

Plot No. 2, Knowledge Park-III, Greater Noida (U.P.) –201306

**POST GRADUATE DIPLOMA IN MANAGEMENT (2023-24)**  
**MID TERM EXAMINATION (TERM -III)**

Subject Name: **Decision Science**

Time: **01.00 hrs.**

Sub. Code: **PG35**

Max Marks: **20**

**Note: Section A carries 5 marks: 5 questions of 1 mark each, Section B carries 15 marks having 4 questions (with one choice) of 5 marks each.**

**SECTION- A (All Questions are Compulsory)**

- Q. 1: (A).** What is the role of Decision Science in Business Management? **(CO1, L1)**
- Q. 1: (B).** Write down the additional theorem of Probability for the two events. What is the difference between joint and mutually exclusive events? **(CO1, L2)**
- Q. 1: (C).** Calculate the Probability of  $P(A \cup B)$  if events A and B are independent. Given  $P(A) = 0.3, P(B) = 0.2$ . **(CO1, L2)**
- Q. 1: (D).** The event of drawing a Jack or a Heart card from a well-shuffled deck of playing cards. Find the Probability. **(CO1, L2)**
- Q. 1: (E).** Can the graphical method solve the three or more decision variable problems? If not, Explain. **(CO2, L3)**

**SECTION- B (Attempt any Three)**

- Q. 2.** Write down a comprehensive definition of quantitative techniques. Additionally, define the statistics and operations research techniques within quantitative techniques used for decision-making. **(CO1, L2)**

- Q. 3.** A decision matrix with cost data is given below:

Course of Action	State of the Nature			
	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
A <sub>1</sub>	1	3	8	5
A <sub>2</sub>	2	5	4	7
A <sub>3</sub>	4	6	6	3
A <sub>4</sub>	6	8	3	5

Find the best course of action with the managerial recommendation. **(CO2, L3)**

- i.** Maximin
  - ii.** MiniMin
  - iii.** Laplace
  - iv.** Minimax Regret
- Q. 4.** Solve the linear programming problem (LPP) using the graphical method and state the managerial recommendation from the optimal solution. **(CO2, L3)**

$$\text{Max } Z = 5X_1 + 3X_2 \text{ (in \$)}$$

Subject to the constraints

$$3X_1 + 5X_2 \leq 15 \text{ (in Hours)}$$

$$5X_1 + 2X_2 \leq 10 \text{ (in Hours)}$$

$$X_1, X_2 \geq 0$$

- Q. 5.** A company produces two types of products: Product A and Product B. Each unit of Product A requires 2 hours of labor and 1 hour of machine time to manufacture, while each unit of Product B requires 1 hour of labor and 3 hours of machine time. The company has a total of 100 hours of labor and 120 hours of machine time available each week. Product A sells for \$50 per unit, and Product B sells for \$40 per unit. The company wants to maximize its weekly revenue.
- i.** Formulate the appropriate Linear Programming Problem
  - ii.** Create the Initial table of the Simplex Method **(CO4, L6)**