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18MBA14

First Semester MBA Degree Examination, July/August 2021 Business Statistics and Analytics

Time: 3 hrs.

Max. Marks:100

Note: Answer any Five full questions.

- 1** a. List the various measures of Dispersion. (03 Marks)
 b. The mean and the standard deviation of the two groups are given below. Calculate the Combined standard deviation.

Group	Mean	S.D	n
1	60	8	50
2	55	7	50

(07 Marks)

- c. The runs scored by two batsman A and B in the last seven innings are given below :

A	10	20	30	40	50	60	70
B	3	5	6	7	9	10	12

- i) Who is the top scorer amongst the two batsman?
 ii) Which batsman is more consistent? (10 Marks)

- 2** a. Distinguish between Merge and burst event. (03 Marks)
 b. Calculate the Karl Pearson's coefficient of correlation for the following data :

X	10	20	30	40	50	60
Y	3	6	9	12	15	18

(07 Marks)

- c. For the variable x and y the regression equations are as follows :
 $7x - 3y - 18 = 0$; $4x - y - 11 = 0$.

- i) Find the Arithmetic mean of x and y.
 ii) Identify the regression equations for x on y and y on x.
 iii) Find out the regression co-efficient.
 iv) Find out the correlation co-efficient. (10 Marks)

- 3** a. What is Poisson distribution? Write the formula used to calculate Poisson distribution. (03 Marks)
 b. In a certain factory, 20% of the bolts produced by a machine are found to be defective. Determine the probability that out of 4 bolts chosen at random
 i) 1 ii) 0 iii) almost 2 bolts are defective. (07 Marks)

- c. In a certain locality, 1000 light bulbs with a mean life of 120 days are installed. The length of the life of bulbs are normally distributed with standard deviation of 20 days.

- i) How many bulbs will expire in less than 90 days?
 ii) How many bulbs will survive for more than 100 days?
 iii) How many bulbs will survive between 60 and 100 days?

The area under Normal curve for different Z are given below :

Z	1.5	1	3
Area	0.4332	0.3413	0.4987

(10 Marks)

- 4 a. Distinguish between Positive and Negative correlation. (03 Marks)
 b. Fit a Straight line trend equation by the method of Least Squares and estimate the trend values. Determine the sales for the year 1990.

Year	1981	1982	1983	1984	1985	1986	1987	1988
Sales	80	90	92	83	94	99	92	104

(07 Marks)

- c. Calculate the Mean, Median and Mode for the following data :

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	10	5	6	9	10

(10 Marks)

- 5 a. What is Seasonal Variation? List the various methods used to calculate the seasonal variations. (03 Marks)
 b. What is Time Series Analysis? Explain briefly the various components of time series analysis with suitable examples. (07 Marks)
 c. Calculate initial basic feasible solution for the following Transportation problem using Vogle's approximation method.

Origin	Destination				Supply
	D ₁	D ₂	D ₃	D ₄	
O ₁	4	4	3	1	250
O ₂	3	6	4	1	250
O ₃	1	9	3	3	500
O ₄	0	8	2	5	200
Demand	100	200	300	400	

(10 Marks)

- 6 a. What is Project Crashing? (03 Marks)
 b. A firm can produce 3 types of cloth A, B and C. Three kinds of wool are required Red, Green and Blue. One unit of length of Type A cloth needs 2 mtr of red wool and 3 mtr of blue wool. One unit of length of Type B cloth needs 3 mtr of red wool, 2 mtr of green wool and 2 mtr of blue wool. One unit of Type C cloth needs 5 mtr of green wool and 4 mtr of blue wool. The firm has a stock of 8 mtr of red, 10 mtr of green and 15mtr of blue. The firm expects a profit of Rs 5, Rs 6 and Rs 10 on cloth A, B and C respectively. Formulate this as LPP. (07 Marks)
 c. For the following data, draw the network diagram and determine the following :

Activity	A	B	C	D	E	F
Immediate predecessor	-	A	A	BC	-	E
Duration	2	3	4	6	2	8

- i) Calculate the Earliest and latest times ii) Determine the critical path.
 iii) Calculate the Total Project duration. (10 Marks)

- 7 a. In a certain distribution, if Median is 20 and Mean is 10. Calculate the value of Mode. (03 Marks)
 b. Calculate Spearman's Rank Correlation for the following Data and Interpret the result :

X	80	64	54	49	48	35	32	29	20	18	15	10
Y	36	38	39	41	27	43	41	52	51	41	40	52

(07 Marks)

- c. Compute 4 yearly moving average for the following Data and represent the values graphically : (10 Marks)

Year	1991	1992	1993	1994	1995	1996	1997	1998
Sales	36	43	43	34	44	54	34	24



- 8 a. Solve the following LPP Graphically :

$$\text{Min } Z = 6x_1 + 14x_2$$

$$\text{Subject to } 5x_1 + 4x_2 \geq 60$$

$$3x_1 + 7x_2 \leq 84$$

$$x_1 + 2x_2 \geq 18$$

$$\text{and } x_1, x_2 \geq 0.$$

(10 Marks)

- b. A project consists of seven activities, whose time estimates (in weeks) and other characteristics are given below :

Activity	Preceding activity	T_o	T_m	T_p
A	-	2	3	10
B	-	2	3	4
C	A	1	2	3
D	A	4	6	14
E	B	4	5	12
F	C	3	4	5
G	DE	1	1	7

- Show the PERT network for the project.
- Identify the Critical path and Total project duration.
- What is the probability that the project will be completed within 15 days?
[Note : $P[Z = 0.84]$ is 0.2995].

(10 Marks)
