2312E1574

Candidate's Seat No:____

IIS IMBA (NEP) Sem.3 Examination
DSC-C-IMBA-233
Business Mathematics
December-2025

Time : 2.00 Hours] **[Max.Marks : 50**

Note:
1) All questions are compulsory.
2) Attempt new question on new page.
3) Non – Programmable scientific calculator can be used.

Q-1. Attempt any FIVE of the Following: **[10]**

a) Solve the system of linear equations using substitution/elimination:
$2x + y = 10, x - y = 2$

b) Solve: $\begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix} + \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$

c) Find the value of x if the determinant of $\begin{bmatrix} x & 2 \\ 3 & 4 \end{bmatrix}$ is 10.

d) Find the solution of the inequality $4x - 7 \geq 2x + 5$.

e) Explain the importance of mathematics in business with suitable examples.

f) Solve the quadratic equation $x^2 - 6x + 5 = 0$.

g) Solve the linear equation: $7x - 5 = 3x + 11$

Q-2. Attempt any FIVE of the Following: **[10]**

a) Identify the type of the function:
(i) $4x^2 + 3x - 2.5$
(ii) $log_e 2 - 101$

b) Find the derivative of $f(x) = 5x^3 - 2x$.

c) Draw the graph of the linear function $y = 2x + 3$.

d) Evaluate: $\lim_{x \to 3} 2x - 1$

e) Find: $\int (3x^2 + 4)\, dx$

f) Calculate simple interest on ₹8,000 at 5% per annum for 2 years.

g) Find the compound amount on ₹10,000 at 6% annually for 3 years.

Q-3. Attempt any TWO of the Following: **[10]**

a) Solve the following Linear Programming Problem using the Graphical method:
Maximize $Z = 4x + 5y$
Subject to
$x + y \leq 20$
$2x + y \leq 30$
$x, y \geq 0$

b) Solve the following Linear Programming Problem using Simplex method:
Minimize $Z = 4x + 3y$
Subject to
$x + y \geq 6$
$2x + y \geq 8$
$x, y \geq 0$

P.T.O

c) A company is planning to launch a new product and has two alternatives Product A and Product B. For Product A, If market demand is high then the probability is 0.6 and the company earns a profit of ₹40,000. If market demand is low then the probability 0.4 and the company incurs a loss of ₹10,000. For Product B, If demand is high then the probability is 0.5 and the profit is ₹30,000. If demand is low then the probability is 0.5 and the loss is ₹5,000. Frame a decision tree for the problem and calculate the Expected Monetary Value (EMV) for both products. Which product should the company choose?

Q-4. Attempt any TWO of the Following: **[10]**

a) A box contains 6 red balls, 4 blue balls, and 5 green balls. Two balls are selected one after another without replacement.
(i) Find the probability that the first ball is red and the second is blue.
(ii) Find the probability that the two selected balls are of different colours.

b) The following are the number of phones sold by a shop in 6 days: 12, 18, 16, 14, 20, 10
Calculate the mean and standard deviation of the sales.

c) A company claims that the mean lifetime of its LED bulbs is 1,200 hours. A random sample of 64 bulbs showed a mean lifetime of 1,150 hours, with a known population standard deviation of 120 hours. Using a Z-test, whether the sample gives enough evidence against the company's claim.

Q-5. Attempt Following with appropriate option. **[10]**

(Attempt the question in given order and mentioned correct option for the answer with the question number, for example like:
1) – a,
2) – b, ... and so on.)

1) For minimization LPP, the objective coefficients in the simplex table are usually
   a) Positive
   b) Negative
   c) Zero
   d) Fractional

2) The dual of a minimization problem is always a
   a) Linear equation
   b) Maximization problem
   c) Minimization problem
   d) Transportation problem

3) In a decision tree, the square node represents
   a) A decision points
   b) A chance events
   c) A payoff
   d) A terminal condition

4) The value of a game with a saddle point is equal to
   a) Minimum of the row minima
   b) Maximum of the column maxima
   c) Either A or B (they are equal)
   d) None of the above

5) The sum of probabilities of all elementary events in a sample space is
   a) 0
   b) 0.5
   c) 1
   d) Depends on events

6) The measure that divides the data into two equal halves is
   a) Mean
   b) Median
   c) Mode
   d) Range

7) A function of the form $f(x) = 32^x$ is classified as
   a) Polynomial function
   b) Exponential function
   c) Logarithmic function
   d) Rational function

8) Which of the following is NOT a basic mathematical operation?
   a) Addition
   b) Subtraction
   c) Differentiation
   d) Multiplication

9) A matrix of order 2×3 contains
   a) 2 elements
   b) 3 elements
   c) 5 elements
   d) 6 elements

10) Payoff matrix is used for
   a) Differentiation
   b) Integration
   c) Decision-making under uncertainty
   d) LPP with constraints

****