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16/17MBA14

First Semester MBA Degree Examination, June/July 2019
Quantitative Methods

Time: 3 hrs.

Max. Marks:80

Note: *1. Answer any FOUR full questions from Q.No.1 to 7.*
2. Q.No. 8 is compulsory.
3. Use of Probability distribution is permitted

1 a. What is normal distribution? Write the formula to calculate its probability. **(02 Marks)**
   b. Name the various measures of central tendency. Explain the desired qualities of an ideal measure of central tendency. **(06 Marks)**
   c. Compute Arithmetic Average, Median and Mode from the following data:

Weight in kg	93-97	98-102	103-107	108-112	113-117	118-122	123-127	128-132
Number of students	3	5	12	17	14	6	3	1

(08 Marks)

2 a. What is correlation? Distinguish between positive and negative correlation with suitable examples. **(02 Marks)**
   b. 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. **(06 Marks)**
   c. From the prices X and Y of shares A and B respectively given below, state which share is more stable in value. **(08 Marks)**

Price of share A(X)	55	54	52	53	56	58	52	50	51	49
Price of share B(Y)	108	107	105	105	106	107	104	103	104	101

3 a. What do you mean by Regression Analysis give any two uses of it? **(02 Marks)**
   b. In a binomial distribution with 6 independent trials, the probability of 3 and 4 successes is found to be 0.2457 and 0.0819 respectively. Find the parameters 'p' and 'q' of the binomial distribution. **(06 Marks)**
   c. From the following data calculate Spearman's rank correlation coefficient after making adjustment for tied ranks: **(08 Marks)**

x	48	33	40	9	16	16	65	24	16	57
y	13	13	24	6	15	4	20	9	6	19

4 a. Define Dummy activity. What is the purpose of introducing dummy activity? **(02 Marks)**
   b. Discuss the difference between decision making under certainty and risk. **(06 Marks)**

c. The following table shows the number of motor registrations in a certain territory for a term of 5 years and the sale of motor tyres by a firm in that territory for the same period. Find the regression equation to estimate the sale of tyres when motor registration is known. Estimate the sale of tyres when registration is 850. **(08 Marks)**

Year	Motor registration	Number of tyres sold
1	600	1250
2	630	1100
3	720	1300
4	750	1350
5	800	1500

5 a. What is Bayesian decision rule? **(02 Marks)**

b. What are the common errors in drawing networks? **(06 Marks)**

c. Anita electric company produces two products P_1 and P_2. Products are produced and sold on weekly basis. The weekly production cannot exceed 25 for product P_1 and 35 for product P_2 because of limited available facilities. The company employs total of 60 workers. Product P_1 requires 2 man-weeks of labour, while P_2 requires one man-week of labour. Profit margin on P_1 is Rs.60 and on P_2 is Rs.40. Formulate this problem as linear programming problem and solve that using graphical method. **(08 Marks)**

6 a. Explain infeasibility with suitable example. **(02 Marks)**

b. A set of examination marks is approximately normally distributed with a mean of 75 and standard deviation of 5. If the top 5% of students get A grade and the bottom 25% get grade F. What mark is the lowest A and what mark is the highest F? **(06 Marks)**

c. The data on normal time and cost along with crashed time and cost associated with a project are shown in the following table:

Activity	Immediate Predecessor	Normal		Crash	
		Time (weeks)	Cost (Rs'000)	Time (weeks)	Cost (Rs'000)
A	-	10	20	7	30
B	-	8	15	6	20
C	B	5	10	4	14
D	B	6	11	4	15
E	B	8	9	5	15
F	E	5	5	4	8
G	A, D, C	12	3	8	4

71,000

The indirect cost is Rs.400 per day. Find the optimum duration and associated minimum project cost. **(08 Marks)**

7 a. What is linear programming? List its advantages. **(02 Marks)**

b. An assembly is to be made from two parts X and Y. Both parts must be turned on a Lathe. Y must be polished whereas X need not be polished. The sequence of activities, together with their predecessors is given below.

Activity	A	B	C	D	E	F	G	H
Description	Open work order	Get material for X	Get material for Y	Turn X on lathe	Turn Y on lathe	Polish Y	Assemble X hand Y	Pack
Predecessor Activity	-	A	A	B	B, C	E	D, F	G

Draw a network diagram of activities for the project. **(06 Marks)**

c. For a project consisting of several activities the durations and required resources for carrying out each of activities and their availabilities are given below:

Resources availability:
i) Operators = 50
ii) Equipment X = 1, Y = 1 and Z = 1

Activity	Equipment	Operators	Duration (days)
1-2	X	30	4
1-3	Y	20	3
1-4	Z	20	6
2-4	X	30	4
2-5	Z	20	8
3-4	Y	20	4
4-5	Y	20	4
4-5	X	30	6

i) Draw the network, identify critical path and compute the total float for each of the activities.
ii) Find the project completion time under the given resource constraints. **(08 Marks)**

8 a. A manufacturer wants to ship 22 loads of his product as shown below. The matrix gives the kilometers from sources of supply to the destinations.

		Destination					
		D_1	D_2	D_3	D_4	D_5	Supply
Source	S_1	5	8	6	6	3	8
	S_2	4	7	7	6	5	5
	S_3	8	4	6	6	4	9
	Demand	4	4	5	4	8	22 / 25

The shipping cost is Rs.10 per load per kilometer. What shipping schedule should be used inorder to minimize the total transportation cost? **(08 Marks)**

b. A dairy firm has 3 plants located in a state. The daily milk production at each plant is as follows:

Plant 1: 6 million liter; Plant 2 : 1 million liter; Plant 3 : 10 million liter.

Each day the firm must fulfil the needs of its 4 distribution centres. The minimum requirement of each centre is as follows:

Distribution centre 1: 7 million liter
Distribution centre 2 : 5 million liter
Distribution centre 3 : 3 million liter
Distribution centre 4 : 2 million liter

Cost in (hundreds) of rupees of shipping 1 million liter from each plant to each distribution centre is given in the following table:

	Distribution Centre			
	D_1	D_2	D_3	D_4
P_1	2	3	11	7
P_2	1	0	6	1
P_3	5	8	15	9

Find initial basic feasible solution by
i) Northwest corner rule method
ii) Vogel's approximation method. **(08 Marks)**

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