CBCS Scheme

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16MBA14

First Semester MBA Degree Examination, Dec.2016/Jan.2017
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.

1 a. What is binomial distribution? Write the formula to calculate probability. **(02 Marks)**

b. How do you explain the choice of arithmetic mean as the best measure of central tendency? Under what circumstances would it be appropriate to use median or mode? **(06 Marks)**

c. A survey was conducted to determine the age (in years) of 120 automobiles. The result of survey is as follows:

Age of auto :	0-4	4-8	8-12	12-16	16-20
Number of autos :	13	29	48	22	8

Find the median age and modal age of autos. Also find the mean age. **(08 Marks)**

2 a. Distinguish between positive, negative and zero correlation with suitable diagram. **(02 Marks)**

b. In a bolt factory machines A, B, C manufacture respectively 25%, 35% and 40% of the total productions. Of their output, 5%, 4% and 2% respectively are defective bolts. A bolt is drawn at random and is found to be defective. What is the probability that it is manufactured by i) Machine A; ii) Machine B? **(06 Marks)**

c. The following data represent the percentage of goal met by each of three sales persons over last five years:

Raman :	88	68	89	92	103
Sindhu :	76	88	90	86	79
Prasad :	104	88	118	88	123

Which salesman is more consistent and why? **(08 Marks)**

3 a. What do you mean by regression analysis? Distinguish between simple and multiple regression. **(02 Marks)**

b. The management of a photograph record company has discovered that the number of defects on records appears to follow a Poisson distribution with mean equal to 0.4.
i) What is the probability that a record selected at random will have 3 defects?
ii) If management sets a policy that records sold to customers must not have any defects, what percentage of its record production will not be made available for sales because of defects? **(06 Marks)**

c. The following data relate to the scores obtained by salesman of a company in an intelligence test and their weekly sales in thousands of rupees:

Salesman:	A	B	C	D	E	F	G	H	I
Test score:	50	60	50	60	80	50	80	40	70
Weekly sales:	30	60	40	50	60	30	70	50	60

Obtain the regression line of sales on intelligence test score of the salesmen. If the intelligence test score of a salesman is 65, what would be his expected sales? **(08 Marks)**

4 a. Illustrate merge and burst events in network analysis. **(02 Marks)**

b. Briefly explain the different types of decision making environments. **(06 Marks)**

c. Calculate Spearman's rank correlation coefficient between advertisement cost ('000 Rs) and sales (lakhs Rs) from the following data and interpret your result. **(08 Marks)**

Advertisement cost:	57	16	24	65	16	16	9	40	48	33
Sales:	19	6	9	20	4	15	6	24	13	13

5 a. What is a decision tree? What are nodes and branches? **(02 Marks)**

b. List out the differences between CPM and PERT. **(06 Marks)**

c. Anita electric company produces two products P_1 and P_2. Products are produced and sold on a weekly basis. The weekly production can not 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 week 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 a linear programming problem and solve graphically for maximum profit. **(08 Marks)**

6 a. What is a redundant constraint? Explain with a neat sketch. **(02 Marks)**

b. In a manufacturing organization with 5000 employees, the mean wage of workers is Rs.8000 per month with standard deviation of Rs.2000. Assuming normal distribution, estimate:

i) Number of workers getting salary below Rs.6000.

ii) Number of workers getting salary above Rs.10000.

iii) Number of workers getting salary between Rs.7000 and Rs.9000.

Given $P(0 < z < 1) = 0.34134$ and $P(0 < z < 0.5) = 0.19146$. **(06 Marks)**

c. Construct a network diagram for the following project whose activities, precedence relationship and duration of each activity is given below. Also find the critical path and minimum time to complete the project. **(08 Marks)**

Activities	A	B	C	D	E	F	G	H	I
Predecessor	-	-	-	A	A	B, D	C	C	F, G
Time (days)	8	10	8	10	16	17	18	14	9

7 a. Explain the assumptions of linear programming model. **(02 Marks)**

b. Particulars regarding the monthly wages paid to employees of two service organizations X and Y are as follows:

	Organization X	Organization Y
Number of employees	550	650
Average monthly wage	Rs.5000	Rs.4500
Variance of distribution of wage	900	1600

i) Which organization pays a larger amount as wage?

ii) Find the combined mean and variance of wages of two organizations. **(06 Marks)**

c. Consider the following project:

Activity	1-2	1-3	1-4	2-3	2-5	3-4	3-6	4-6	5-6
t_o	2	6	6	2	11	15	3	9	4
t_m	4	6	12	5	14	24	6	15	10
t_p	6	6	24	8	23	45	9	27	16

Determine the critical path and the expected duration of completing the project with its standard deviation. Also find the probability that project will not be completed before 60 days. $[P[0 < z < 1.5] = 0.4332]$. **(08 Marks)**

8 a. Find initial solution for the following transportation problem using i) Least cost method; ii) Vogel's approximation method.

Plant	Distribution centre			Production
	D_1	D_2	D_3	
P_1	6	4	12	10
P_2	10	6	5	80
P_3	15	16	8	70
Demand	20	50	90	

(08 Marks)

b. A solution for the following transportation problem is: $x_{13} = 10$, $x_{21} = 20$, $x_{24} = 5$, $x_{31} = 5$, $x_{32} = 10$, $x_{33} = 5$.

Factory	Destination				Supply
	D_1	D_2	D_3	D_4	
F_1	5	10	4	5	10
F_2	6	8	7	2	25
F_3	4	2	5	7	20
Demand	25	10	15	5	

i) Is this solution feasible?
ii) Is this solution optimal?
iii) Does this problem have more than one solution?
If so find all the solutions. Justify and show all.

(08 Marks)

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