Printed Page:- 05 **Subject Code:- BMBA0102**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MBA

SEM: I - THEORY EXAMINATION (2023-2024)

Subject: Business Statistics and Quantitative techniques for Managers

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Empirical relationship among mean, median and mode is (CO1) 1

(a) Mode = 3Median – 2Mean

(b) Mode = Median - Mean

(c) Mode = 3Median + 2Mean

(d) Mode = 3Median x Mean

1-b. The sum of square of the deviations is minimum about (CO1) 1

(a) Mean

(b) Mode

(c) Median

(d) None of the above

1-c. The coefficient of correlation between -x and -y is 0.7, then coefficient of correlation between x and y is (CO2) 1

(a) 0.49

(b) -0.7

(c) 0.7

(d) none of these

1-d. If the regression line is Y on X, then the variable X is known as..... (CO2) 1

(a) Dependent variable

(b) Independent variable

(c) Both a and b

(d) None of the above

1-e. Variance of the random variable (X) is defined as: (CO3) 1

(a) $E(X^2)$

(b) $E(X^2) - E(X)$

(c) $E(X^2) - [E(X)]^2$

(d) None of these

1-f. Two dice are thrown simultaneously. The probability of obtaining a total score 9 is : (CO3) 1

(a) 5/36

(b) 1/9

(c) 7/36

(d) None of these

1-g. .....is the name of method to optimize the objective function in LPP. (CO4) 1

(a) Simplex Method

(b) Least Cost Method

(c) Hungarian Method

(d) None of the above

1-h. Allocation Models are (CO4) 1

(a) Iconic models

(b) Analogue Models

(c) Symbolic Models

(d) None of the above

1-i. With the transportation technique, the initial solution can be generated in any fashion one chooses. The only restriction is that (CO5) 1

(a) The edge constraints for supply & demand are satisfied.

(b) The solution is not degenerate.

(c) The solution must be optimal.

(d) One must use the north west corner

1-j. If we were to use opportunity cost value for an unused cell to test optimality, it should be (CO5) 1

(a) Equal to zero

(b) Most negative number

(c) Most positive number

(d) Any value

2. Attempt all parts:-

2.a. Define coefficient of variation. (CO1) 2

2.b. Define linear regression. (CO2) 2

2.c. Define mutually exclusive events in probability. (CO3) 2

2.d. Write at least four application areas of linear programming problem.(CO4) 2

2.e. Write down the name of best method of finding the initial solution of a transportation problem. (CO5) 2

SECTION-B 30

3. Answer any five of the following:-

3-a. Calculate the mean deviation from mean for the following data: (CO1) 6

X	10	11	12	13	14	Total
Frequency	3	12	18	12	3	48

3-b. Find Median of following data: (CO1) 6

Age Group	0-20	20-40	40-60	60-80	80-100
Frequency	15	32	54	30	19

3-c. Calculate rank correlation coefficient from the following data: (CO2) 6

X	90	30	82	45	32	65	40	88	73	66
Y	85	42	75	68	45	63	60	90	62	58

3-d. Define Regression and write down the properties of regression coefficients.(CO2) 6

3.e. A can hit a target 3 times in 5 shots, B 2 times in 5 shots and C 3 times in 4 shots. All of them fire one shot each simultaneously at the target. What is the probability that at least two shots hit. (CO3) 6

3.f. Define LPP and also write down the assumptions of LPP. (CO4) 6

3.g. Define Assignment Problem and also write down the steps of hungarian method of Assignment Problem .(CO5) 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Find the Coefficient of Variation if goals scored by two teams A & B in a football session were as follows: (CO1) 10

No. of Goals Scored	0	1	2	3	4
No. of Matches by A	27	9	8	5	4
No. of Matches by B	17	9	5	6	3

Which team is more consistent?

4-b. Find : Quartile Deviation & Coefficient of Quartile Deviation For the following distribution: (CO1) 10

Class Interval	0-15	15-30	30-45	45-60	60-75	75-90	90-105
F	8	26	30	45	20	17	4

5. Answer any one of the following:-

5-a. From the following table calculate the coefficient of correlation by Karl Pearson's method. (CO2) 10

X	6	2	10	4	8
Y	9	11	5	8	7

5-b. Find equation of line of regression of x on y from the following data : (CO2) 10

x	1	1.5	2	2.5	3	3.5	4
y	5.3	5.7	6.3	7.2	8.2	8.7	8.4

6. Answer any one of the following:-

6-a. A random variable has the following probability mass function: (CO3) 10

x	1	2	3	4	8	9
P(x)	k	3k	5k	7k	9k	11k

Calculate the following;

a. k
b. $P(X \geq 3)$
c. $P(2<x<5)$.
d. Find expectation and variance of the distribution

6-b. In a bolt factory machines A, B and C manufacture respectively 20%, 30% and 50% of the total of its output. Of them 5, 4 and 2 per cent respectively are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine B ? (CO3) 10

7. Answer any one of the following:-

7-a. Solve the following LP problem by Simplex Method: (CO4) 10
Maximize $Z = x_1 + x_2 + 3x_3$
Subject to $3x_1 + 2x_2 + x_3 \leq 3$
$2x_1 + x_2 + 2x_3 \leq 2$
and $x_1 , x_2 , x_3 \geq 0$

7-b. Reshma wishes to mix two types of food P and Q in such a way that the vitamin contents of the mixture contain at least 8 units of vitamin A and 11 units of vitamin B. Food P costs Rs 60/kg and Food Q costs Rs 80/kg. Food P contains 3 units/kg of Vitamin A and 5 units / kg of Vitamin B while food Q contains 4 units/kg of Vitamin A and 2 units/kg of vitamin B. Formulate the LPP. Determine the minimum cost of mixture by using graphical method (CO4) 10

8. Answer any one of the following:-

8-a. a) What is the meaning of degeneracy in transportation problem. Explain the procedure to remove it . 10

b) Explain the difference between assignment problem and transportation problem.(CO5)

8-b. Find the IBFS of the given cost minimization transportation problem by using Vogel approximation method: (CO5) 10

	P	Q	R	S	Supply
A	3	5	7	4	50
B	6	8	5	2	50
C	1	9	7	3	50
Demand	20	60	30	40	