

Reg. No.:



W6590

Name:

University of Kerala

Third Semester FYUGP Degree Examination, November 2025

Value Addition Courses

MATHEMATICS

UK3VACMAT201 - Project Management and Game Theory

Academic Level: 200-299

2024 Admission

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

Qn No.	Question	CL	CO
1	What is a network analysis ?	RE	1
2	Define value of game.	RE	3
3	What is pay off matrix?	UN	4
4	True or False: A Saddle point represents the Payoff value that is both the minimax and maximin value of the game.	UN	2
5	What is the use of dummy activity in project network.	UN	1
6	What is a strictly determinable game?	UN	3

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO															
7	Draw AOA network and AON net work for the activities A,B and C with the condition C must follow A and B.	UN	1															
8	Explain Minimax and Maximin principle used in the theory of game.	UN	3															
9	Compare event and activity in a network diagram	AP	2															
10	For the game with payoff matrix: <table border="1" style="margin: 10px auto; width: 60%;"> <thead> <tr> <th rowspan="2">Player A</th> <th colspan="3">Player B</th> </tr> <tr> <th>B1</th> <th>B2</th> <th>B3</th> </tr> </thead> <tbody> <tr> <th>A1</th> <td>-1</td> <td>2</td> <td>-2</td> </tr> <tr> <th>A2</th> <td>6</td> <td>4</td> <td>-6</td> </tr> </tbody> </table> <p>Determine the optimal strategies for players A and B . Also determine the value of game.</p>	Player A	Player B			B1	B2	B3	A1	-1	2	-2	A2	6	4	-6	AP	3
Player A	Player B																	
	B1	B2	B3															
A1	-1	2	-2															
A2	6	4	-6															

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO																								
11	<p>A)</p> <p>Solve the following games by using maximin (minimax) principle, whose payoff matrix are given below:</p> <p>Include in your answer:</p> <p>(i) strategy selection for each player</p> <p>(ii) the value of the gameto each player.</p> <p>Does the game have a saddle point?</p> <table border="1" style="margin: 10px auto; width: 60%;"> <thead> <tr> <th rowspan="2">Player A</th> <th colspan="4">Player B</th> </tr> <tr> <th>B₁</th> <th>B₂</th> <th>B₃</th> <th>B₄</th> </tr> </thead> <tbody> <tr> <th>A₁</th> <td>3</td> <td>-5</td> <td>0</td> <td>6</td> </tr> <tr> <th>A₂</th> <td>-4</td> <td>-2</td> <td>1</td> <td>2</td> </tr> <tr> <th>A₃</th> <td>5</td> <td>4</td> <td>2</td> <td>3</td> </tr> </tbody> </table> <p>OR</p> <p>B)</p> <p>1. What is principle of dominance? Apply dominance rule and solve the following problem.</p>	Player A	Player B				B ₁	B ₂	B ₃	B ₄	A ₁	3	-5	0	6	A ₂	-4	-2	1	2	A ₃	5	4	2	3	AP	3, 3
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12	<p>A)</p> <p>A project consists of the following activities, their immediate predecessors, and durations.</p> <p>Activity Predecessor(s) Duration (days)</p> <table border="1"> <tbody> <tr><td>A</td><td>–</td><td>4</td></tr> <tr><td>B</td><td>A</td><td>3</td></tr> <tr><td>C</td><td>A</td><td>5</td></tr> <tr><td>D</td><td>B</td><td>6</td></tr> <tr><td>E</td><td>B, C</td><td>4</td></tr> <tr><td>F</td><td>D</td><td>2</td></tr> <tr><td>G</td><td>E</td><td>3</td></tr> <tr><td>H</td><td>F, G</td><td>5</td></tr> </tbody> </table> <p>a) Draw the project network diagram clearly showing all precedence relationships.</p> <p>b) Explain the role of dummy activities if needed and identify whether any are required in this case.</p> <p>OR</p> <p>B)</p> <p>Differentiate PERT and CPM</p>				A	–	4	B	A	3	C	A	5	D	B	6	E	B, C	4	F	D	2	G	E	3	H	F, G	5	AN	2, 2																												
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14	<p>A)</p> <p>Create a network diagram for the project with activity -predecessor activity relation given below.</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Predecessor Activity</th> </tr> </thead> <tbody> <tr><td>A</td><td>-</td></tr> <tr><td>B</td><td>A</td></tr> <tr><td>C</td><td>A</td></tr> <tr><td>D</td><td>B</td></tr> <tr><td>E</td><td>B</td></tr> <tr><td>F</td><td>C</td></tr> <tr><td>G</td><td>E</td></tr> <tr><td>I</td><td>F</td></tr> <tr><td>J</td><td>F</td></tr> <tr><td>K</td><td>J</td></tr> <tr><td>L</td><td>G</td></tr> <tr><td>M</td><td>K, L</td></tr> </tbody> </table> <p>OR</p> <p>B)</p> <p>A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers.</p> <table border="1"> <thead> <tr> <th rowspan="2">Activity (i - j)</th> <th colspan="3">Estimated Duration (weeks)</th> </tr> <tr> <th>Optimistic</th> <th>Most Likely</th> <th>Pessimistic</th> </tr> </thead> <tbody> <tr><td>1 - 2</td><td>1</td><td>1</td><td>7</td></tr> <tr><td>1 - 3</td><td>1</td><td>4</td><td>7</td></tr> <tr><td>1 - 4</td><td>2</td><td>2</td><td>8</td></tr> <tr><td>2 - 5</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>3 - 5</td><td>2</td><td>5</td><td>14</td></tr> <tr><td>4 - 6</td><td>2</td><td>5</td><td>8</td></tr> <tr><td>5 - 6</td><td>3</td><td>6</td><td>15</td></tr> </tbody> </table> <p>(a) Draw the network diagram of the activities in the project.</p> <p>(b) Find the expected duration and variance for each activity.</p>	Activity	Predecessor Activity	A	-	B	A	C	A	D	B	E	B	F	C	G	E	I	F	J	F	K	J	L	G	M	K, L	Activity (i - j)	Estimated Duration (weeks)			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	CR	2, 2
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