CBCS SCHEME

USN | | | | | | | | | | |

18MBA14

First Semester MBA Degree Examination, Jan./Feb. 2023
Business Statistics and Analytics

Time: 3 hrs.   Max. Marks:100

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

1 a. Define Statistics.   (03 Marks)

b. Calculate mean deviation from mean and median for the following data :   (07 Marks)

Tax paid (in lakhs)	0 - 20	20 – 40	40 – 60	60 – 80	80 - 100
No. of Firms	14	21	36	15	11

c. The median and mode of the following marks are known to be 33.5 and 34 respectively. Three frequency values from the table are however missing. Find these missing values.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	4	16	?	?	?	6	4

N = 230   (10 Marks)

2 a. Define Time Series.   (03 Marks)

b. Explain Classification. What are the different types of Classification?   (07 Marks)

c. The number of employees, wages and variance of the wage per employees for 2 factories are given below :

Particulars	Factory A	Factory B
No. of Employees	100	150
Average wagers for Employee per month	3200	2800
Variance of the wages/employee per month	625	729

Which factory is having greater variation in the distribution of wages / employee?

(10 Marks)

3 a. Explain Merge and Burst events.   (03 Marks)

b. Explain Correlation. What are the different types of correlation?   (07 Marks)

c. The following data related to the score obtained by 9 salesmen of a Company in an intelligence test and their weekly sales in rupees in thousands.

Test Scores	50	60	50	60	80	50	80	40	70
Weekly Sales	30	60	40	50	60	30	70	50	60

i) Obtain the regression equation of sales on intelligence test scores of the salesman.
ii) The intelligence test score of a salesman is 65. What could be his expected weekly sales?   (10 Marks)

4 a. What are the components involved in the formulation of an LPP?   (03 Marks)

b. The number of defects per unit in a sample of 330 units of manufactured product was found as follows :

No. of defects	0	1	2	3	4
No. of units	214	92	20	3	1

Fit a Poisson distribution to the data $(e^{-0.439} = 0.6447)$ (07 Marks)

c. A Company has 3 operational departments (Weaving , Processing and Packing) with capacity to produce 3 different types of clothes namely A, B and C yielding a profit of Rs 2 , Rs 4 and Rs 3 per meter respectively. One meter of A requires 3 minutes in weaving, 2 minutes in processing and 1 minute in packing. Similarly 1 meter of B requires 4 minute in weaving , 3 minute in other two department. While one meter of C requires 3 minutes in each department. In a week total run time of each department is 60, 40 and 80 hrs for weaving , processing and packing department respectively. Formulate the LPP to find product mix to maximize the profit. **(10 Marks)**

5 a. What do you mean by Unbalanced Transportation problem? **(03 Marks)**
   b. Differentiate between PERT and CPM. **(07 Marks)**
   c. The sales of lathes in the last 3 years are given below. Use the method of simple average to determine the seasonal index of each month.

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
2009	16	17	19	19	24	24	21	29	30	34	34	39
2010	22	21	27	26	30	27	21	27	31	36	33	43
2011	28	28	38	39	39	33	37	37	40	50	44	56

(10 Marks)

6 a. Explain Mutually exclusive events with a suitable example. **(03 Marks)**
   b. Draw a network corresponding to the following information and find the critical path.

Activity	1-2	1-3	2-6	3-4	3-5	4-6	5-6	5-7	6-7
Duration	4	6	8	7	4	6	5	19	10

(07 Marks)

   c. Find the values of mean , median and mode from the following data :

Wts (in kgs)	93-97	98-102	103-107	108-112	113-117	118-122	123-127	128-132
f	3	5	12	17	14	6	3	1

(10 Marks)

7 a. Explain the Empirical relationship between mean , median and mode. **(03 Marks)**
   b. Calculate Spearman's rank correlation coefficient between Advertisement and Sales given below :

Advt.	39	65	62	90	82	75	25	98	36	78
Sales	47	53	58	86	62	68	60	91	51	84

(07 Marks)

   c. Solve graphically :
   Maximize $Z = 10x_1 + 15x_2$
   Subject to the constraints $2x_1 + x_2 \leq 26$
   $$2x_1 + 4x_2 \leq 56$$
   $$x_1 - x_2 \geq -5$$
   $$x_1, x_2 \geq 0.$$

(10 Marks)

8   <u>**Compulsory Question**</u> :

a. The data for a PERT is given in the following table :

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	28	45	9	27	16

    i)   Draw a network and estimate the earliest and latest event times for all modes and hence determine the critical path.

    ii)   What is the Probability that project duration will exceed 60 days?

    iii)   What are the chances of completing projects between 45 and 54 days?

b. Determine an initial basic feasible solution to the following transportation problem by using NWCM and VAM methods.

	D_1	D_2	D_3	D_4	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	950

(20 Marks)

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