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Printed Page:-4 **Subject Code:-CMBMF0101**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MBA MF

SEM: I - THEORY EXAMINATION (2025 - 2026)

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. Variance of the 20 observation is 5. Now each observation is multiplied by 2. The resulting Variance is (CO1,K2) 1

(a) 5 (b) 100 (c) 20 (d) 10

1-b. Empirical relationship among mean, median and mode is (CO1,K1) 1

(a) Mode = 3Median – 2Mean

(b) Mode = Median - Mean

(c) Mode = 3Median + 2Mean

(d) Mode = 3Median x Mean

1-c. Regression coefficient x on y is equal to 0.09 and regression coefficient y on x is equal to 9 then value of coefficient of correlation will be (CO2,K1) 1

(a) + 0.9

(b) – 0.9

(c) 0.81

(d) 0.09

1-d. Strong positive association when(CO2,K1) 1

(a) Correlation between 0 to 0.25

(b) Correlation 0.25-0.5

(c) Correlation 0.5-0.75

(d) Correlation >0.75

1-e. A coin is biased so that its chances of landing Head is $\frac{2}{3}$. If the coin is flipped 3 times, the probability that the first 2 flips are heads and the 3rd flip is a tail is (CO3,K3) 1

(a) 4/27
(b) 1/27
(c) 4/9
(d) 2/9

1-f. Expectation of X: E(X) = 10 ,then value of E (3X – 4):(CO3,K1) 1

(a) 34 (b) 24 (c) 10 (d) 26

1-g. Operations Research attempts to find the best and ____ solution(CO4,K1) 1

(a) Optimum
(b) Perfect
(c) Degenerate
(d) None of the above

1-h. Models having risk and uncertainty are(CO4,K1) 1

(a) Deterministic
(b) Probabilistic
(c) Symbolic
(d) Allocation

1-i. The assignment problem in operations research is mainly used to (CO5,K1) 1

(a) Determine the shortest path between nodes
(b) Allocate tasks or jobs to resources in the most cost-effective way
(c) Decide the best order for performing tasks
(d) Balance workload across resources

1-j. Identify the method that is not used for finding the initial feasible solution (CO5,K1) 1

(a) NWCR (b) LCM (c) VAM (d) MODI

2. Attempt all parts:-

2.a. Define Range and Inter quartile range.(CO1,K2) 2

2.b. Prove that Correlation coefficient is the geometric mean between the regression coefficients.(CO2,K3) 2

2.c. Define dependent and independent events. (CO3,K2) 2

2.d. Discuss why simplex method is better technique than graphical method. (CO4,K2) 2

2.e. Explain the modifications required in the assignment algorithm when the objective function is of maximization instead of minimization. (CO5,K2) 2

30

SECTION-B

3. Attempt all parts:-

3.a. Answer any one of the following:-

3.a.(i) Calculate the Mode for the following distribution of monthly rent Paid by Libraries in Karnataka: (CO1,K3) 6

Monthly rent	500-1000	1000-1500	1500-2000	2000-2500	2500-3000	3000 & above
No.of Library	5	10	8	16	14	12

3.a.(ii) Distinguish between skewness and kurtosis. Explain types of skewness and kurtosis. (CO1,K2) 6

3.b. Answer any one of the following:-

3.b.(i) Explain the correlation and types of correlation.(CO2,K3) 6

3.b.(ii) Obtain both the lines of regression for the given dataset: (CO2,K3) 6

x	1	3	5	7	8	10
y	8	12	15	17	18	20

3.c. Answer any one of the following:-

3.c.(i) Explain the following terms with example: 6
a) Probability
b) Conditional probability. (CO3, K2)

3.c.(ii) Three cards are drawn successively from a well-shuffled pack of 52 playing cards. Find the probability all three cards drawn successively is ace without replacing the card after each draw.(CO3, K3) 6

3.d. Answer any one of the following:-

3.d.(i) A manufacturer produces two types of models A and B. Each model of the type A requires 4 hrs of grinding and 2 hrs of polishing; whereas each model of the type B requires 2 hrs of grinding and 5 hrs of polishing. The manufacturer has 2 grinders and 3 polishers. Each grinder works 40 hrs in a week and each polisher works 60 hours in a week. Profit on A model is 3/-. and on B model is 4/- . Whatever is produced in a week is sold in the market. How should the manufacturer allocate his production capacity to the two types of models so that he may make the maximum profit in a week. (CO4,K3) 6

3.d.(ii) Explain the different types of models used in Operations Research. (CO4,K2) 6

3.e. Answer any one of the following:-

3.e.(i) Define Unbalanced transportation problem. Discuss how to convert Unbalanced transportation problem into a balanced transportation problem. (CO5, K2) 6

3.e.(ii) Write all assumptions taken while solving the assignment problems.(CO5, K2) 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Find average life of each model of three laptops and obtain which model has better uniformity where lives of two models of laptops in a recent survey are given as:(CO1, K3) 10

Life in months	0 - 5	5 - 10	10 - 15	15 - 20	20 – 25
Model A	2	4	6	5	3
Model B	2	7	10	8	3

4-b. Find out Mean, Median from the following data:(C01,K3) 10

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	15	20	45	15	5

5. Answer any one of the following:-

5-a. From the following data collection the rank correlation coefficient after making adjustment for tied ranks. (CO2,K3) 10

X	48	33	40	9	16	16	65	24	16	57
Y	13	13	24	6	15	4	20	9	6	19

5-b. The equation of two regression lines in a correlation analysis are as follows: 10
3x+2y=26
6x+y=31
A student obtains the mean value (7, 4) and the value of correlation coefficient r=0.5, you agree with him? If not, suggest your results. (CO2,K3)

6. Answer any one of the following:-

6-a. A random variable has the following probability mass function 10

X:	0	1	2	3	4	5	6	7	8
P(X):	k	3k	5k	7k	9k	11k	13k	15k	17k

Calculate the following:
a. The value of k
b. $P(X \geq 3)$
c. $P(2 \leq X < 5)$.
d. Find expectation. (CO3, K3)

6-b. In a factory which manufactures bolts, machines A, B and C manufacture respectively 25%, 35% and 40% of the bolts. Of their outputs, 5, 4 and 2 percent are respectively defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it is manufactured by the machine A? (CO3,K3) 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. Describe the various Phases of O.R. Also, discuss the limitations of O.R. (CO4,K2) 10

8. Answer any one of the following:-

8-a. Solve the following assignment problem. Cell values represent processing cost of each job machine combination on assigning job A, B, C and D to the machines I, II, III and IV.(CO5,K3) 10

		Machine			
		I	II	III	IV
Job	A	10	12	19	11
	B	5	10	7	8
	C	12	14	13	11
	D	8	15	11	9

8-b. Find initial basic feasible solution by using VAM method of the following transportation problem.(CO5,K3) 10

	X	Y	Z	Capacity
A	8	7	3	60
B	3	8	9	70
C	11	3	5	80
DEMAND	50	80	80	210