GL BAJAJ
Institute of Management & Research, PGDM Institute
Greater Noida
FIND YOUR SPARK

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POST GRADUATE DIPLOMA IN MANAGEMENT (2022-24)
END TERM EXAMINATION (TERM- III)

Subject Name: **Decision Science**	Time: **02.00 Hrs.**
Sub. Code: **PG35**	Max Marks: **40**

Note:
All questions are compulsory. Section A carries 5 marks: 5 questions of 1 mark each, Section B carries 21 marks having 3 questions (with internal choice question in each) of 7 marks each and Section C carries 14 marks one Case Study having 2 questions of 7 marks each.

Kindly write the all the course outcomes as per your TLEP in the box given below:

CO1- To understand the fundamental concepts of Decision Science.
CO2- To apply the knowledge and skills necessary to formulate and implement business decisions under uncertainty.
CO3- To analyze and make business decisions using the tools of Decision Science.
CO4- To develop a skill to make effective decisions critical business situations.

SECTION – A

Attempt all questions. All questions are compulsory.   **1×5 = 5 Marks**

Questions	CO	Bloom's Level
Q. 1 (A): "Optimization is the process of making bad decisions, when worst is possible". Discuss this statement in the context of Decision Science.	CO1	L2
Q. 1 (B): Discuss Slack and Surplus Variable in the context of Automobile industry.		
Q. 1 (C): Differentiate between Addition Theorem and Multiplication Theorem of Probability with suitable example.		
Q. 1 (D): Explain Minimax and Maximin in the context of bargaining at Flee Market.		
Q. 1 (E): Discuss Conservative approach and Optimistic approach in decision theory.		

SECTION – B

All questions are compulsory (Each question have an internal choice. Attempt any one (either A or B) from the internal choice)   **7 x 3 = 21 Marks**

Questions	CO	Bloom's Level
Q. 2: A. Maximize $Z = 100X_1 + 60 X_2 + 40X_3$ s.t $X_1 + X_2 + X_3 < 100$ $10X_1 + 4X_2 + 5X_3 < 600$ $2X_1 + 2X_2 + 6X_3 < 300$	CO2	L3

$$X_1, X_2, X_3 \geq 0$$

OR

B. A man is known to speak the truth 2 out of 3 times. He throws a die and reports that the number obtained is a four. Find the probability that the number obtained is actually a four.

Q. 3: A. Discuss application Rule of Dominance and find the optimal solution for the following given Pay-off matrix

Player B / Player A	B1	B2	B3
A1	30	40	-80
A2	0	15	-20
A3	90	20	+50

CO3 | L4

OR

B. Find the Optimal Sequence and Idle time for Machine A and Machine B:

Job	I	II	III	IV	V
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

Q. 4: A. Explain the Queue management system at Domino's using the following concepts:
i) The input (arrival pattern)
ii) The Waiting Line (Queue)
iii) Service mechanism (service pattern)
iv) The queue discipline (Server)
v) Customer's behaviour

CO4 | L6

OR

B. Find the Optimal Assignment and Cost of the following:

Job	Employee				
	A	B	C	D	E
I	13	8	16	18	19
II	9	15	24	9	12
III	12	9	4	4	4
IV	6	12	10	8	13
V	15	17	18	12	20

SECTION – C

Read the case and answer the questions   **7×02 = 14 Marks**

Questions	CO	Bloom's Level

Q. 5: Case Study:

Scenario 1:
A company has three plants P1, P2 and P3 each producing 50, 100, 150 units of a similar product. There are five warehouses W1, W2, W3, W4 and W5 having demand of 100, 70, 50, 40, and 40 units respectively. The cost of sending one unit

from various plants to the ware house differs as given in the cost matrix. Determine the optimal transportation schedule to minimize the cost

	W1	W2	W3	W4	W5	Supply
P1	20	28	32	55	70	50
P2	48	36	40	44	25	100
P3	35	55	22	45	48	150
Demand	100	70	50	40	40	300

Scenario 2: Prisoner's Dilemma

Two bank robbers, Elizabeth and Henry, have been arrested and are being interrogated in separate rooms. The authorities have no other witnesses, and can only prove the case against them if they can convince at least one of the robbers to betray their accomplice and testify to the crime.

Each bank robber is faced with the choice to cooperate with their accomplice and remain silent or to defect from the gang and testify for the prosecution.

If they both co-operate and remain silent, then the authorities will only be able to convict them on a lesser charge resulting in one year in jail for each (1 year for Elizabeth + 1 year for Henry = 2 years total jail time).

If one testifies and the other does not, then the one who testifies will go free and the other will get five years (0 years for the one who defects + 5 for the one convicted = 5 years total).

However, if both testify against the other, each will get three years in jail for being partly responsible for the robbery (3 years for Elizabeth + 3 years for Henry = 6 years total jail time).

Answer the following questions using concepts of transportation model & game theory Game Theory and applications:

Q5 (A): Determine the optimal transportation schedule to minimize the cost.

Q5 (B): What are the ways to combat Prisoner's dilemma?

| CO3 | L4 |
| CO4 | L6 |

Mapping of Questions with Course Learning Outcome

Question Number	Bloom's Level	Cos	Marks Allocated
Q. 1:	L2	CO1	5 marks
Q. 2:	L3	CO2	7 marks
Q. 3:	L4	CO3	7 marks
Q. 4:	L6	CO4	7 marks
Q. 5:	L4, L6	CO3, CO4	14 marks