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16/17MBA14

First Semester MBA Degree Examination, Dec.2018/Jan.2019
Quantitative Methods

Time: 3 hrs.

Max. Marks:80

Note: 1. *Answer any Four questions from Q.No. 1 to Q.No. 7.*
2. *Question No. 8 is compulsory.*
3. *Scientific Calculator allowed.*

1 a. What is a Random Variable What are the types of it? **(02 Marks)**
   b. Following is the distribution of marks in Quantitative methods by 50 students : **(06 Marks)**

Marks (more than) :	0	10	20	30	40	50
No. of students :	50	46	40	20	10	3

   Calculate the median marks.
   c. From the following data obtain the two regression equations : **(08 Marks)**

Sales :	91	97	108	121	67	124	51	73	111	57
Purchases :	71	75	69	97	70	91	39	61	80	47

2 a. What is a Decision tree? **(02 Marks)**
   b. Ten unbiased coins are tossed simultaneously. Find the probability of obtaining :
      i) Exactly 6 heads   ii) No head   iii) Not more than 3 heads. **(06 Marks)**
   c. The table gives the frequency distribution of food expenditure per family per month among the working class families in two locations. Find the standard deviation and co-efficient of variance. The expenditure pattern in which locality is more consistent.

Range of Expenditure (in thousand rupees/week)	No. of Families	
	Place A	Place B
15 – 19	25	40
20 – 24	280	260
25 – 29	300	400
30 – 34	200	210
35 – 39	60	70
40 - 44	35	20

   (08 Marks)

3 a. The mean age of combined group of men and women is 30 years. If mean age of group of men is 32 yrs and that of group of women is 27 yrs. Find the percentage of men and women. **(02 Marks)**
   b. Explain the different types of decision making environment. **(06 Marks)**
   c. Find the initial basic feasible solution for the given transportation problem using North west corner and Least cost method.

   Distribution Centre

		D₁	D₂	D₃	D₄	Supply
Plant	P₁	2	3	11	7	6
	P₂	1	0	6	1	1
	P₃	5	8	15	9	10
	Demand	7	5	3	2	

   (08 Marks)

4 a. What is an unbalanced transportation problem?   (02 Marks)
   b. What is Correlation Analysis? What are the different types of correlation?   (06 Marks)
   c. The daily wages of 1000 workers are normally distributed around a mean of Rs 70 and with
      σ of Rs 5. Estimate the number of workers whose daily wages will be
      i)   Between Rs 70 & 72   ii) Between Rs 69 & 72
      iii) More than Rs 75   iv) Less than Rs 63.
      Given $P(0 < Z < 0.2) = 0.0793$, $P(0 < Z < 0.4) = 0.1554$, $P(0 < Z < 1) = 0.3413$,
      $P(0 < Z < 1.4) = 0.4192$.   (08 Marks)

5 a. What is a Scattered diagram?   (02 Marks)
   b. Draw a network using the following information regarding activities and duration. Also find
      the critical path and total duration of the project.

Activity	A	B	C	D	E	F	G
Immediate predecessor activity	-	-	B	B	B	E	A, D, C
Duration (weeks)	12	10	6	5	8	4	13

                                                                                             (06 Marks)
   c. What is Decision theory? Explain the steps of decision making process.   (08 Marks)

6 a. What are Looping and dangling errors in network?   (02 Marks)
   b. From the following table, calculate the co-efficient of correlation by Karl Pearson Method.

x :	6	2	10	4	8
y :	9	11	?	8	7

      Arithmetic mean of x & y series are 6 & 8 respectively.   (06 Marks)
   c. A manufacturer produces two different models x & y of the same product. Model x makes a
      contribution of Rs 50 per unit and model y Rs 30 per unit, towards total profit. Raw
      materials r_1 and r_2 are required for production. At least 18 kgs of r_1 and 12 kgs of r_2 must be
      used daily. Also atmost 34 hours of labour are to be utilized. A quantity of 2kg of r_1 is
      needed for model x and 1 kg of r_1 for model y. For each of x and y ; 1 kg of r_2 is required. It
      takes 3 hours to manufacture model x and 2 hours to manufacture model y. How many units
      of each model should be produced in order to maximize the profit? Use graphical method to
      solve the problem.   (08 Marks)

7 a. What is a Redundant constraint?   (02 Marks)
   b. The date about the sales and advertisement expenses of a firm is given below :

	Sales (in crore Rs)	Advertisement Expenses (in crore Rs)
Mean	40	6
SD	10	1.5

      Co-efficient of correlation is 0.9.
      i) Estimate the likely sales for a proposed advertisement. Expenses of Rs 10 crores.
      ii) What should be the advertisement? Expenses if the firm proposes a sales target of 60
      crores of rupees?   (06 Marks)
   c. Find the value of mean , median and mode from the data given below :   (08 Marks)

Weights (in kgs) :	93-97	98-102	103-107	108-112	113-117	118-122	123-127	128-132
No. of students :	3	5	12	17	14	6	3	1

8 a. A firm owns facilities at seven places. It has manufacturing plants at places A, B and C with
      daily output of 500, 300 and 200 units of an item respectively. It has warehouses at places P,
      Q, R and S with daily requirements of 180, 150, 350 and 320 units respectively. Per unit
      shipping charges on different routes are given below :

To	P	Q	R	S
From A	12	10	12	13
From B	7	11	8	14
From C	6	16	11	7

The firm wants to send the output from various plants to warehouses involving minimum transportation cost. Use VAM to obtain total transportation cost. **(08 Marks)**

b. A project has the following activities and characteristics :

Activity i - j	Estimated Duration in weeks		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

i)   Draw the network diagram.
ii) Find expected time and variance.
iii) Determine the variance & standard deviation of critical path.
iv) Determine the probability that project will be completed atleast 3 weeks earlier than expected. Given $P(0 < Z < 1) = 0.3413$. **(08 Marks)**

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