CBCS Scheme

First Semester MBA Degree Examination, June/July 2018
Quantitative Methods

Time: 3 hrs.   Max. Marks: 80

Note: 1. *Answer any FOUR full questions from Q.No.1 to Q.No.7.*
2. *Question No. 8 is compulsory.*
3. *Provide statistical table.*

1 a. State relationship between mean median and mode. Also define measure of central tendency (MOCT).
   (02 Marks)
   b. In a bolt factory there are four machines A, B, C, D manufacturing respectively 20%, 15%, 25%, 40% of the total production. Out of these 5%, 4%, 3%, 2% are defective. If a bolt drawn at random was found defective. What is the probability that it was manufactured by A or D?
   (06 Marks)
   c. Discuss the following methods under "Decision making under uncertainty".
   i)   Maximax criterion
   ii) Maximin criterion
   iii) Minimax regret criterion
   iv) Insufficient region criterion.
   (08 Marks)

2 a. Define mutually exclusive, equally likely and exhaustive events.   **(02 Marks)**
   b. For a certain frequency table which has only been partly reproduced here, the mean was found to be 1.46.

No. of accidents :	0	1	2	3	4	5	Total
Frequency (No. of days) :	46	?	?	25	10	5	200

   Calculate the missing frequencies.
   (06 Marks)
   c. What is "Decision tree analysis"? What are its advantages? Describe various types of decision trees.
   (08 Marks)

3 a. Define the terms decision, decision theory.   **(02 Marks)**
   b. In a normal dist 15% item are below 35 and 10% items are above 65. Find the mean and standard deviation.
   (06 Marks)
   c. Lives of two models of refrigerators turned in for new models in a variation in weights compared to heights.

Life (No. of years)	No. of refrigerators	
	Model A	Model B
0 – 2	5	2
2 – 4	16	7
4 – 6	13	12
6 – 8	7	19
8 – 10	5	9
10 – 12	4	1

   i) What is the average life of model of these refrigerators?
   ii) Which model has more uniformity?
   (08 Marks)

4 a. The correlation between eating ice-cream and getting fever is resulted with r = 0.9. What is your interpretation? **(02 Marks)**

b. Quotations of index number of security prices of a certain joint stock company are given below.

Years :	2004	2005	2006	2007	2008	2009	2010
Debenture (Rs.)	97.8	99.2	98.8	98.3	98.4	96.7	97.1
Share (Rs.)	73.2	85.8	78.9	75.8	77.2	87.2	83.8

Using spearman's rank correlation method. Determine the relationship between debenture price and share price. **(06 Marks)**

c. Given the following information
   i) Draw the network
   ii) Determine total float. Free float and independent float.
   iii) Find the critical path

Activity	A	B	C	D	E	F	G	H	I
Proceeding activity	-	-	-	A	A	B, D	C	C	F, G
Duration (days)	8	10	8	10	16	17	18	14	9

(08 Marks)

5 a. What is merge and burst event. **(02 Marks)**

b. If two regression equations are given $3x + 4y = 1$. $3x + y = 4$ find mean values of x and y. Also find coefficient of correlation. **(06 Marks)**

c. The following table shows the jobs of a network along with their time estimates

	Job	1 – 2	1 – 6	2 – 3	2 – 4	3 – 5	4 – 5	6 – 7	5 – 8	7 - 8
	t_0	1	2	2	2	7	5	5	3	8
Duration (days)	t_m	7	5	14	5	10	5	8	3	17
	t_p	13	14	26	8	19	17	29	9	32

Draw the project network and find the prob of the project completing in 40 days.
$[Z_{0.05}(0.8) = 0.2881]$ **(08 Marks)**

6 a. Define probability and also state rules of probability. **(02 Marks)**

b. In a factory employing 3000 persons, 5% earn less than Rs.150 per day, 580 earn form Rs. 150 to Rs. 200 per day, 30% earn from Rs. 200 to Rs. 250 per day, 500 earn from Rs.250 to Rs. 300 per day, 20% earn from Rs. 300 to Rs. 350 per day and rest earn Rs. 350 or more per day. What is the median wage and model wage. **(06 Marks)**

c. The following data relate to advertising expenditure (in lakhs) and their corresponding sales (in crores)

Advertising Exp : 10 12 15 23 20
Sales : 14 17 23 25 21

Estimate : i) Sales corresponding to advertise expenditure Rs. 30 lakhs
         ii) The advertise expenditure for a sales target of Rs. 35 crores. **(08 Marks)**

7 a. What is meant by correlation analysis? What are the types of correlation? (02 Marks)

b. The probability that a pen manufactured by a factory be defective is 1/10. If 12 such pens are manufactured what is the probability that
   i) Exactly 2 are defective
   ii) At least two are defective. (06 Marks)

c. A compnay manufacturing air coolers has two plants located at Bombay and Calcutta with a weekly capacity of 200 units and 100 units respectively. The company supplies air coolers to its 4 showrooms situated at Ranchi, Dehli, Lucknow and Kanpur which have a demand of 75, 100, 100 and 30 units respectively. The cost per unit (in Rs.) is shown in the following table.

Plants	Ranchi	Dehli	Lucknow	Kanpur
Bombay	90	90	100	100
Calcutta	50	70	130	85

Plan the production programme so as to minimize the total cost of transportation by
   i) Least cost method and
   ii) North west corner rule. (08 Marks)

8 **Compulsory : Case Study**

a. An animal feed company must produce 200kg of a mixture consisting of ingredients x_1 and x_2. The ingredients x_1 costs Rs. 3 per kg and x_2 costs Rs. 5 per kg. Not more than 80kg of x_1 can be used and atleast 60kg of x_2 must be used. Find the minimum cost mixture. (04 Marks)

b. Use graphical method to solve the following LPP.

Minimise $Z = 40x_1 + 24x_2$

$$20x_1 + 50x_2 \geq 4,800$$

$$80x_1 + 50x_2 \geq 7,200$$

$$x_1, x_2 \geq 0.$$ (04 Marks)

c. i) What is Transportation problem?
   ii) What do you mean by degeneracy in transportation problem? How to overcome it to solve the problem.
   iii) Also state the conditions for optimality in transportation problem. (04 Marks)

d. Find the basic feasible solution for the following transportation problem by using vogels approximation method (VAM)

Destination \ Origin	D_1	D_2	D_3	D_4	Supply
C_1	11	13	17	14	250
O_2	16	18	14	10	300
O_3	21	24	13	10	300
Demand	200	225	275	250	950

(04 Marks)

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