processes. The following information is available from the cost Records

	Process 1	Process 2	Process 3	Total
	Rs.	Rs.	Rs.	Rs.
Materials	5,200	3,960	5,924	15,084
Direct wages	4000	6000	5000	15000
production overheads				18000

1,000 units Rs. 6 per unit were introduced in process 1 production are absorbed as a percentage of direct wages.

The actual output and normal loss of the respective processes are direct wages.

	Output (units)	Normal loss as a percentage of input	Value of scrap (per unit)
Processes 1	950	5%	RS.4
Processes 2	840	10%	Rs. 5
Processes 3	750	15%	Rs. 10

Prepare the processes 1 account.

(For candidate admitted from 2008 – 2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2013

Business Administration – Elective

STRATEGIC COST MANAGEMENT

Time: Three hours

Maximum : 75 marks

Section A – (5*5=25)

Answer ALL questions.

1. (a) Explain the role of cost Systems and their drawbacks.

(OR)

(b) Define business Process Engineering. What are its uses.

2. (a) What are the drawbacks of profit variance analysis in an organization?

(OR)

(b) Write a note on Learning Curves.

3. (a) Discuss the merits and demerits of ABC analysis.

(OR)

(b) What are the various features of cost driver concept?

4. (a) Designing cost systems suitable to a process oriented manufacturing
i. environment.

(OR)

(b) Describe the general procedure for implementing ABC techniques.

5. (a) What is cost of quality?

Section – B (5*10=50)

Answer ALL questions.

6. (a) Discuss just in time and flexible manufacturing system as enablers of Low cost strategy with suitable example.

(OR)

(b) Explain the significance of Linear programming analysis in cost Management.

7. (a) Discuss the concept of target with suitable examples.

(OR)

(b) What are the merits and demerits of activity based costing?

8. (a) Describe how activity based costing is implemented.

(OR)

(b) Define cost of quality and explain the measurement of COQ.

9. (a) Explain the importance of cost of quality.

(OR)

(b) Discuss the concept of life cycle with suitable examples.

10. Case study:

Following are the particulars for the production of 2,000 sewing machines of Bharath Engineering Co.Ltd. for the year 2004:

Cost of materials Rs. 1,60,000 Wages Rs. 2,40,000 manufacturing expenses Rs. 1,00,000 salaries Rs. 1,20,000 office rent, Rates insurance Rs. 20,000 General expenses Rs. 40,000 selling expenses Rs. 60,000 and sales Rs. 8,000 The company plans to manufacture 3,000 service machines during 2005. You are required to such a statement showing the price at which machine would be sold so as to show a profit of 10% selling price. The following information is supplied to you:

- (a) Price of material is expected to rise by 20%
- (b) Wages rates are expected to show an increase of 5%
- (c) Manufacturing expenses will rise in proportion to the combined cost of Material and wages,
- (d) Other expenses will remain unaffected by the rise in output.

SL.No. 5514

P8MBA3EB1

(For candidate admitted from 2008 – 2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2014

Business Administration – Elective

STRATEGIC COST MANAGEMENT

Time : Three hours

Maximum: 75 marks

Section A – (5*5=25)

Answer ALL questions.

1. (a) distinguish between value added and non value added activities.

Or

(b) What are the limitations of cost accounting?

2. (a) describe target costing in detail.

Or

(b) Explain the strategic positioning concept.

3. (a) what is the role of cost driver in tracing costs to products?

Or

(b) What are the basic steps required for activity –based costing?

4. (a) distinguishes between internal failure costs and external failure costs.

Or

(b) describe processing cycle efficiency.

5. (a) explain JIT method.

Or

(b) Discuss the salient features of TQM approach.

Section – B (5*10=50)

Answer ALL questions.

6. (a) Explain how bench marking can be used to improve activity performance.

Or

(b) “Learning curves are relatively easy to estimate, however, their influence tends to be of very marginal value”-discuss.

7. (a) When does the disposal phase of the post –sale and disposal cycle of a product begin and end?

Or

(b) What is the profitability measure most widely used to develop the target profit margin under target costing?

8. (a) What are the key reasons for product cost difference between traditional costing systems and ABC systems?

Or

(b) Give the criterion for choosing cost drivers for allocating costs to products.

9. (a) what costs and revenues are relevant in evaluating the profit impact of an increase in sales? Explain.

Or

(b) What are the opportunity costs that are relevant in make-or-buy decisions? Explain.

10. Case study:

Consider you as a plant manager of a plant designed to supply covers for convertible automobiles. In recent years. The profits of the plant have been decreasing. To what extents do you hold the plant manager responsible for the profit decrease? How the problem can be interpreted by cost manager?

(For candidates admitted from 2008 – 2009 onwards)

M.B.A DEGREE EXAMINATION, NOVEMBER 2015.

Business Administration – Elective

STRATEGIC COST MANAGEMENT

Time : Three Hours

Maximum : 75 marks

Section A – (5*5=25)

Answer ALL the questions.

1. (a) What is CVP? Explain

(or)

(b) What is learning curve? Explain its relevance for planning for profit?

2. (a) What is target costing and how are target costs derived?

(OR)

(b) What is strategic cost management? Mention its objectives.

3. (a) Enumerate the drawbacks of traditional costing.

(OR)

(b) Bring out the benefits of activity based costing.

4. (a) How do you analyze quality cost?

(OR)

(b) Enumerate the various costs of quality.

5. (a) What is total quality management? Also mention its features?

(OR)

(b) Write a note on:

i. Bench marking

ii. Balance score card

Section - B (5*10 =50)

Answer ALL the questions.

6. (a) “The learning curves effects are used for planning and decision Making” – Do You Agree explain?

(OR)

(b) What is cost estimating? Also examine the prerequisites of good Estimating.

7. (a) Explain how cost reduction targets can be determined and achieved under target costing.

(OR)

(b) Write a note on:

- i. Sensitivity analysis
- ii. Life cycle costing

8. (a) Examine the steps involved in activity based costing.

(OR)

(b) What is activity based costing? Also explain what factors determine the suitability of application of ABC?

9. (a) Elaborate the various management techniques for quality cost.

(OR)

(b) Discuss the concept of life cycle with suitable examples.

10. Case study:

As the cost accountant of a colliery you are required to suggest a programme for achieving a cost reduction of Rs.2 per ton on the present budgeted cost of Rs.20 per ton. draft a report to the management indicating broadly the steps to be taken to achieve this planned reduction.

(For candidates admitted from 2008-2009 onwards)

M.BA. DEGREE EXAMINATION, APRIL 2010

BUSINESS ADMINISTRATION-MAJOR

STRATEGIC MANAGEMENT

Time : Three hours

Maximum : 75 marks

PART A-(5*5=25)

ANSWER ALL QUESTION

1. (a) What are the merits of corporate strategic planning?

OR

(b) What role that a leader has to assume in strategic management?

2. (a) What are the potential weaknesses of SWOT analysis?

OR

(b) Explain the implication of core competencies.

3. (a) 'Strategic planners commonly establish long term objectives in seven areas to achieve long term prosperity'. What are those seven areas?

OR

(b) What are the means and forms of diversification?

4. (a) What do you mean by competitive cost dynamics?

OR

(b) Explain BCG approach as a tool of strategy evaluation.

5. (a) how do functional tactics differ from corporate and business strategies?

OR

(b) What key concerns must functional tactics address in production?

SECTION B- (5*10=50)

ANSWER ALL QUESTION

6. (a) Explain the importance of marketing in the strategic planning process.

OR

(b) How can a mission statement be an enduring statement of values and simultaneously provide a basis of competitive advantage?

7. (a) narrate a firm's external environment.

OR

(b) Choose an industry in which you would like to compete. Use the five, force method of analysis to explain why you find that industry attractive.

8. (a) describe generic strategies in detail.

OR

(b) How strategies management can be initiated at the business level?

9. (a) Describe 'Cycle approach to strategies planning.

OR

(b) Explain 'cash flow' as evaluative mechanism of strategies.

10. Case Study:

Select a business whose strategy is familiar to you identify What you think are the key premises the strategy. Then select the key indicators that you would use to monitor each of these premises.

S.NO. 7852

P8MBA

(For candidates admitted from 2008-2009 onwards)

M.BA. DEGREE EXAMINATION, APRIL 2011

BUSINESS ADMINISTRATION

STRATEGIC MANAGEMENT

Time : Three hours

Maximum : 75 marks

PART A-(5*5=25)

ANSWER ALL QUESTION

1. (a) Explain the importance and limitations of strategic management.

OR

(b) What is meant by strategy? Illustrate with examples.

2. (a) Identify the criteria used for assessing internal environment.

OR

(b) Explain the feature of industry analysis.

3. (a) what is corporate parenting? State its characteristics.

OR

(b) Write a short notes on strategic alliance.

4. (a) what are the factors involved in GE's Strategic planning grid?

OR

(b) What do you understand about the experience curve? State its benefits.

5. (a) Elucidate the concept of 'Re-engineering'. What are the principles to be followed?

OR

(b) What is acquisition strategy? Discuss.

PART B-(5*10=50)

ANSWER ALL QUESTION

6. (a) How will you develop a good vision for an organisation? What role does vision play in strategy formulation?

OR

- (b) Define and differentiate between vision, mission, goals, objectives and policies.

7. (a) What is environment? State how would you scan and evaluate the environment.

OR

- (b) Examine the various critical success factors. How do you identify them? Do they help in a company's SWOT analysis?

8. (a) Enumerate the role of diversification. How do companies employ diversification as a strategy?

OR

- (b) As a strategic executive, design a realistic model for the evaluation and control process in the indian context.

9. (a) What is 7s model? How can this be used for gaining sustainable competitive advantage?

OR

- (b) Elucidate the cultural change that are taking place in india and its impact on business uses.

10. (a) A Rs.750 crore indian pharmaceutical company has invented 7 new molecules which could help in the treatment of AIDS and cancer. The company has patented its products in india. Global market is dominated by large resourceful MNCs. Device suitable strategies for the indian company to enter the global market.

OR

- (b) Explain the impact of globalisation on the strategic management practices of indian companies.

S.NO.4876

P8MB13

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2012

Business Administration

STRATEGIC MANAGEMENT

Time : three hours

Maximum : 75 marks

PART A (5*5=25)

ANSWER ALL QUESTIONS

1. (a) Discuss the nature and scope of corporate management and its role in non business organization, giving example.
OR
(b) what are the benefits of strategic management?
2. Differentiate between external and internal environment
OR
(b) explain the steps involved in Environmental scanning.
3. (a) Explain the different type of stability strategy with example
OR
(b) Elaborate the advantage and disadvantage of vertical integration
4. (a) What do you mean by competitive cost dynamics? What are the factors associated with it?
OR
(b) Briefly discuss on the corporate rating approach with example
5. (a) Write a short note on commander approach give example.
OR
(b) illustrate with facts about the future of strategic management.

PART B-(5*10=50)
ANSWER ALL THE QUESTION

6. (a) Discuss the function of senior management in corporative governance with examples

OR

(b) What are some of basic question that have to be answered before the management decides about the structure suitable for the strategy chosen?

7. (a) Based on the extremes of “use of authority by the leaders” and “area of freedom for subordinates”, present in a chart the spectrum of leadership styles. Discuss the attributes of successful leaders.

OR

(b) Write short note on the following

- (i) Demographic environment
 - (ii) Political environment
 - (iii) Socio cultural environment
 - (iv) Technological environment
8. (a) What is the role of strategy in the aspect of business level management with respect to companies operating in india?

OR

(b) A ford foundation study found that a majority of institutional investor took social consideration into account in the selection of investments. In the light of this, why should the firms undertake social audit? What benefit can a firm expect to get from social audit?

9. (a) Explain the BGC matrix approach in detail.

OR

(b) Discuss the various mode of technology transfer. Explain the evolution of technology with respect to the customer and buyer’s point of view

10. (a) Discuss the different approaches to mode of entering a foreign market.

OR

(b) Illustrate with example on Dupont’s control model

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2015

Business Administration

STRATEGIC MANAGEMENT

Time : three hours

Maximum : 75 marks

PART A (5*5=25)

ANSWER ALL QUESTIONS

1. (a) Describe the essential characteristics of a mission statement
OR
(b) Briefly describe hierarchical level of planning.
2. (a) What is distinctive competence? How is it important to strategy formulation?
OR
(b) What is SWOT matrix? What are its uses?
3. (a) What are the stability strategies? When are they used?
OR
(b) What are reverse mergers? Give examples, what are its significance?
4. (a) Explain the components of BCG matrix?
OR
(b) Describe the strategies followed by service industries in India.
5. (a) What is strategic group? State its scope.
OR
(b) What is corporate culture? What are its significance in strategic management?

PART B (5*5=10)

ANSWER ALL THE QUESTIONS

6. (a) Compare and contrast strategic decision making with conventional decision making and elaborate its nature through discussing various issues involved in it.
OR
(b) Describe the different aspects of environmental scanning necessary for identifying the opportunities and threats in the company's environment.

7. (a) Explain in detail about responsibility of a business its customers, share holders, employees and community / society
OR
(b) Explain the various dimensions of corporate social responsibility and analyze its impact and interlink in strategic management process.
8. (a) Describe the major element of government regulatory framework within which india companies work. What are they implication of each of these element for strategy implementation?
OR
(b) Explain in detail about strategy structure relationship
9. (a) Compare and contrast joint ventures, mergers and acquisitions. Illustrate the advantages of these grand strategic options
OR
(b) How do strategic alliances helps corporation grow? Analyze the strategic impact of any three strategic alliances that you know in today's corporate world.
10. (a) Analyze the function of board of directors through an example of public sector enterprise and privately held public limited company
OR
(b) Analyse the contribution of michael porter to the field of strategic management and elaborate discuss the most significant contribution of porter from your view point.

(For candidates admitted from 2008-2009 onwards)

M.BA. DEGREE EXAMINATION, NOVEMBER 2013

BUSINESS ADMINISTRATION-MAJOR

STRATEGIC MANAGEMENT

Time : Three hours

Maximum : 75 marks

PART A-(5*5=25)

ANSWER ALL QUESTION

1. (a) Distinguish between strategic planning and operational planning.

OR

(b) What are the components of a mission statement?

2. (a) What is an organisation's task environment? What are the major dimension of that environment?

OR

(b) why is so important to assess a firms strengths and weaknesses in relative terms?

3. (a) What are the objectives of a turn around strategy?

OR

(b) Good time is crucial for ensuring the success of a business-level strategy. Elucidate

4. (a) Identify any two types of organisations that may need to evaluate their more frequently than others. Justify your choices

OR

(b) What are the benefits if strategic evaluation?

5. (a) How does strategy effect the structure of an organisation?

OR

(b) compare strategy formulation with strategy implementation in terms each being an art or a science.

PART B-(5*10=50)

ANSWER ALL QUESTION

6. (a) “The purpose of strategy is to define the nature of relationship between a firm and its environment”. Critically examine the statement.

OR

- (b) Explain the principal value of a vision and mission statement. Write a vision and mission statement for an organisation of your choice.

7. (a) What are the various environmental factors that affect the business? Discuss their relative importance.

OR

- (b) Define ‘synergy’ Explain how a firm can build and sustain synergies in business under its control over a period of time.

8. (a) Develop argument for and against the following suggestion: “The best corporate level strategy for large Indian companies is to remain moderately diversified and simultaneously attempt to concentrate on their core competencies”.

OR

- (b) What is corporate level strategy? Why is it important to diversified firm?

9. (a) What kind of barriers are there in strategy evaluation and control. Suggest suitable ways to overcome these barriers.

OR

- (b) Find out ways through which strategists can identify the gaps between actual performance and standards and initiate corrective steps to set everything in order.

10. (a) Explain the various approaches to implementation of strategy.

OR

- (b) Take the case of an MNC operating in the FMGC sector. What steps should it take to allocate its resources to different competing divisions? What kind of problem could be expected to surface during such an exercise? How can they be dealt with?

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2014.

Business Administration- Elective

ADVERTISING AND SALES PROMOTION

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Explain the different types of consumer contests.
Or
b) What is sales promotion? Discuss its significance.
2. a) How do you appraise the sales agency?
Or
b) What is campaign advertising? Why is it needed?
3. a) Discuss the rationale of testing the opinion of consumers.
Or
b) What is aptitude test? Where do you use this test? Enumerate its limitations.
4. a) What do you know about logo? Enumerate its significance.
Or
b) What is budgeting? What are its essentials?
5. a) Describe the steps involved in the flow of communication.
Or
b) Outline briefly the social aspects of advertising.

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) What do you know about Wilbur schramm's model? Enumerate its significance and drawback.
Or
b) Elucidate briefly about the theory of cognitive dissonance.
7. a) Outline briefly about the simulation primary and selective demand.
Or
b) Describe the steps involved in the determination of target audience.
8. a) Describe the different methods of sales promotion.

Or

b) Explain briefly the evaluation of different promotional strategies .

9. a) How does a company's financial performance affect the management's decision to advertising for the purpose of sales.

Or

b) Explain the qualities of a good advertising media.

10. a) "The sales budget is the pivot of budgeting control"-Discuss.

Or

b) Write short notes on

- i) Advertising organization.
- ii) Experimental design.
- iii) Layout.

S.NO.4895

P8MBA17

(For candidates admitted from 2008-2009 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Fourth semester

Business Administration

ENTREPRENEURIAL DEVELOPMENT

Time: Three hours

maximum: 75 marks

PART A-(5X5=25)

Answer all questions

1. (a) Define the term business and discuss the features of business.

Or

(b) Discuss the key traits social entrepreneur.

2. (a) Briefly explain the meaning of 'Feasibility Report'.

Or

(b) Write short note on

i. EOU

ii. SEZ

3. (a) Explain the features of project finance.

Or

(b) Bring out the various costs associated while completing the total estimated cost of the project.

4. (a) Write a note on institution assisting entrepreneur development in India.

Or

(b) Briefly explain the role of state government in providing incentives, subsidies, grants and tax concessions to the entrepreneur.

5. (a) How does sensitivity analysis help in identifying better projects?

PART B-(5X10=50)

Answer all questions

6. (a) Narrate the differences between a manager and entrepreneur.

Or

(b) Explain the attributes of a successful entrepreneur.

7. (a) Elaborate the schemes offered by commercial banks for development of entrepreneur.

Or

(b) State the goals working capital policies of a firm.

8. (a) Discuss the parameters for financial viability of a project.

Or

(b) Enumerate the step involved in determinate the projects financial viability.

9 (a) Explain the role entrepreneurship training institutes in nurturing ED culture.

Or

(b) Elaborate the functions of SIDBI.

10 (a) Explain the important contents of a project report.

Or

(b) How can probability theory be utilized in analyzing the significance of sensitivity analysis?

S.NO.4527

P8MBA17

(For candidates admitted from 2008-2009 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2014.

Fourth semester

Business Administration

ENTREPRENEURIAL DEVELOPMENT

Time: Three hours

maximum: 75 marks

PART A-(5X5=25)

Answer all questions

1 (a) Discuss the nature of entrepreneurship

Or

(b) What are the risks involved with entrepreneurship?

2 (a) Discuss the services rendered by SSDIC to entrepreneurs.

Or

(b) What are the functions of the state level institutions?

3 (a) Explain the points to be noted while selecting the projects

Or

(b) What are the components of feasibility study?

Or

4 (a) Discuss the different types of subsidies offered to entrepreneurs.

Or

(b) Write short note on incentives and subsidies.

5 (a) what is the purpose of conducting market research?

Or

(b) What are the points to be noted while conducting market research?

PART B-(5X10=50)

Answer all questions

6 (a) Discuss the qualities of a successful entrepreneur

Or

(b) Explain the various environmental barriers to entrepreneurship.

7 (a) Discuss the various stages involved in the process of project identification.

Or

(b) What is a feasibility report?

8 (a) How to identify the financial viability of the new project?

Or

(b) What are the contents of a project proposal?

9 (a) Discuss the significance of incentives to the entrepreneurs

Or

(b) Describe the various government initiatives to promote entrepreneurship.

10 (a) What are the points to be noted while performing the SWOT analysis for identifying better projects?

Or

(b) Discuss the stages in the project report formulation.

(For candidates admitted from 2008-2009 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2015.

Fourth semester

Business Administration

ENTREPRENEURIAL DEVELOPMENT

Time: Three hours

maximum: 75 marks

PART A-(5X5=25)

Answer all questions

1 (a) Discuss the nature of entrepreneurship

Or

(b) What are the risks involved with entrepreneurship.

2 (a) Discuss the services rendered by SSDIC to entrepreneurs.

Or

(b) What are the functions of the state level institutions?

3 (a) Explain the points to be noted while selecting the projects

Or

(b) What are the components of feasibility study?

4 (a) Explain the incentives available to entrepreneurs in India

Or

(b) Write a note on “The Small Business innovation research Program” [SBIR]

5 (a) Elucidate the concept of SWOT analysis

Or

(b) Identify the need for marketing research

PART B-(5X10=50)

Answer all questions

7. (a) Discuss the various performed by entrepreneur
Or
(b) Enumerate the government procedure to be complied with while starting a new business
8. (a) what is the role of commercial banks as a source financial for the entrepreneurs?
Or
(b) Elucidate the concept of “working capital” Examine the major determinants of working capital requirement of an organization
9. (a) Discuss the importance of financial planning in setting up a new venture. How break-even analysis can be used by entrepreneur?
Or
(b) Enumerate the main institutions engaged in the training and development of entrepreneur in India.
10. (a) Identify the need for incentives to the entrepreneurs
Or
(b) Explain the various exemptions given under different acts to small scale industry entrepreneurship
11. (a) Outline the guidelines to be adhered while designing a good project report. State the major contents of the project report.
Or
(b) Enumerate the role and need of different financial institutions that support entrepreneurship.

M.B.A DEGREE EXAMINATION, APRIL 2014

Business Administration-Elective

GLOBAL FINANCIAL MANAGEMENT

Time: Three hours

Maximum:75 marks

SECTION-A

1.a) Explain the european monetary system.

Or

b) Briefly explain the europen currency unit.

2. a) Who are the participants of the foreign exchange market?

Or

b) Write a note on currency futures?

3.a) What is law of one price? Under what circumstances, this law cannot be applied?

Or

b) What so you mean by foreign exchange exposure?

4.a) What a note on international capital budgeting.

Or

b) How international working capital is managed?

5. a) Discuss the financial instruments used by MNCs to raise money?

Or

b) List out any four methods of entering foreign markets for investment.

SECTION –B (5*10=50)

6. a) Write a detailed note on the international monetary and financial environment.

Or

b) Describe the different option available to determine the foreign exchange rate.

7. a) What is foreign exchange risk? How it can be managed?

Or

b) What is foreign exchange rate? Briefly discuss the factors affecting the foreign exchange rate?

8. a) Briefly discuss the three kinds of foreign exchange exposures.

Or

b) What are derivatives? Explain their types.

9.a) Discuss the features of a futures contract.

Or

b) What are the merits and demerits of financing a multinational company.

10. a) Assume you are a trader with deutsche bank from the quote screen on your computer terminal, you notice that Dresdner bank is quoting and credit Suisse is offering SF you learn that UBS is making a between the Swiss franc and the euro, with a current quote of show how you can make a triangular arbitrage profit by trading at these prices. (Ignore bid-ask spreads for this problem.) Assume you have RS 5,00,000 with which to conduct the arbitrage.

or

b) What happens if you initially sell dollars for Swiss francs? What c/SF price will eliminate triangular arbitrage?

M.B.A DEGREE EXAMINATION, APRIL 2012

BUSINESS ADMINISTRATION-ELECTIVE

GROUP DYNAMICS

TIME: 3 HOURS

MAXIMUM MARK: 75 marks

PART-A- (5*5=25)

1. Explain the different types of group in an organisation
(Or)
What are the features of a group
2. What is TNA
(Or)
What are the advantages of OJT
3. Explain the approach for consensus in an groups
(Or)
What are the problems in reaching group compatibility
4. Why conflict management is important in todays scenario
(Or)
What is meant by inter group competition
5. How is team building brought about in organisation
(Or)
Group dynamics results in organisational development-Discuss

PART-B (5*5=50)

6. Why do people feel alienated from one's own self or others? If a member of a group tries to destroy the cohesiveness of the group what measures may be taken to deal with him/her? Explain with suitable examples.
(Or)
Bring out the salient features of formal groups and differentiate with informal groups.
7. How does feedback improve the skills of group members
(Or)
How do group dynamics affect the success of a training program.
8. Explain the theory and model of interpersonal behaviour of C William Schutz
(Or)
Explain conflict and its management in terms of group dynamics

9. Explain the role of group dynamics in team performance
(Or)

What is intergroup competition? is it healthy to the organisation

10. How can training be used to reduce inter group competition and conflict
(Or)

Group dynamics is the key to success in the organisation- comment

P8MBA16
APRIL 2012
INTERNATIONAL BUSINESS ENVIRONMENT

SECTION A

1.a) What are the various types of international business?

Or

b) Briefly explain the elements of economic environment.

2.a) Explain the influence of Government of trade investments.

Or

b) What is 'Balance of Trade'?

3.a) How international productivity can be enhanced?

Or

Distinguish between tariff and non-tariff barriers.

4.a) Write a note on the euro currency market.

Or

b) Explain the functions of international banks.

5.a) Write a note on 'Global competitiveness'.

Or

b) What do you mean by 'Multilateral settlements'?

SECTION B

6.a) Discuss the recent world trade practices in detail.

Or

b) Enumerate the main elements of culture and explain their significance in international business environment.

7.a) What is meant by intra-firm trade? In what ways does this affect the host country?

Or

b) Enumerate the various legislations governing the foreign trade in India?

8.a) Discuss the scope and functions of WTO in detail.

Or

b) Give a brief account of the world financial environment.

9.a) Discuss the determinants of foreign exchange rate.

Or

b) Explain the role international capital market in the global financial environment.

10.a) What effects do MNC operations usually have on the management of domestic firms?

Or

b) Discuss International code on Transfer technology in detail.

APRIL 2013
INTERNATIONAL BUSINESS ENVIRONMENT
SECTION A

1.a) How will an idea, good or service fit into the international market?

Or

b) Briefly explain the recent trends in world trade.

2.a) Explain how culture influences international business.

Or

b) Write a note on 'Balance of Trade'.

3.a) Should trade or investment be used to enter a foreign market?

Or

b) Write a note on tariff barriers.

4.a) Discuss the instruments used in international money market.

Or

b) Explain the functions of stock market.

5.a) Write a note on 'Export licensing'.

Or

b) What do you mean by 'Multilateral settlement'.

SECTION B

6.a) Critically examine the various approaches to controlling international business.

Or

b) How political environment influences international business?

7.a) Distinguish between the current account and capital account detailing the items included in each of them.

Or

b) Enumerate the various legislations governing the foreign trade in India.

8.a) Explain the role of WTO in detail.

Or

b) Explain the mechanism of foreign exchange market in detail.

9.a) Discuss the determinants of foreign exchange rate.

Or

b) Explain the functioning of the international capital markets.

10.a) Explain the functioning of multinational companies.

Or

b) What are the benefits of Globalization?

APRIL 2014
INTERNATIONAL BUSINESS ENVIRONMENT

SECTION A

- 1.a) Why do firms enter into international business?
Or
b) What are the methods of international business?
- 2.a) Explain the structure of balance of payments.
Or
b) How government can influence trade investment in international business environment?
- 3.a) What is the main purpose of WTO?
Or
b) What do you mean by world financial environment?
- 4.a) What is an offshore financial center and what are its functions?
Or
b) How stock market are determined in international business environment?
- 5.a) Explain the concept of human resource development.
Or
b) What do you mean by global organization?

SECTION B

- 6.a) Discuss the international environment that affect international business.
Or
b) Explain the impact of political environment on international business.
- 7.a) Explain international product life cycle theory.
Or
b) Explain the concept of trade creation and trade diversion by formation of RTB.
- 8.a) What are the function of regional growth of global business?
Or
b) Discuss the nuances of regional trade market.
- 9.a) Discuss the methods of meaning foreign exchange in international trade.
Or
b) why governments intervene in trade the business ? what are the available to them for such international.
- 10.a) Discuss the factors that cause globalization of business.
Or
b) explain different stages of negotiating international business environment.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration - Elective

LEAN MANUFACTURING

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Explain the term –“ lean manufacturing”.
Or
b) Explain the significance of mass production.
2. a) Write a note on lean principles.
Or
b) Differentiate lean and six sigma.
3. a) Write a note on total quality management.
Or
b) Discuss the concept of KAIZEN.
4. a) Explain “JUST IN TIME “ system.
Or
b) What are “QC Circles”?
5. a) What is “SQC”?
Or
b) Describe the different types of lean waste.

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) Discuss lean production system with suitable illustration.
Or
b) “PPC is a hub around which all other functions revolve” Justify the statement.
7. a) Discuss the lean principles in detail.

Or

- b) Explain the objective of production and operations management and methods employed to achieve those objectives.
8. a) Explain traditional method of inspection versus statistical quality control methods.

Or

- b) What are control chart? How can they used to control quality? How are upper and lower limits decided?
9. a) Briefly discuss about the six sigma methodologies.

Or

- b) Write short notes on the following.
 - I) Line Balancing.
 - ii) Importance of inspection.
10. a) Write short notes on the following.
 - i) Cellular layouts.
 - ii) Lean network.

Or

- b) Discuss the future of lean manufacturing.

(for candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2012

Business administration

MANAGEMENT CONTROL SYSTEMS

TIME: THREE HOURS

MAXIMUM : 75 MARKS

PART-A (5*5=25)

ANSWER ALL QUESTIONS

1. (a) List out the principal characteristics of a management control system

OR

- (b) Distinguish between management control and operational control

2. (a) What are the different types of controls? Illustrate with suitable examples

OR

- (b) Discuss the major responsibility of a controller

3. (a) Discuss the goal of non -profit organization

OR

- (b) Explain the characteristics features of a key variable.

4. (a) write short note on transfer pricing.

OR

- (b) What do you mean by budgetary control system? Explain the process of budgetary control in an organization.

5. (a) what do you understand by management information system? explain its significance in designing management control system in an organization.

OR

- (b) what are the characteristic of a project organization.

PART C-(5*10+50)

ANSWER ALL QUESTIONS

6. (a) Discuss the different phases of management control system.

OR

- (b) distinguish between management control and strategic planning.

7. (a) explain the features of different types of organizations in detail.

OR

- (b) write short notes on the following

(i) balanced score card

(ii) organizational climate

8. (a) explain the key variables used management control system.

OR

- (b) Discuss in the detail the various organization in incentive plans.

9. (a) What do you mean by performance measurement? Explain the requirements in an effective performance measurement system.

OR

- (b) What do you understand by investment centers? Explain the methods used for measuring investment center performance.

10. (a) what are the various control issues faced by multi national corporation?

OR

- (b) explain the unique features of non-profit organization and discuss the management control system used in these organizations.

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL 2013

Business administration

MANAGEMENT CONTROL SYSTEMS

Time: three hours

Maximum: 75 marks

PART A –(5*5=25)

Answer all questions.

1.(a) List the principal characteristics of a management control system.

OR

(b) Discuss the characteristics of control.

2.(a) Define control. What are the steps involved in controlling?

OR

(b) Discuss the major responsibility of a controller.

3.(a) Discuss the goals of nonprofit organizations.

OR

(b) Explain the characteristics/features of a key variable.

4. Write short note on transfer pricing

OR

(b) What do you mean by budgetary control system? Explain the process of budgetary control in an organization.

5.(a) What do you understand by management information system? Explain its significance in designing management control system in an organization.

OR

(b) What are the characteristics of a project organization?

PART B –(5*10=50)

Answer all questions

6. (a) Discuss the different phases of management control system.

OR

(b) Distinguish between management control and strategies planning

7.(a) Explain the features of different type of organization in detail.

OR

(b) What do you mean by divisional organizational structure? Discuss.

8.(a) Explain the key variables used in management control system.

OR

(b) Discuss in detail the various organizational incentive plans.

9.(a) What do you mean by performance measurement? Explain the requirements for an effective performance measurement system.

OR

(b) What do you understand by investment centers? Explain the methods used for measuring investment center performance.

10.(a) What are the various control issues faced by Multi National corporations?

OR

(b) Explain the unique features of Non-profit organizations and discuss the management control systems used in these organizations.

(For the candidates admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2014.

Business administration – Elective

MANAGING INTERPERSONAL EFFECTIVENESS

Time: Three hours maximum : 75 marks

SECTION – A (5 X 5 =25)

Answer all questions.

1. (a) Define self knowledge. How is it developed.
(or)
(b) Discuss the strategies followed in self presentation.
2. (a) write note on the following :
(i) Proximics
(ii) Kinetics

(Or)
(b) what do you understand by deception ?how is it detected ?
3. (a) Discuss the merits and demerits of attitudinal change.

(or)
(b) Describe the conditions for promoting the consistency.
4. (a) Give an account of environmental quality. How can the environmental quality be developed?

(or)
(b) “Environment determines our behavior ” substantiate.
5. (a) explain the various impact of stress.

Or
(b) Discuss the various precautions have to take to face old aging.

SECTION – B (5X10=50)

Answer ALL questions.

6. (a) discuss the importance of impression management.

Or

(b) “ self initiative broadening one’s knowledge ‘’. – discuss.

7. (a) “ Effective communication enhance employees behavior.” – substantiate.

Or

(b) Discuss the various media used in communication.

8. (a) critically examine the factors creating stress among the workers.

Or

(b) Discuss the various problems arrive the organizational environment.

9. (a) Discuss the various organizational structure.

Or

(b) Elucidate the characteristics of tradable environment.

10.(a) How does the social psychology help improve the quality of life?

(b) How does the stress affect the workers in the work place?

S.NO .3037

P8 MBA EC 5

(For the candidates admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2014.

Business administration – Elective

MANAGING INTERPERSONAL EFFECTIVENESS

Time: Three hours maximum : 75 marks

SECTION – A (5 X 5 =25)

Answer all questions.

1. (a) Define self – perceiving. In what way it useful to the management.

Or

(b) Discuss the importance of gaining self- knowledge.

2. (a) Write note on the following

- (i) Deception
- (ii) Paralanguage

Or

(b) what is meant by proxemics? Explain its types.

3.(a) Briefly explain the qualities that make a communication persuasive.

(b) when will the qualities that make a communication persuasive.

4. (a) Give an account of social behaviour.

(b) what is crowding? How does it influence the human behavior?

5. (a) What do you contributes to a good quality of life?

(b) describe the obstacles faced by the working women in our society.

SECTION – B

Answer all questions.

6. (a) Discuss the importance of self- monitoring.

Or

(b) Explain the various strategies involved in self presentation.

7. (a) "Body language exhibits the non – verbal leakage". Discuss it with suitable examples.

OR

(b) Elucidate the various uses of non – verbal communication in health care industry.

8. (a) Explain in what ways ambience affect the behavior of a person .

OR

(b) Describe the various external factors that influence the human behavior.

9. (a) what is meant by attitude? How does it change through persuasion? Illustrate the concept with some example

OR

(b) Write detailed note on consistency and non – consistency attitude.

10.(a) Explain the various parameters of consumer behavior involved in the quality of life.

OR

(b) Write notes on:

(i) public health

(ii) aging and life quality.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration- Elective

MATERIAL MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) What are the major issues in international buying?

Or

- b) Identify the situations in which negotiations are possible.

2. a) What are the future of strategic material planning?

Or

- b) Can ' material budget' be treated as material planning?

3. a) State the procedures involved in receiving materials.

Or

- b) What are the complications regarding the disposal of surplus materials?

4. a) What are the essentials of an effective inspection?

Or

- b) Enlist the advantages of computerization in material management.

5. a) Write a note on "Outstanding" in the materials control.

Or

- b) State the claiming procedure in the case of loss of materials.

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) Explain the techniques in selecting a right source of supply of required materials.

Or

- b) Discuss the decisions regarding the timing of material purchasing.

7. a) Explain the various method of pricing issue of materials during inflation and deflation.
Or

b) Describe the principles of inventory control.

8. a) “Transportation fulfills the place utility and quality requirements “– Discuss.
Or

b) Distinguish between material planning production planning. How will you establish sustainability in material planning?

9. a) Give a detailed account on the organization materials department .Explain the steps to ensure the cheap and efficient flow of materials during the production.

Or

b) Describe the policy of a materials control.

10. Case Study.

X ltd. Purchases materials for its consumption from a source at a longer distance. Later It found a source of supply nearer to its place. Suggest the points to be classified or evaluate before considering this new source of supply.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration - Elective

OBJECT ORIENTED PROGRAMMING AND C++

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Explain straight with an example.
Or
b) Define the terms
 - i) Data abstraction and
 - ii) Encapsulation.
2. a) Write a note on refining process.
Or
b) Define the terms class and object.
3. a) Explain the implementation of interface.
Or
b) Write short notes on data modeling.
4. a) What do you mean by overriding and how it will differ from overloading?
Or
b) List out the rules for using constructors.
5. a) Define the term abstract class with an example.
Or
b) Define operator overloading and rules used for overloading operators.

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) Discuss in detail about
 - i) Run programming and
 - ii) Structured programming.

Or

- b) Explain in detail about various methods of reusing codes.
- 7. a) Explain about program concepts and interfaces.

Or

- b) Discuss in detail about object oriented design concepts.
- 8. a) Explain the importance of system analysis and design.

Or

- b) Explain object oriented design with system design.
- 9. a) Discuss about private and public inheritance with an example.

Or

- b) Implement a program using constructor to add two complex numbers.
- 10. a) Implement a program for changing significance of data member using operator overloading.

Or

- b) Briefly explain friend function and implementation.

S.No 4898

P 8 MBA 4 EB4

(for candidate admitted from 2008-2009 on words)

M B A DEGREE EXAMINATION, APRIL 2012

Business Administration- Elective.

PROJECT MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION-A

Answer ALL Questions.

1. (a) What is project management? State the steps Involved in it.
(OR)
(b) Is project management a profession? Substantiate.
2. (a) Explain the steps involved in Project Screening?
(OR)
(b) Briefly explained the silent feature of a Project Report Preparation.
3. (a) What technical aspects are considered in technical analysis?
(OR)
(b) Describes the essential of a project Methodology?
4. (a) Why does Project Planning fail?
(OR)
(b) What are critical activities?
5. (a) What is communications? What are barriers to Project communications?
(OR)
(b) What is Project Direction? when there is Need for Direction?

SECTION-B (5×10=50)

Answer ALL Question

6. (a) What is project? Explain the classification of project?

(OR)

- (b) Discuss the role and responsibilities of the project manager?

7. (a) What are factors would you take into account Identifying promising investment opportunities?

(OR)

- (b) What is Project formulation? Explain different stages of Project formulations?

8. (a) What is market and demand analysis? what are steps involved in it.

(OR)

- (b) What is a managerial appraisal? Discuss fundamentals of managerial appraisals?

9. (a) What are the fundamentals characteristics a good plan? What are the components of project planning technique?

(OR)

- (b) Define resources scheduling differences between resource leveling, resource allocation and resource smoothing.

10. Case Study:

In spite of all care and diligence from all sections most of government and private sector

Projects in India result in cost overrun ranging from 20 to 100% what could be the factors,

Do you think attribute to the cost overrun and whether all are controllable by the cost

Controller or cost engineer of a project?

S.No 3537

P 8 MBA 4 EB4

(for candidate admitted from 2008-2009 on words)

M B A DEGREE EXAMINATION, APRIL 2013

Business Administration-Elective.

PROJECT MANAGEMENT

Time: Three hours

Maximum:75 marks

SECTION-A

Answer ALL Questions.

1. (a) Define project mention its kinds.

(or)

(b) Evaluate the role of a project manager.

2. (a) How would you identify investment opportunities.

(or)

(b) Draw a detailed note on project Environment.

3. (a) Discuss three important issues that managers must consider while conducting technical analysis

(or)

(b) Explain the key issues in regards to choice of technology, Equipment and processes at the stage of formulations of DPR.

4. (a) Describe the components of a good project planning.

(or)

(b) Bring out the characteristics of project scheduling.

5. (a) What is project cost monitoring? How are project cost monitored?

(or)

(b) Compare CPM with PERT technique.

SECTION-B (5×10=50)

Answer ALL Question

6. (a) State the objectives of project management.

(or)

(b) Describes the important phases of a project life-cycle.

7. (a) Discuss the various stages of project formulations.

(or)

(b) “Project should be formulated primarily to most the needs of customers”- substantiate your answer.

8. (a) Highlight the important of market analysis of project management.

(or)

(b) Explain the essentials of a project methodology.

9. (a) Examine the various methods of time estimation in a projects.

(or)

(b) Explain project cost estimation.

10. Case Study.

A well- established financial software firm has in project running in USA. Some of the software engineers are maintaining their project India man offshore basis . Now that company was to switch over their projects from USA to India. To accomplish this, they built a team and they selected you as the project manager for that. Now answer the following Questions based on the assumption

(a) Conduct feasibility study of the project as behavioral feasibility study.

(b) Objectives and scope of the project.

(c) Expected problems in the project and its potential steps.

(d) The risk factors, impact of the risk and proper action plan against those risk.

(e) The proper organizational structure that you planned for that project.

(for candidate admitted from 2008-2009 on wards)

M B A DEGREE EXAMINATION, APRIL 2014

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION-A

Answer ALL Questions.

1. (a) What is Public relation? Explain its nature.

(or)

(b) Explain the concept of publicity with suitable examples.

2.(a) Define 'public opinion'? Explain the principal approaches to the study of public opinion.

(or)

(b) Mention the psychological factors that influence the perception of the public.

3.(a) What are the major tools in public relations?

(or)

(b) How do public relations differ from campaigning?

4(a) Discuss the various tools used in media.

(or)

(b) What is meant by interpersonal media? Explain its limitations.

5.(a) Explain the term lobbying with examples.

(or)

(b) Explain the various promotional techniques.

SECTION-B (5×10=50)

Answer ALL Question

6.(a) Describe the four models of public relations.

(or)

(b)Examine the history and development of public relations.

7.(a) Explain the procedure of preparing public key relations plan.

(or)

(b) (i) Write a note on public opinion

(ii) Discuss the major decisions in involved public relations.

8.(a) Why there is a need for global public relations? What are its challenges?

(or)

(b) Discuss the current trends in PR problem

9.(a) Explain the concept classification are a functions of media.

(or)

(b) Elaborately discusses the various public media.

10.(a) Differentiate between advertising and public relations.

(or)

(b) How rumors and lobbying can be maintained.

S.No 4899

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2012

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum:75mark

SECTION-A

Answer ALL Questions.

1.(a) Define public relations.

(or)

(b) What is the role of Public Relations?

2. (a) what do you meant by Public relation plan?

(or)

(b) write a detailed note on public relation are marketing mix.

3. (a) Write a short note on public opinion research?

(or)

(b) Explain the different between public relation and remains?

4. (a) List out the tools use in media.

(or)

(b) Describe the significance of company literature.

5. (a)Describe the significance of tournament public relations.

(or)

(b)Discuss the different types of promotional techniques.

SECTION-B (5×10=50)

Answer ALL Question

6.(a) Examine the history of Public Relations.

(or)

(b) Write a note on Public Relations associations.

7. (a) How do you prepare Public Relation plan?

(or)

(b) Explain the psychological factors that affect the perception of the public.

8.(a) Enumerate the steps involved in public relations process.

(or)

(b) Discuss the current trends in PR profession.

9. (a) Discuss elaborately on the various type of company literature .

(or)

(b) Explain the important of promotional public relations?

10. (a) Discuss in detail the management of issues public relation.

(or)

(b) Write elaborately on lobbying and relation management.

S.No 3032

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

M B A DEGREE EXAMINATION, APRIL 2015

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum:75marks

SECTION A

ANSWER ALL QUESTION

1.(a) Write history of PR .

(or)

(b) Write about PR associations.

2.(a) Explain about psychological factors affect perception of public.

(or)

(b) Write about decision making process.

3.(a) Write about public opinion research.

(or)

(b) State about public relation.

4.(a) What is documentaries? Explain.

(or)

(b) Explain company information Iralletins.

5.(a) write about estimations.

(or)

(b) How to manage rumtrafs?

SECTION B (5 X10 =50)

ANSWER ALL QUESTION

6.(a) Discuss the development of PR.

(or)

(b) Explain the rule of PR.

7.(a) Write about public opinion.

(or)

(b) Write about public thought process.

8.(a) Discuss public opinion research.

(or)

(b) Discuss the process of public relation.

9.(a) Write about films.

(or)

(b) State about company literature.

10.(a) How to position the organization through advertizing.

(or)

(b) Explain lobbying.

S.No 3538

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2013

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: 3 hrs

Maximum:75 marks

SECTION A

ANSWER ALL QUESTION

1. (a) Illustrate public relation with suitable examples.

(or)

(b) Explain the purpose of public relations.

2. (a) Write a note on “Public opinion”.

(or)

(b) Explain the significance of PR in public decision making process.

3.(a) Write short notes on public opinion research.

(or)

(b) Explain the legal issues in public relations.

4. (a) How does the serve as a public relation.

(or)

(b) How does public relations differ from campaigns.

5. (a) Exclusions are helpful for public relation do you agree? Why ?

(or)

(b)Write about notes on lobbying?

SECTION B(5x 10=50)

ANSWER THE QUESTION

6.(a) Examine the history and development of public relations.

(or)

(b) Discuss the public relation associations.

7.(a) Public relation is a social philosophy of management- Discuss?

(or)

(b) Explain the psychological factors that affect the perception of the public.

8. (a) Enumerate the steps involved in public relations process.

(or)

(b) Discuss the current trends in PR preferences.

9. (a) Media practitioners and PR practitioners are mutually dependent-Justify.

(or)

(b) Elaborately discuss the various tools of media.

10. (a) critically examine the role of the linked communication system on public relation with to new information and communication technology.

(or)

(b) Discuss about the various adverting and promotional techniques.

(for candidate admitted from 2008-2009 on words)

M B A DEGREE EXAMINATION, APRIL 2012

Business Administration- Elective.

PROJECT MANAGEMENT

Time: Three hours

Maximum:75 marks

SECTION-A

Answer ALL Questions.

1. (a) What is project management? State the steps Involved in it.
(OR)
(b) Is project management a profession? Substantiate.
2. (a) Explain the steps involved in Project Screening?
(OR)
(b) Briefly explained the silent feature of a Project Report Preparation.
3. (a) What technical aspects are considered in technical analysis?
(OR)
(b) Describes the essential of a project Methodology?
4. (a) Why does Project Planning fail?
(OR)
(b) What are critical activities?
5. (a) What is communications? What are barriers to Project communications?
(OR)
(b) What is Project Direction? when there is Need for Direction?

SECTION-B (5×10=50)

Answer ALL Question

6. (a) What is project? Explain the classification of project?
(OR)
(b) Discuss the role and responsibilities of the project manager?

7. a) What are factors would you take into account Identifying promising investment opportunities?

(OR)

(b) What is Project formulation? Explain different stages of Project formulations?

8. (a) What is market and demand analysis? what are steps involved in it.

(OR)

(b) What is a managerial appraisal? Discuss fundamentals of managerial appraisals?

9. (a) What are the fundamentals characteristics a good plan? What are the components of project planning technique?

(OR)

(b) Define resources scheduling differences between resource leveling, resource allocation and resource smoothing.

10. Case Study:

In spite of all care and diligence from all sections most of government and private sector

Projects in India result in cost overrun ranging from 20 to 100% what could be the factors,

Do you think attribute to the cost overrun and whether all are controllable by the cost

Controller or cost engineer of a project?

(for candidate admitted from 2008-2009 on words)

M B A DEGREE EXAMINATION, APRIL 2013

Business Administration-Elective.

PROJECT MANAGEMENT

Time: Three hours

Maximum:75 marks

SECTION-A

Answer ALL Questions.

1. (a) Define project mention its kinds.

(or)

(b) Evaluate the role of a project manager.

2. (a) How would you identify investment opportunities.

(or)

(b) Draw a detailed note on project Environment.

3. (a) Discuss three important issues that managers must consider while conducting technical analysis

(or)

(b) Explain the key issues in regards to choice of technology, Equipment and processes at the stage of formulations of DPR.

4. (a) Describe the components of a good project planning.

(or)

(b) Bring out the characteristics of project scheduling.

5. (a) What is project cost monitoring? How are project cost monitored?

(or)

(b) Compare CPM with PERT technique.

SECTION-B (5×10=50)

Answer ALL Question

6. (a) State the objectives of project management.

(or)

(b) Describes the important phases of a project life-cycle.

7. (a) Discuss the various stages of project formulations.

(or)

(b) “Project should be formulated primarily to most the needs of customers”- substantiate your answer.

8. (a) Highlight the important of market analysis of project management.

(or)

(b) Explain the essentials of a project methodology.

9. (a) Examine the various methods of time estimation in a projects.

(or)

(b) Explain project cost estimation.

10. Case Study.

A well- established financial software firm has in project running in USA. Some of the software engineers are maintaining their project India man offshore basis . Now that company was to switch over their projects from USA to India. To accomplish this, they built a team and they selected you as the project manager for that. Now answer the following Questions based on the assumption

- a) Conduct feasibility study of the project as behavioral feasibility study.
- b) Objectives and scope of the project.
- c) Expected problems in the project and its potential steps.
- d) The risk factors, impact of the risk and proper action plan against those risk.
- e) The proper organizational structure that you planned for that project.

(for candidate admitted from 2008-2009 on wards)

M B A DEGREE EXAMINATION, APRIL 2014

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum:75marks

SECTION-A

Answer ALL Questions.

1. (a) What is Public relation? Explain its nature.

(or)

(b) Explain the concept of publicity with suitable examples.

2.(a) Define 'public opinion'? Explain the principal approaches to the study of public opinion.

(or)

(b) Mention the psychological factors that influence the perception of the public.

3.(a) What are the major tools in public relations?

(or)

(b) How do public relations differ from campaigned?

4(a) Discuss the various tools used in media.

(or)

(b) What is meant by interpersonal media? Explain its limitations.

5.(a) Explain the term lobbying with examples.

(or)

(b) Explain the various promotional techniques.

SECTION-B (5×10=50)

Answer ALL Question

6.(a) Describe the four models of public relations.

(or)

(b)Examine the history and development of public relations.

7.(a) Explain the procedure of preparing public key relations plan.

(or)

(b) (i) Write a note on public opinion

(ii) Discuss the major decisions in involved public relations.

8.(a) Why there is a need for global public relations? What are its challenges?

(or)

(b) Discuss the current trends in PR problem

9.(a) Explain the concept classification are a functions of media.

(or)

(b) Elaborately discusses the various public media.

10.(a) Differentiate between advertising and public relations.

(or)

(b) How rumors and lobbying can be maintained.

S.No 4899

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2012

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum:75mark

SECTION-A

Answer ALL Questions.

1.(a) Define public relations.

(or)

(b) What is the role of Public Relations?

2. (a) what do you meant by Public relation plan?

(or)

(b) write a detailed note on public relation are marketing mix.

3. (a) Write a short note on public opinion research?

(or)

(b) Explain the different between public relation and remains?

4. (a) List out the tools use in media.

(or)

(b) Describe the significance of company literature.

5. (a)Describe the significance of tournament public relations.

(or)

(b)Discuss the different types of promotional techniques.

SECTION-B (5×10=50)

Answer ALL Question

6.(a) Examine the history of Public Relations.

(or)

(b) Write a note on Public Relations associations.

7. (a) How do you prepare Public Relation plan?

(or)

(b) Explain the psychological factors that affect the perception of the public.

8.(a) Enumerate the steps involved in public relations process.

(or)

(b) Discuss the current trends in PR profession.

9. (a) Discuss elaborately on the various type of company literature .

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(b) Explain the important of promotional public relations?

10. (a) Discuss in detail the management of issues public relation.

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S.No 3032

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

M B A DEGREE EXAMINATION, APRIL 2015

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: Three hours

Maximum:75marks

SECTION A

ANSWER ALL QUESTION

1.(a) Write history of PR .

(or)

(b) Write about PR associations.

2.(a) Explain about psychological factors affect perception of public.

(or)

(b) Write about decision making process.

3.(a) Write about public opinion research.

(or)

(b) State about public relation.

4.(a) What is documentaries? Explain.

(or)

(b) Explain company information Iralletins.

5.(a) write about estimations.

(or)

(b) How to manage rumtrafs?

SECTION B (5 X10 =50)

ANSWER ALL QUSTION

6.(a) Discuss the development of PR.

(or)

(b) Explain the rule of PR.

7.(a) Write about public opinion.

(or)

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8.(a) Discuss public opinion research.

(or)

(b) Discuss the process of public relation.

9.(a) Write about films.

(or)

(b) State about company literature.

10.(a) How to position the organization through adverting.

(or)

(b) Explain lobbying.

S.No 3538

P 8 MBA 4 EC4

(for candidate admitted from 2008-2009 onwards)

MBA DEGREE EXAMINATION, APRIL 2013

Business Administration-Elective.

PUBLIC RELATIONS MANAGEMENT

Time: 3 hrs

Maximum:75 marks

SECTION A

ANSWER ALL QUESTION

1. (a) Illustrate public relation with suitable examples.
(or)
(b) Explain the purpose of public relations.
2. (a) Write a note on "Public opinion".
(or)
(b) Explain the significance of PR in public decision making process.
3. (a) Write short notes on public opinion research.
(or)
(b) Explain the legal issues in public relations.
4. (a) How does the serve as a public relation.
(or)
(b) How does public relations differ from campaigns.
5. (a) Exclusions are helpful for public relation do you agree? Why ?
(or)
(b) Write about notes on lobbying?

SECTION B(5x 10=50)

ANSWER THE QUESTION

6. (a) Examine the history and development of public relations.
(or)
(b) Discuss the public relation associations.
7. (a) Public relation is a social philosophy of management- Discuss?
(or)
(b) Explain the psychological factors that affect the perception of the public.
8. (a) Enumerate the steps involved in public relations process.
(or)
(b) Discuss the current trends in PR preferences.

9. (a) Media practitioners and PR practitioners are mutually dependent-Justify.
(or)
(b) Elaborately discuss the various tools of media.
10. (a) critically examine the role of the linked communication system on public relation with
to new information and communication technology.
(or)
(b) Discuss about the various advertizing and promotional techniques.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration- Elective

RELATIONAL DATABASE SYSTEM MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Define relational data model.

Or

(b)What do you mean by data dictionary?

2. a) Write short notes on visual basic.

Or

(b)Explain data management and control.

3. a) Discuss briefly the steps involved in designing a database.

Or

b) Discuss briefly how to set toolbars to our working style.

4. a) Explain in detail the various normal forms.

Or

b) Distinguish between primary and candidate key.

5. a) Discuss the main features of Oracle.

Or

b) Explain the procedure used for creating and manipulating table.

SECTION B (5 x 10 = 50)
Answer the ALL questions.

6. a) Discuss in detail the advantages and disadvantages of using a database system.

Or

- b) Discuss in detail the components of an E-R diagram.

7. a) Define data model. Explain the different types of data models with relevant examples.

Or

- b) With relevant examples discuss the following in SQL.

- i) Data Definition Language.
- ii) Data Manipulation Language.
- iii) Data Control Language.
- iv) Views.

8. a) What is normalization? Explain normalization techniques using functional dependencies with relevant examples.

Or

- b) With a relevant example discuss the steps involved in processing a query.

9. a) Explain in detail about triggers and procedures.

Or

- b) Differentiate client and server. Explain with an example.

10. a) Discuss the different forms in visual basic with suitable example.

Or

- b) Discuss about array and its classifications. Explain in detail about implementation of array in VB.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2014.

Business Administration- Elective

RETAIL MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) What do you mean by retailing system? Explain the components of retailing system.

Or

(b) Explain the significance of the retail industry.

2. a) What do you know about consumer behavior? Why should we study it?

Or

(b) Discuss the various approaches to study the marketing.

3. a) Describe the steps involved in choosing the retail location.

Or

b) Discuss the central place theory.

4. a) What is buying function? What are the factors affecting the buying functions?

Or

b) What do you know about retail promotion? Why is it necessary?

5. a) Write a detailed note on regional franchise. Bring out its various features.

Or

b) Explain the franchising trend in India

SECTION B (5 x 10 = 50)
Answer the ALL questions.

6. a) How do the social factors influence the retail business? – Discuss.

Or

b) Explain the advantages and disadvantages of retail websites.

7. a) Discuss the various factors influencing consumer behavior.

Or

b) Describe the various retail product approaches.

8. a) Give an account of creative display. Discuss the merits and demerits of creative display.

Or

b) Discuss the role of information technology in supply chain management.

9. a) What do you know about supply chain management.

Or

b) How do the technologies reshaping the e-business in India?

10. a) What do you know about online retail. Discuss its merits and demerits.

Or

b) Discuss the future of Indian retail business.

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2014.

Business Administration- Elective

RETAIL MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) What do you mean by retailing system? Explain the components of retailing system.

Or

(b) Explain the significance of the retail industry.

2. a) What do you know about consumer behavior? Why should we study it?

Or

(b) Discuss the various approaches to study the marketing.

3. a) Describe the steps involved in choosing the retail location.

Or

b) Discuss the central place theory.

4. a) What is buying function? What are the factors affecting the buying functions?

Or

b) What do you know about retail promotion? Why is it necessary?

5. a) Write a detailed note on regional franchise. Bring out its various features.

Or

b) Explain the franchising trend in India

SECTION B (5 x 10 = 50)
Answer the ALL questions.

6. a) How do the social factors influence the retail business? – Discuss.

Or

b) Explain the advantages and disadvantages of retail websites.

7. a) Discuss the various factors influencing consumer behavior.

Or

b) Describe the various retail product approaches.

8. a) Give an account of creative display. Discuss the merits and demerits of creative display.

Or

b) Discuss the role of information technology in supply chain management.

9. a) What do you know about supply chain management.

Or

b) How do the technologies reshaping the e-business in India?

10. a) What do you know about online retail. Discuss its merits and demerits.

Or

b) Discuss the future of Indian retail business.

S.NO.4900

P 8 MBA 4 ED 4

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration- Elective

SOFTWARE PROJECT MANAGEMENT

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Define 'System analysis and design'.

Or

(b) What is the structured system analysis ?
2. a) Write the tools used for scheduling software development activities.

Or

(b) Describe the content of a project plan.
3. a) How databases are created?

Or

b) Write a note on normalization.
4. a) Give any two approaches in identifying the activities of a project.

Or

b) Give the objectives of activity planning.
5. a) List the goal of a software project.

Or

b) What is the project quality?

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) Give an overview of system analysis and design.

Or

b) Discuss the DFD and data dictionary concepts in detail.
7. a) Explain how software implementation is done.

Or

- b) Explain the significance of post implementation reviews of a software project.
8. a) Elaborately discuss on the cost/benefit analysis of a project.

Or

- b) How project resources planning is carried out in organization?
9. a) What are the challenges and opportunities faced in managing software projects?

Or

- b) With suitable techniques explain the concepts of PERT and CPM in project scheduling.
10. a) Describe in detail any one of the software models.

Or

- b) Describe the factors that influence the quality of software product.

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL, 2013.

Business administration – Elective

WEALTH MANAGEMENT

Time : Three hours

Maximum : 75 Marks

SECTION A (5X5=25)

Answer ALL questions.

1. (a) Discuss the significance of marketing financial services.

Or

(b) Elucidate the components of services marketing mix?

2. (a) Why services quality is important in financial services?

Or

(b) Explain the debt concept in detail.

3. (a) Define 'Derivative'. What is its use?

Or

(b) What are options and futures?

4. (a) Define 'Mutual funds' What are its merits and demerits?

Or

(b) Define insurance Explain its importance.

5. (a) What is financial planning? Explain its objectives.

Or

(b) What are the various ways by which tax planning can be done?

SECTION B – (5 X10 = 50)

Answer ALL questions.

6. (a) Explain the major activities involved in the marketing of financial services.

Or

(b) Discuss any two component of services marketing mix in detail.

7. (a) In the context of financial services. How does the perception affect consumer choice?

Or

(b) Explain the derivatives trading mechanism.

8. (a) What are commodity markets? Discuss commodity trading with suitable examples.
Or
(b) How mutual funds are managed?
9. (a) Explain the characteristics of risk and return.
Or
(b) What are the basics of currency market?
10. (a) Discuss the importance of investment planning.
Or
(b) Explain the role of a wealth manager.

(For candidates admitted from 2008-2009 onwards)

M.B.A DEGREE EXAMINATION, APRIL, 2014.

Business administration – Elective

WEALTH MANAGEMENT

Time : Three hours

Maximum : 75 Marks

SECTION A (5X5=25)

Answer ALL questions.

1. (a) Explain the role of promotion in services marketing mix.

Or

- (b) What are the elements of services marketing mix?

2. (a) What are the quality standards expected in financial service?

Or

- (b) Explain the use of debt instruments in financial planning.

3. (a) Explain the term 'Derivative'.

Or

- (b) What are options and futures?

4. (a) Write a note on 'Mutual funds'.

Or

- (b) Explain the significance of insurance.

5. (a) Explain the importance of credit information.

Or

- (b) What is tax planning? How is it done?

SECTION B – (5 X10 = 50)

Answer ALL questions.

6. (a) How financial services are marketed?

Or

- b. Explain any two elements of service marketing mix in details.

7. a. Explain the concept and importance of consumer behavior.

Or

(b) Who are the operators in the derivatives market? Explain.

8. (a) How commodity markets function? Explain.

Or

(b) How mutual funds are managed?

9. (a) Explain the characteristics of risk return.

Or

(b) Discuss the concept and classification

10. 10. (a) How retirement planning is done?

i. Or

b. (b) Explain the various types of mutual funds?

S.NO.4911

P 8 MBA 4 EE 6

(For candidates admitted from 2009-2010 onwards)

M.B.A. DEGREE EXAMINATION, APRIL 2012.

Business Administration - Elective

WORLD CLASS MANUFACTURING

Time: Three hours

Maximum: 75 marks

SECTION A- (5 x 5=25)

Answer the ALL questions.

1. a) Define Facility layout.

Or

b) Define Job shop scheduling.

2. a) Write short notes on Break-down maintenance.

Or

b) Discuss briefly about the Review of operation Scheduling Process.

3. a) Describe the process of MRP.

Or

b) Discuss briefly Manufacturing Resources Planning.

4. a) What are the objectives of a good manufacturing plant layout?

Or

b) Discuss the strategic decisions in manufacturing management.

5. a) Discuss the objective of preventive maintenance.

Or

b) Explain the reliability improvement.

SECTION B (5 x 10 = 50)

Answer the ALL questions.

6. a) Explain how the effects of globalization affected Indian industry.

Or

b) Give example that have process and product layout and explain by diagram the two layouts.

7. a) Name recent trends in layouts in manufacturing organization and compare with traditional layouts.

Or

b) Competition leads to quality improvement and cost reduction. Explain with example.

8. a) Describe process of preventive maintenance .

Or

b) Explain Salient features of just-in time and its importance.

9. a) Elucidate how Japanese have successfully proved themselves as world manufactures of various business activities.

Or

b) Compare traditional purchase and modern purchase.

10. The annual requirement of a component is 300 units. X and Y are two methods of manufacturing using different tooling and fixtures . Operating out of machine is Rs. 150 per hour. Base on additional data given explain which method upon would prefer during the period of one year.

Details	Method-X	Method-Y
Fixed cost	Rs.34,000	Rs.26,000
Life	4 Months	3 Months

Tolling cost	Rs.3,500	Rs.5,000
Life	300 pcs	500 pcs
Processing time	5 mins	3 mins