CMR INSTITUTE OF TECHNOLOGY

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Internal Assesment Test – II

Sub:	OPERATIONS RESEARCH							Code:	MBA204
Date:	07-08-2025	Duration:	90 mins	Max Marks:	50	Sem:	II	Branch:	MBA

SET – II

		Marks	OBE CO	OBE RBT
	Part A - Answer Any Two Full Questions (2* 20 = 40 marks) **Part B – Compulsory – Case Study (1*10 = 10 marks)**			
1 (a)	Explain the term Decision of a Game.	[03]	CO3	L2
(b)	Outline the importance of Game Theory.	[07]	CO3	L4
(c)	Examine the Situations of two-person zero sum pure strategy games, Concept of Saddle Point or Equilibrium point and Principle of Dominance method.	[10]	CO3	L3
2 (a)	Explain the term Minimax in Decision Th.ory.	[03]	CO3	L2
(b)	Solve the problem and Determine the optimal Provide the optimal job sequencing involving three machines M1, M2 and M3 in that order for the following data:	[07]	CO3	L3

Job		J1	J2	J3	J4	J5
Time on Machines	M1	7	12	11	9	8
	M2	8	9	5	6	7
	M3	11	13	9	10	14

(c)	Outline the case of and write the interpretation for the same. A businessman from Chennai wishes to sell his products in Bangalore. He can set up a showroom in the city or can sell through a wholesaler. Setting up a showroom will entail costs of Rs. 6,00,000 with a 55% probability of success. If the showroom succeeds, be can gain a net profit of Rs. 10,00,000 per year. If it fails, he can either shutdown the showroom or rent it out for an annual rent of Rs. 3,60,000 (for the rest of the year). The probability that he gets rent for the showroom is 40%. If he sells through a wholesaler, he incurs Rs. 3, 00,000 initial costs. The chances of selling successfully are 45% with a net profit of Rs. 5, 50,000 per year. a) Advise the businessman on the best decision. b) How is the decision tree analysis useful in business decision?	[10]	CO3	L4
3 (a)	Infer the term Payoff Matrix.	[03]	CO3	L3
(b)	Summarize the given case as given below. Consider the payoff matrix of Player A as shown in below table and solve it optimally using graphical method.	[07]	CO3	L5

PLAYER A		PLAYER B				
		1	2	3	4	5
	1	3	0	6	-1	7
	2	-1	5	-2	2	1

(c) Judge the case and formulate the Equation for the same. [10] CO4 L5

A small maintenance project consists of the following jobs, whose precedence relationships are given below:

Job	1-2	1-3	2-3	2-5	3-4
Duration (Days)	15	15	3	5	8
Job	3-6	4-5	4-6	5-6	6-7
Duration (Days)	12	1	14	3	14

From the above information, you are required to:

a) Draw an arrow diagram representing the project.
b) Find the total float for each activity.
c) Find the critical path and the total project duration.

Part B - Compulsory (01*10=10 marks)

4 **Case Study**

Analyze the case given below. [10] CO4 L4

The time estimates (in weeks) for the activities of a PERT network are given below:

Activity		Completion time (Weeks)		
Event	Event	Optimistic	Most likely	Pessimistic
1	2	1	1	7
1	3	1	4	7
1	4	2	2	8
2	5	1	1	1
3	5	2	5	14
4	6	2	5	8
5	6	3	6	15

a) Draw up the project network and identify all the paths thereby.
b) Determine the expected project length.
c) Calculate the standard deviation and variance of the project length.
d) What is the probability that the project will be completed?
   i. Atleast 4 weeks earlier that the expected time?
   ii. Not more than 4 weeks later than the expected time?
e) If the project due date is 19 weeks, what is the probability of not meeting the due date?
f) What is the probability that the project will be completed within the schedule i.e. 20 weeks?
g) Find the project duration at 90% probability.

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03	PS04
CO1:	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases.									
CO2:	Use appropriate quantitative techniques to get feasible and optimal Solutions.									
CO3:	Understand the usage of game theory, Queuing Theory and Simulation for Solving Business				1a, 1b,		1a, 1b,		2b, 2c,	

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SCHEME OF EVALUATION
Internal Assessment Test 1– Aug 2025

Sub: OPERATION RESEARCH | Code: MBA204

Date: 7/8/25 | Duration: 90mins | Max Marks: 50 | Sem: II | Branch: MBA

Note: Part A - Answer Any Two Full Questions (20*02=40 Marks)

Part B - Compulsory (01*10= 10marks)

Part	Question #		Description	Marks Distribution		Max Marks
A	1	a)	Decision as a Game Choice made by a player that affects the game's outcome.	3 M	3	20 M
		b)	Importance of Game Theory: ✓ Analyzing strategic in ✓ Improving decision ✓ Across disciplines ✓ Predicting outcomes ✓ Cooperation & conflict	3 M for listing & 4 M for Expl.	7	
		c)	✓ Two person zero sum pure strategy ✓ Saddle point ✓ Dominance Prop ✓ Equilibrium point	2.5 M for each	10	

	2	a)	Minimax in Decision Theory minimize the maximum loss or regret in a situation where the O/A depends on uncertain factors or the actions of an opponent.	3M	3	20 M
		b)	Job Sequence 1 | 4 | 5 | 2 | 3 Total Time = 72 D.F for m_1 = 25 D.F for m_2 = 37 D.F for m_3 = 15	7M	7	
		c)	Showroom 3, 10, 600 Wholesale 8 2 500	10M	10	

		a)	Payoff matrix outcomes of a decision making scenario often in game theory	3m	3	
		b)	$\begin{bmatrix} 3 & -1 \\ -1 & 2 \end{bmatrix}$ — 3m V = 5/7 — 2m A = {3/7, 4/7} B = {2/7, 0, 0, 4/7, 0} — 2m		7	20 M
3		c)	Critical path 1-2-3-4-6-7 54 Days EF = 0|3|0|5|0|10|2|0|10|0 LF = 0|3|0|5|0|10|0|0|10|0 ST = 0|3|0|5|0|10|0|0|10|0	10m	10	

B	4	a)	i) Variance = 1700 cases $\sigma = 3$; $\sigma^2 = 9$ cases ii) 9.18%. iii) 90.82%. iv) 74.86%. v) 84.13%. vi) 20.87 = 21 cases	10 M	10	10 M