

I Sem. M.B.A. Examination, January 2008
(2007-08 Scheme)

Paper – 1.5 : BUSINESS ADMINISTRATION
Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

Instruction : Calculators and tables are allowed

SECTION – A

Answer **any 6** questions. **Each** question carries **2** marks. (2×6=12)

1. a) What is dispersion ? What is the purpose of a measure of dispersion ?
- b) What is skewness ? What are the different measures of skewness ?
- c) How will you interpret the sign and magnitude of a correlation coefficient ?
- d) List the chief properties of a normal distribution.
- e) What is a sign test ? When is it used ?
- f) In which context is the Mann Whitney U Test used ?
- g) What is kurtosis ? Explain the three different curves under kurtosis.
- h) What is Binomial distribution ? What are its business applications ?

SECTION – B

Answer **any 3** questions. **Each** question carries **8** marks. (3×8=24)

2. a) If $A = \begin{vmatrix} 6 & 1 & 9 \\ 3 & 4 & 2 \\ 7 & 5 & 8 \end{vmatrix}$ and $B = \begin{vmatrix} 3 & 9 & 1 \\ 2 & 6 & 3 \\ 4 & 5 & 7 \end{vmatrix}$

find $2A + 4B$.

- b) Explain the method of moving averages in calculating the trend. What are the merits and limitations of this method ?
3. a) Fit a straight line trend by the method of least squares to the following data and project the production for the next two years : (A graph is not necessary).

Year	2002	2003	2004	2005	2006
Production in metric tons	45	45	47	48	52

P.T.O.

b) A candidate has to be selected for a managerial post with the following characteristics :

An MBA degree (probability of getting such a candidate is one in hundred).

Excellent communication skills (probability is one in fifty).

Knowledge of a foreign language (probability is one in eighty).

Experience of working as a manager (probability of getting such a candidate is one in 20).

Find the probability of getting the required candidate.

4. KMF wishes to test whether the preference pattern of Bangalore consumers for different kinds of milk is dependent on income levels. A random sample of 1200 consumers gives the following data. Use the chi square test and determine whether the preference patterns are independent of income levels.

Income	Type of milk preferred		
	Low fat	Medium fat	High fat
Low	100	225	25
Medium	125	75	150
High	75	150	275

5. a) Explain the procedure of setting up and testing a hypothesis.
 b) An aptitude test for selecting Management Trainees was conducted on 5000 candidates. The average score was 56 and the standard deviation was 24. Assuming normal distribution for the scores, find :
 a) The number of candidates whose scores exceeded 85.
 b) Candidates who scored between 65 and 70.
 c) Candidates who scored less than 50.
 d) Candidates who scored 60.
6. Find Karl Pearson's coefficient of correlation, the probable error and comment on the significance of correlation for the following data :

Advertisement expenses in 00,000 Rs.	15	18	19	20	22	24	25
Sales in 00,000 Rs.	24	26	26	27	28	28	30

SECTION - C

Answer any 2 questions. Each question carries 12 marks.

(2×12=24)

7. What is business forecasting ? Explain the various techniques of forecasting. Explain the major steps in forecasting. What are the limitations of forecasting ?
8. a) What is a decision tree ? What are the steps in decision tree analysis ?
 b) A manufacturer is faced with 2 alternatives about his products :
 A) Modify existing product or
 B) Produce and market a new product.
 The consequences of the above are :

Alternative	Initial demand Probability		Pay off on high demand
	High	Low	
A	0.6	0.4	5 lakhs
B	0.5	0.5	7 lakhs

The first stage choice leads to further choices only when the demand turns out to be low. Details of this second stage are :

I Stage choice	II Stage alternative	Final Demand	Probability	Pay off Rs. in lakhs
A	Reduce price	Low	0.3	0.4
		High	0.7	1.7
	Increase price	Low	0.8	0.6
		High	0.2	2.25
B	Reduce price	Low	0.2	0.50
		High	0.8	1.25
	Increase price	Low	1.0	0.80
		High	0	2.00

Construct a decision tree and a payoff table. Advice the manufacturer on the best course of action.

9. Construct index numbers of price from the following data by applying :

- 1) Laspeyres Method
- 2) Paasche Method
- 3) Bowley's Method
- 4) Marshal Edgeworth Method

Also find Fischer's ideal index and test it for factor reversal and time reversal tests.

Commodity	P_0	Q_0	P_1	Q_1
A	12	18	14	16
B	15	20	16	15
C	14	24	15	20
D	13	29	12	23
E	11	28	13	21

SECTION – D

Case Study

This is a **compulsory** question.

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10. Four judges of a soft skills assessment test gave the following marks to six candidates. Using ANOVA test whether there is a significant difference in

- a) the performance of the six candidates
- b) the judgement of the four judges.

Judges	Candidates					
	A	B	C	D	E	F
1	11	12	11	12	13	13
2	13	13	11	13	12	12
3	3	12	12	14	13	12
4	14	15	13	16	14	12



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I Semester M.B.A. (Day) Examination, January 2009
(2007-08 Scheme)
MANAGEMENT
1.5 : Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

Instruction : Calculators and tables are allowed.

SECTION – A

Answer any 6 questions. Each question carries 2 marks.

(2×6=12)

1. a) Distinguish between 'maxima and minima'.
- b) List out the characteristics of statistics.
- c) What are the limitations of binomial distribution ?
- d) What is decision making under uncertainty ?
- e) What are the advantages of stratified random sampling ?
- f) What is standard error ?
- g) What is index number ?
- h) What is correlation ?
- i) What is regression ?

SECTION – B

Answer any three questions. Each question carries 8 marks.

(3×8=24)

2. a) Explain addition, subtraction and multiplication of matrices with examples.
- b) From the following information determine the units to be manufactured in order to earn maximum profit.

$$T_C = 0.0008x^2 + 3.4x + 25,000 \text{ and } TR = -0.001x^2 + 25x.$$

P.T.O.



3. a) What is a statistical average ? State the properties of a good average.
- b) Five students P, Q, R, S and T are given a problem to solve. The probabilities are $P - \frac{1}{3}$, $Q - \frac{1}{5}$, $R - \frac{1}{6}$, $S - \frac{1}{8}$ and $T - \frac{1}{9}$ of solving the problem. What is the probability that the problem will be solved ?
4. a) With an example of your own, discuss the research design of a proposed survey.
- b) For a group of 20 items, $\sum X = 1452$, $\sum X^2 = 144280$ and mode = 63.7. Find the Pearsonian coefficient of skewness.
5. The mean and standard deviation of marks obtained by the candidates in a competitive examination are 50 and 15 respectively. If 1200 candidates appear for the examination, find :
- a) The number of candidates who are expected to score more than 70.
- b) The expected number of candidates who score between 60 and 75 marks.
- c) The number of candidate who may score less than 40 marks.
- d) The number of candidates who may score between 35 and 55 marks.
6. Using the following data, show that Fisher's index satisfies time reversal test and factor reversal test.

Item	2005		2007	
	Price	Quantity	Price	Quantity
P	5	6	6	7
Q	7	12	6	13
R	6	15	8	15
S	8	10	8	12



SECTION - C

Answer any two questions. Each question carries 12 marks. (2×12=24)

7. a) Explain the applications of statistics in managerial decision-making. Also discuss the limitations of statistics.

b) What is sampling ? Why is it important ? Discuss the methods of sampling.

8. A businessman has two independent investments A and B available to him, but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop or if A is successful, then take B or vice-versa. The probability of success on A is 0.7, while for B, it is 0.4. Both investments require an initial capital outlay of Rs. 20,000 and both return nothing if the venture is unsuccessful. Successful completion of A will return Rs. 30,000 (over cost), whereas successful completion of B will return Rs. 50,000 (over cost). Draw the decision tree and determine the best strategy.

9. a) ABC Ltd. gives the following information relating to the sales of refrigerators in the past ten years :

Years : 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007

Refrigerators

sold in thousands: 8 10 11 11 18 15 19 19 22 24

Fit a straight line trend by the method of least squares and estimate the sales for 2009.

b) Calculate the coefficient of correlation and the probable error and comment on the significance of correlation for the following data :

X	6	7	7	9	10	12
Y	18	16	17	19	19	21

SECTION - D
(Case Study)

This is a compulsory question.

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10. A study was carried out on the advertising methods of a brand of product. The unit sales achieved by five stores were recorded as under :

	Store A	Store B	Store C	Store D	Store E
Method - I	78	85	82	88	79
Method - II	93	87	85	85	85
Method - III	81	92	77	83	81
Method - IV	79	83	71	78	78

Calculate the F-ratio, using ANOVA and 5% level of significance. Establish whether a) four methods of advertisement produce different effects on the sales volumes and b) there is a significant difference between the sales in the different stores.



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I Semester M.B.A. (Day) Examination, March 2011
(2007-08 Scheme)
MANAGEMENT
Paper – 1.5 : Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any six** questions. Each question carries **two** marks.

(2×6=12)

1. a) List the uses of statistics.
- b) What is the sign test ?
- c) What are Index Numbers ?
- d) What is a null hypothesis ?
- e) Define Integration.
- f) What is Binomial distribution ?
- g) What is meant by level of confidence ?
- h) What is cluster sampling ?

SECTION – B

Answer **any three** questions. Each question carries **eight** marks.

(3×8=24)

2. a) Why is statistics called imposing mathematics ?
- b) Following are the marks obtained by two students 'A' and 'B' in 10 tests of 100 marks each.

Tests	1	2	3	4	5	6	7	8	9	10
A	44	80	76	48	52	72	72	51	60	54
B	48	75	54	60	63	69	72	51	57	66

Find who is better in studies and if consistency is the criterion for awarding a prize, who should get the prize ?

P.T.O.

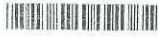


3. Using the chi square test, analyse the following data to determine whether the preference pattern of consumers for cell phones is dependent on income levels.

Cell phones	Low	Medium	High	Total
Nokia	65	90	100	255
Motorola	35	40	80	155
Ericcson	50	60	220	330
Total	150	190	400	740

4. a) In an AP of 3, 9, 15, ... find the (i) sum of the first 14 terms and (ii) the twelfth term ?
- b) P and Q play for a prize of Rs. 1,00,000. P is to throw a dice first and is to win if he throws 1. If he fails, Q is to throw and is to win if he throws 1 or 2. If he fails, P is to throw again and is to win if he throws 1, 2 or 3. Find their respective expectations.
5. The average monthly sales of 5000 firms are normally distributed. It mean and standard deviation are Rs. 36,000 and Rs. 10,000 respectively. Find :
- The number of firms the sales of which are over Rs. 40,000.
 - Percentage of firms the sale of which will be between Rs. 38,500 and 41,000.
 - The number of firms the sales of which will be between Rs. 30,000 and Rs. 40,000.
 - The number of firms the sales of which are less than Rs. 30,000.
6. Determine the regression equation X on Y and Y on X for the following data :

X	12	14	16	20	32
Y	34	40	38	42	50



SECTION – C

Answer **any two** questions. **Each** question carries **twelve** marks. (2×12=24)

- 7. a) What do you mean by sampling errors ? Explain the types of sampling errors.
- b) Illustrate skewness with diagram given $Q_1 = 18, Q_3 = 35, \text{Mode} = 21, \text{Mean} = 18$, find the coefficient of skewness.
- 8. a) Is it important for the chosen samples to be representative of the population. Using the various methods of sampling, explain how representativeness can be achieved.
- b) Elaborate on how a decision tree and the payoff-EMV concepts are useful in managerial decision making.
- 9. a) The following are the annual profits, in thousand of rupees, in a certain business :

Year	2001	2002	2003	2004	2005	2006	2007
Profits (Rs. 000)	60	72	75	65	80	85	95

- i) Use the method of Least Squares to fit a straight line to the above data.
- ii) Also make an estimate of the profits for the year 2009.
- b) Find the coefficient of correlation with the help of 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



SECTION - D

This is a compulsory question.

(1×15=15)

10. Calculate the consumer price index by the method of (a) Aggregate expenditure and (b) Family budget for the given data :

Commodity	Quantity in 2009	Price in 2009	Price in 2010
A	100	8	12.00
B	25	6	7.50
C	10	5	5.25
D	20	48	52.00
E	25	15	16.50
F	30	9	27.00



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I Semester M.B.A. (Day) Degree Examination, February 2012
(2007-08 Scheme)

MANAGEMENT

Paper – 1.5 : Bumastics

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any six** of the following. **Each** question carries **two** marks. (2×6=12)

1. a) What are transposed determinants ?
- b) What do you mean by uncertainty risk in decision tree ?
- c) Define snow ball sampling.
- d) What is difference between colinear and cojoint variable ?
- e) What do you mean by lag correlation ?
- f) Define Bay's Theorem.
- g) Differentiate between level of significance and confidence intervals.
- h) Define Anova.

SECTION – B

Answer **any three** of the following. **Each** question carries **eight** marks. (3×8=24)

2. Differentiate between parametric and non parametric test.
3. Urn – 1 contains, 5 red and 5 black balls, urn – 2 contains 4 red and 8 black balls and urn – 3 contains 3 red and 6 black balls. One urn is chosen at random and a ball is drawn. The colour of the ball is black. What is the probability that it has been drawn from urn – 3.

4. For the matrix $P = \frac{1}{3} \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{pmatrix}$ verify that $pp' = 1 = p'p$. Where p' is transpose of P and

I is the unit matrix of order 3. Hence write down the inverse of P .

5. Explain the basic assumptions on which the decision tree analysis is based. What are the critical factors the appraiser will have to take into consideration while adopting this method.

P.T.O.



6. Write short notes on the following concepts :
- Rules of addition and multiplication in theory of probability.
 - Distinction between correlation and regression.
 - Explain Skewness and kurtosis with a suitable diagram.
 - Meaning of any two non-parametric tests and their uses.

SECTION - C

Answer **any two** of the following. **Each** question carries **12** marks. (2×12=24)

7. Compute the two regression equations from the data :
- | | | | | | | |
|---|----|----|----|----|----|----|
| x | 27 | 30 | 42 | 19 | 25 | 30 |
| y | 31 | 27 | 47 | 12 | 19 | 33 |
- If $x = 28$, what is the value of y .
8. Describe various probability and non probability sampling techniques used.
9. Calculate a set of moving averages of period :
- 3
 - 5
- for the following time series data :
- 8, 11, 10, 21, 4, 9, 12, 10, 23, 5, 10, 13, 11, 26, 6 which set of moving averages is the correct one to use for obtaining a trend for the series.

SECTION - D

(1×15=15)

10. The following is the information pertaining to the sample psychological health ratings of corporate executives in the field of Banking, Manufacturing and Fashion retailing.

Banking	41	53	54	55	43
Manufacturing	45	51	48	43	39
Fashion Retailing	34	44	46	45	51

Can we consider the psychological health of corporate executives in the given three fields to be equal at 1% and 5% level of significance.

Draw the necessary hypothesis to prove your argument.



I Semester M.B.A. (Day) Degree Examination, February/March 2013
(2007-2008 Scheme)
MANAGEMENT
Paper – 1.5 : Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer any six questions. Each sub question carries two marks. (2×6=12)

1. a) What are matrices ?
- b) Define statistics.
- c) What is Baye's theorem.
- d) What is Poisson distribution ?
- e) What is decision making under risk ?
- f) What is Mann Whitney test ?
- g) What is meant by the secular trend ?
- h) What is kurtosis ?

SECTION – B

Answer any three questions. Each question carries eight marks. (3×8=24)

2. a) What is a measure of dispersion ? Discuss four important measures of spread indicating their uses.
- b) Following are the records of two players regarding their performance in cricket matches.

Score of Player A	48	52	55	60	65	45	63	70
Score of Player B	33	35	80	70	100	15	41	25

- i) Which player has scored more on an average ?
- ii) Which player is more consistent in his performance ?

P.T.O.



3. The owner of a solar heater is examining the number of solar homes started in the region in each of the last seven months. Develop the linear equation of trend by the method of least squares and find out the number of homes with solar heaters in April, May, June and July.

Month	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	March
Number of Homes	15	15	26	27	33	41	51

4. For the following contingency table :
- Construct a table of observed and expected frequencies.
 - Calculate the Chi square statistic.
 - State the Null and alternative hypothesis.
 - Using 0.05 level of significance, derive the analysis.

The data given below is regarding in favour of, against and indifferent to a National Policy on FDI.

Occupation	Favour of	Against	Indifferent	Total
Social Workers	80	30	10	120
Lawyers	70	60	20	150
University Students	50	50	30	130
Total	200	140	60	400

5. a) A can solve 90 per cent of the problems given in a book and B can solve 70 per cent. What is the probability that at least one of them will solve a problem selected at random ?



- b) If the height of 300 students is normally distributed with mean 68 inches and standard deviation 2 inches, how many students have height.
- a) Greater than 72 inches
 - b) Between 65 and 71 inches inclusive.
6. A manufacturing company produces four products A, B, C and D. Each product is made from raw materials P, Q and R. One unit of A requires 2 units of P, 1 unit of Q and 4 units of R. One unit of B requires 5 units of P and 3 units of R. One unit of C requires 4, 3 and 2 units of P, Q and R respectively and one unit of D requires 4, 1 and 2 units of P, Q and R respectively.

Find in matrix form :

- a) The total cost of materials consumed
- b) The total production cost
- c) Total sales and
- d) Total contribution.

SECTION - C

Answer any two questions. Each question carries twelve marks. (2x12=24)

7. Construct the cost of living index, calculate Fisher's ideal index and prove the time reversal and factor reversal tests for the following data :

Commodity	2010 Price	2010 Quantity	2011 Price	2011 Quantity
A	16	40	30	40
B	20	60	25	50
C	8	120	15	120
D	4	100	5	100
E	12	50	10	60



8. Perform ANOVA and decide whether the mean productivity is the same or differs among workers.

Workers	Machine Type			
	A	B	C	D
1	40	36	48	38
2	52	44	52	42
3	35	38	45	36
4	48	32	45	34
5	40	40	50	40

Test at significance levels of 5% and 1%.

9. Write short notes on the following :
- Process of testing a hypothesis.
 - Non Parametric tests
 - Decision Tree analysis
 - Importance of interpretation of statistical data in research.

SECTION - D

Compulsory case study.

(1×15=15)

10. A financial manager speculates the relationship between family incomes and their allocation for investment. You are required to calculate the coefficient of correlation for the given data and advise him regarding the significance of the calculated correlation.

Further calculate the estimating equations so that you can advise him on :

- The per cent allocation of investment that a family earning 25 lakhs annually would decide on and.
- What would be the probable annual income of a family allocating 18 percent for investment.

Annual Income in '00,000 Rs.	8	12	10	24	14	13	38	11	16
Per cent allocation for Investment	36	25	34	15	28	30	19	21	22



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I Semester M.B.A. (Day) Examination, February/March 2014
(2007-08 Scheme)
MANAGEMENT

Paper – 1.5 : Business Mathematics and Statistics

Time : 3 Hours

Max. Marks : 75

Instructions : * Calculators and appropriate statistical tables are **allowed**.
* Provide the graph sheets.

SECTION – A

Answer **any six** of the following. **Each** sub-question carries **two** marks. (6×2=12)

1. a) Define "diagonal matrix".
- b) What do you mean by the term ratio ?
- c) What is dispersion ? Why is it important ?
- d) State the classical theory of probability.
- e) What is lag and lead in correlation ?
- f) Distinguish between point estimation and interval estimation.
- g) What is meant by ANOVA ?
- h) What are the business uses of index numbers ?

SECTION – B

Answer **any three** questions. **Each** question carries **eight** marks. (3×8=24)

2. Explain the role of Statistics in managerial decision-making. Illustrate with examples.
3. What is sampling ? Explain the different methods of sampling.

P.T.O.



4. The total cost and total revenue functions for a product are :

$$TC_{(x)} = 300 + 20x + 0.1x^2 \text{ and } TR_{(x)} = 60x.$$

Using the marginal approach, determine the profit maximizing level of output.
What is the maximum profit ?

5. From the following data, find the straight line trend and forecast the production figures for the next two years of a certain company

Year	2006	2007	2008	2009	2010	2011	2012	2013
Production in '000 Kgs	64	70	82	68	75	88	90	94

A graph is necessary.

6. In a certain company training was provided to employees in interpersonal skills to avoid conflicts. From the following data determine whether the training was effective. You may use a 5 percent significance level :

Details	Involved in Conflicts	Not involved in Conflicts
Trained	884	425
Not trained	266	198

SECTION – C

Answer **any two** questions. **Each** question carries **12** marks.

(2×12=24)

7. Explain addition, subtraction, division and multiplication of matrices with examples.
8. Find the correlation coefficient and the regression equations for the following data :

X	12	24	30	45	56	70	83
Y	29	31	44	56	72	88	90



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I Semester M.B.A. Degree Examination, February 2016
(2007-2008 Scheme)

MANAGEMENT

Paper - 1.5 : Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

Instruction : Calculators and appropriate statistical tables are allowed.

SECTION - A

Answer any six sub questions. Each sub question carries two marks. (6x2=12)

1. a) What are measures of central tendency ?
- b) What is kurtosis ?
- c) What is Poisson's distribution ?
- d) What is Baye's theorem ?
- e) What is uncertainty and risk ?
- f) What is meant by confidence level ?
- g) What is lag and lead in correlation ?
- h) What is the linear trend ?

SECTION - B

Answer any three questions. Each question carries eight marks. (3x8=24)

2. What are non parametric tests ? Explain in detail with their managerial applications.

3. a) If $A = \begin{vmatrix} 6 & -3 & 2 \\ 8 & 3 & -1 \\ 1 & -4 & 2 \end{vmatrix}$, $B = \begin{vmatrix} 3 & 2 & 4 \\ 1 & 6 & 9 \\ 8 & 3 & 2 \end{vmatrix}$ and $C = \begin{vmatrix} -1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$. Find $3A + 2B - C$.

- b) In a class of 150 students appearing for a test, the mean marks they got were 60. If the variance was 36, find how many students got,
 - a) Between 70 and 75 marks ?
 - b) Between 55 and 58 marks ?
 - c) Above 72 marks ?
 - d) Less than 53 marks ?

P.T.O.



8. a) For the data given below, find the coefficient of correlation. Find the probable error and determine the significance of the correlation. Also find the range within which the correlation coefficient may lie.

Age	18	24	30	45	50	60	75
Motor Neuro Skills in digits	142	144	150	140	140	130	120

- b) Find the two regression equations for the following data. Also find the name of Y when X = 25 and 30. Find the value of X when Y = 124 and 118.

X	27	29	34	32	36	38	42
Y	110	115	112	110	120	125	130

9. a) What is sampling ? Explain the different sampling methods with their managerial applications.

- b) A team leader needs to be selected from among the members of a team. The members of the team consist of ten people with the following profits

- 1) Lady aged 40 years.
- 2) Man, aged 35 years.
- 3) Man, aged 25 years.
- 4) Man, aged 50 years.
- 5) Lady aged 30 years.
- 6) Lady, aged 38 years.
- 7) Man, aged 28 years.
- 8) Man, aged 45 years.

What is the probability that the team leader will be

- a) a lady, aged above 35 years ?
- b) a man, aged above 40 years ?
- c) a man aged less than 38 years ?



SECTION - D

This Section is **compulsory**.

(1×15=15)

10. Mr. A has three investment options, but he can undertake only one at a time :

Option A : He can open a departmental store with an investment of Rs. 10 lakhs. The cash inflow will be Rs. 25 lakhs with a probability of success of 85 per cent. If he fails, he can still salvage Rs. 5 lakhs. Upon succeeding he can invest in a bakery with an investment of Rs. 8 lakhs. His chances of success are 80 per cent with a cash inflow of Rs. 9 lakhs. If he fails he can still save Rs. 4 lakhs.

Option B : He can open a gift shop with an investment of Rs. 5 lakhs. His chances of success are 75 per cent with a cash inflow of Rs. 8 lakhs. If he fails he can still save Rs. 4 lakhs. If he succeeds he can open a second gift shop with an investment of Rs. 6 lakhs. His chances of success are 60 per cent with a cash inflow of Rs. 7 lakhs. If he fails, he recovers nothing.

Option C : He can open a shoe shop with an investment of Rs. 9 lakhs. His chances of success are high with 70 per cent and cash inflow of Rs. 13 lakhs ; Medium with 25 per cent and cash inflow of Rs. 11 lakhs and save with cash inflow of Rs. 10 lakhs. With high success, he can open another shoe shop with an investment of Rs. 6 lakhs. The chances of success are 90 per cent with a cash inflow of Rs. 8 lakhs. If he fails, he still salvages Rs. 3 lakhs. Draw up a decision tree, the Pay off Table and advice Mr. A on his actions.

Option	Investment (Rs. lakhs)	Success Probability	Cash Inflow (Rs. lakhs)	Salvage (Rs. lakhs)
A	10	0.85	25	5
B	5	0.75	8	4
C	9	0.70	13	10



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I Semester M.B.A. Degree Examination, February 2017

(2007-08 Scheme)

MANAGEMENT

Paper – 1.5 : Business Mathematics and Analytics

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any six** questions ; **each** question carries **two** marks : (6x2=12)

1. a) Define linear equation.
- b) What do you mean by 'adjoint' of a matrix ?
- c) What is multi-stage sampling ?
- d) What is conditional probability ?
- e) What is null hypothesis ?
- f) What do you mean by cluster sampling ?
- g) What is Poisson distribution ?
- h) What is judgemental sampling ?

SECTION – B

Answer **any three** questions, **each** question carries **eight** marks : (3x8=24)

2. a) Explain any five properties of determinants.
- b) Using matrix inversion method, solve the following system of equations

$$2x - y + 2z = 6$$

$$x - 2y + 3z = 6$$

$$3x - 3y - z = -6.$$

P.T.O.



3. a) A firm produces x tonnes of an item at the total cost

$$c(x) = ₹ \left(\frac{1}{10}x^3 - 9x^2 + 85x + 17 \right)$$

Find :

- i) The average cost.
 - ii) The average variable cost.
 - iii) The average fixed cost.
- b) What are various methods of collecting statistical data ? Which of these is more reliable and why ?

4. a) Below are given the figures of production (million tonnes) of a sugar factory :

Year	2003	2004	2005	2006	2007	2008	2009
Production (in tonnes)	80	90	92	83	94	99	92

- i) Fit a straight line trend to these figures.
 - ii) Plot these figures on a graph and show the trend line.
- b) Calculate Pearson's coefficient of skewness :

x :	12.5	17.5	22.5	27.5	32.5	37.5	42.5	47.5
f :	28	42	54	108	129	61	45	33

5. a) Calculate the coefficient of correlation between x and y from the following data and calculate probable error. Assume 69 and 112 as the mean value for x and y respectively.

x :	78	89	99	60	59	79	68	61
y :	125	137	156	112	107	136	123	108

- b) Explain addition and multiplication rule of probability with an example.



6. a) From the following data obtain the two regression equations and calculate the correlation coefficient :

x :	1	2	3	4	5	6	7	8	9
y :	9	8	10	12	11	13	14	16	15

Estimate the value of y which should correspond on an average to $x = 6.2$.

- b) What is chi-square test ? Explain its properties.

SECTION - C

Answer **any two** questions, **each** question carries **twelve** marks : (2x12=24)

7. In 1999 for working class people wheat was selling at an average price of ₹ 120 per 20 kg, cloth ₹ 20 per metre, house rent ₹ 300 per house and other items ₹ 100 per unit. By 2009 cost of wheat rose by ₹ 180 per 20 kg, house rent by ₹ 450 and other items double in price. The working class cost of living index for the year 2009 with 1999 as base was 160. By how much the cloth rose in price during the period ?
8. Calculate the cost of living index, Fisher's ideal index and prove the tests of consistency for the following data :

Commodity	Price in 2009	Quantity in 2009	Price in 2010	Quantity in 2010
A	16	8	18	8
B	14	6	15	7
C	12	5	10	6
D	8	9	9	9
E	16	10	20	12

9. What is sampling ? Discuss the various methods of sampling and comment on their appropriateness and usefulness.



SECTION - D

This Section is **compulsory** :

(1×15=15)

10. A restaurateur has 3 projects in hand. He can only take up one project at a time. The first project is to take up a fast food corner at an investment of ₹ 5,00,000 where the chances of success will be 0.70 with a cash inflow of ₹ 10,00,000. Failure means cash inflow of ₹ 1,00,000 in salvage furniture and utensils.
- The second project is to open an expression coffee shop with an investment of ₹ 7,00,000 where there will be a chances of success will be 0.5 with an inflow of ₹ 4,50,000, failure means an inflow of ₹ 50,000 in salvage material.
- The third project is to start a Apoorva with an investment of ₹ 12,00,000 the chances of success are 0.6 with an inflow of ₹ 14,00,000. Failure means an inflow of ₹ 5,00,000 in salvage material.
- If there is a success, the restaurateur will decide to start a Apoorva with an investment of ₹ 9,00,000, where by he can expect high demand with 0.9 probability and ₹ 11,00,000 inflow, medium demand with 0.2 probability and cashflow of ₹ 10,00,000, low demand with a cash inflow of ₹ 2,00,000.
- All the amounts have been adjusted to current value are expected to draw a decision tree and a pay off table and thereby advise the restaurateur about the best course of action.