

INDIRA UNIVERSITY, PUNE

SCHOOL OF BUSINESS- MBA

Term End Examination (2025 Pattern) April- May – 2026- Semester – II

Course Name: Decision Science
Course Code: 25MBA203

Max. Marks: 50
Time: 2:30 Hrs.

Instructions

- Use of basic calculator is allowed.
- Read each question instructions carefully. (Q1, Q2 & Q3 have internal option)
- Q4 A) and B) both are mandatory
- Graph paper would not be provided. (Use scale/ruler wherever appropriate)

Q1.	Solve any one out of A) and B)	(10 Marks)	CO3																																																				
	A) A company has three Warehouses with four retail stores. The transportation cost is Rs. per unit between warehouses to retail stores is as given below. Apply the appropriate transportation method and obtain optimal solution.																																																						
	<table><tr><td></td><td>D1</td><td>D2</td><td>D3</td><td>D4</td><td>Supply</td></tr><tr><td>S1</td><td>19</td><td>30</td><td>50</td><td>10</td><td>7</td></tr><tr><td>S2</td><td>70</td><td>30</td><td>40</td><td>60</td><td>9</td></tr><tr><td>S3</td><td>40</td><td>8</td><td>70</td><td>20</td><td>18</td></tr><tr><td>Demand</td><td>5</td><td>8</td><td>7</td><td>14</td><td>34</td></tr></table>						D1	D2	D3	D4	Supply	S1	19	30	50	10	7	S2	70	30	40	60	9	S3	40	8	70	20	18	Demand	5	8	7	14	34																				
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	B) A Manufacturing Company have Four plants & Five Wholesale destinations.																																																						
	<table><tr><td>Plant</td><td colspan="5">Wholesale Destinations</td><td></td></tr><tr><td></td><td>Y1</td><td>Y2</td><td>Y3</td><td>Y4</td><td>Y5</td><td>Supply</td></tr><tr><td>X1</td><td>71</td><td>70</td><td>57</td><td>21</td><td>50</td><td>400</td></tr><tr><td>X2</td><td>55</td><td>68</td><td>97</td><td>50</td><td>53</td><td>800</td></tr><tr><td>X3</td><td>58</td><td>50</td><td>42</td><td>58</td><td>27</td><td>400</td></tr><tr><td>X4</td><td>66</td><td>51</td><td>93</td><td>35</td><td>33</td><td>400</td></tr><tr><td>Demand</td><td>280</td><td>360</td><td>460</td><td>680</td><td>220</td><td></td></tr></table>						Plant	Wholesale Destinations							Y1	Y2	Y3	Y4	Y5	Supply	X1	71	70	57	21	50	400	X2	55	68	97	50	53	800	X3	58	50	42	58	27	400	X4	66	51	93	35	33	400	Demand	280	360	460	680	220	
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	Apply all three methods (NWCM, LCM, VAM) to find the initial basic feasible solution and select which one is better.																																																						
Q2.	Solve any one out of A) and B)	(10 Marks)	CO4																																																				
	A) The company carries out the boring, assembling, painting and packaging operations in a factory of four workers																																																						

		Operation/Workers	I	II	III	IV	
		Boring	14	12	15	15	
		Assembling	21	18	18	22	
		Painting	14	17	12	14	
		Packaging	6	5	3	6	

Analyze the assignment problem and find the optimal assignment of workers and infer the optimum solution.

B) Parle Foods is engaged in sales of 5 food products. It has five production plants to five Distribution centers. Revenue per product varies according to the following table.

Plants	Kolkata	Jaipur	Bangalore	Goa	Nashik
Distribution Centers					
Pune	5	11	10	12	4
Ranchi	2	4	6	3	5
Delhi	3	12	5	14	6
Indore	6	14	4	11	7
Chennai	7	9	8	12	5

Examine the problem of assigning the Food Product to Distribution centers which maximizes the revenue and infer the optimal assignments.

Q.3	**Solve any one out of A) and B)**						**(10 Marks)**	CO5																													
A) Estimate the optimal mixed strategies for both players using the following 2×2 game. Evaluate and justify the strategic choices of each player in terms of expected payoffs and risk considerations.						----------	----------	----	----			Player B				Player A		B1	B2			A1	1	5			A2	4	2								
B) A confectioner sells confectionary items. Past data of demand per week in hundred kilograms with frequency is given below:																																					

	<table><tr><td>Demand per week (in hundred kg)</td><td>0</td><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td></tr><tr><td>Probability</td><td>0.20</td><td>0.25</td><td>0.35</td><td>0.10</td><td>0.05</td><td>0.05</td></tr></table> Simulate the demand for next 10 weeks using random numbers given below and find the average demand per week. Random numbers: 78, 59, 33, 52, 34, 12, 47, 42, 34, 55 Evaluate the results and justify managerial decisions that can be taken based on the simulated demand pattern.	Demand per week (in hundred kg)	0	5	10	15	20	25	Probability	0.20	0.25	0.35	0.10	0.05	0.05																				
Demand per week (in hundred kg)	0	5	10	15	20	25																													
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Q.4	Solve both A) and B) (20 Marks) A) Develop the following linear programming model, construct the feasible region graphically and determine the optimal solution. (10 Marks) Minimise $Z = 250x + 200y$ Subject to $6x + 4y \leq 240$, $2x + 5y \leq 150$, $4x + 3y \leq 120$, $x, y \geq 0$ (Non negativity constraints) B) A project has the following activities and other characteristics: (10 Marks) <table><tr><td>Activity</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td></tr><tr><td>Predecessor</td><td>-</td><td>-</td><td>A,B</td><td>A,B</td><td>B</td><td>C</td><td>D</td><td>F,G</td><td>F,G</td><td>E,H</td></tr><tr><td>Duration in Weeks</td><td>4</td><td>3</td><td>2</td><td>5</td><td>6</td><td>4</td><td>3</td><td>7</td><td>4</td><td>2</td></tr></table> Build the Network Diagram for the project and develop a complete project schedule. Determine: - Expected time for each activity - Earliest and latest start and finish times of each activity - Total float of each activity and identify the Critical Path - Expected duration of the project	Activity	A	B	C	D	E	F	G	H	I	J	Predecessor	-	-	A,B	A,B	B	C	D	F,G	F,G	E,H	Duration in Weeks	4	3	2	5	6	4	3	7	4	2	CO6
Activity	A	B	C	D	E	F	G	H	I	J																									
Predecessor	-	-	A,B	A,B	B	C	D	F,G	F,G	E,H																									
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