

**2103000206030015 / 2111000306030015**  
**EXAMINATION FEBRUARY-MARCH 2024**  
**BACHELOR OF SCIENCE (SIXTH SEMESTER)**  
**OPERATION RESEARCH-II(MTH-(E.G.)-6001-OPERATION**  
**RESEARCH-II)-LEVEL 3**

[Time: As Per Schedule]

[Max. Marks: 50]

**Instructions:**

- 1. Fill up strictly the following details on your answer book**
  - a. Name of the Examination : **BACHELOR OF SCIENCE (SIXTH SEMESTER)**
  - b. Name of the Subject : **OPERATION RESEARCH-II(MTH-(E.G.)-6001-OPERATION RESEARCH-II)-LEVEL 3**
  - c. Subject Code No : **2103000206030015 / 2111000306030015**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.

Seat No:

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Student's Signature

**Q.1 (a) Attempt any two:**

**6**

- 1) Explain: Strictly determinable game, Maximin Point.
- 2) State the general form of Transportation problem.
- 3) Solve the following Assignment Problem:

12	10	8
8	9	11
11	14	12

**Q.1 (b) Attempt any one:**

**4**

- 1) Find the value of the game:

Player A	Player B	
	B <sub>1</sub>	B <sub>2</sub>
A <sub>1</sub>	-5	-2
A <sub>2</sub>	-7	-4

2) Determine the value of the game:

Player A	Player B			
	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>
A <sub>1</sub>	3	-5	0	6
A <sub>2</sub>	-4	-2	1	2
A <sub>3</sub>	4	4	2	3

**Q.2 Attempt any two:**

**20**

1) Find initial basic feasible solution using North West Corner method and least cost method:

	P	Q	R	S	Supply
A	6	3	5	4	22
B	5	9	2	7	15
C	5	7	8	6	8
Demand	7	12	17	9	

2) Determine the value of the game using graphical method:

Player A	Player B			
	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>
A <sub>1</sub>	2	5	8	10
A <sub>2</sub>	9	4	2	0

3) Find Optimal solution using MODI method:

	1	2	3	4	Supply
A	2	4	6	11	50
B	10	8	7	5	70
C	13	3	9	12	30
D	4	6	8	12	50
Demand	25	35	105	20	

4) Consider the following unbalanced Transportation problem. Since, there is not enough supply, some of demands at these destinations may not satisfied. Suppose there are penalty costs for every unsatisfied demand unit which are given by 5, 3, and 2 for destinations I, II and III respectively. Find initial basic feasible solution using Vogel's method:

	I	II	III	Supply
A	5	1	7	10
B	6	4	6	80
C	3	2	5	15
Demand	75	20	50	

1) Solve the following assignment problem:

	<b>A</b>	<b>B</b>	<b>C</b>
<b>1</b>	9	26	15
<b>2</b>	13	27	6
<b>3</b>	35	20	15
<b>4</b>	18	30	20

2) Determine the value of the game using graphical method:

<b>Player A</b>	<b>Player B</b>	
	<b>B<sub>1</sub></b>	<b>B<sub>2</sub></b>
<b>A<sub>1</sub></b>	1	-3
<b>A<sub>2</sub></b>	3	5
<b>A<sub>3</sub></b>	-1	6
<b>A<sub>4</sub></b>	4	1
<b>A<sub>5</sub></b>	2	2
<b>A<sub>6</sub></b>	-5	0

3) Solve the following assignment problem:

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>A</b>	41	72	39	52	25
<b>B</b>	22	29	49	65	81
<b>C</b>	27	39	60	51	40
<b>D</b>	45	50	48	52	37
<b>E</b>	29	40	45	26	30

4) Use dominance rule to solve the following game and determine the value of the game:

<b>Player A</b>	<b>Player B</b>		
	<b>B<sub>1</sub></b>	<b>B<sub>2</sub></b>	<b>B<sub>3</sub></b>
<b>A<sub>1</sub></b>	3	7	5
<b>A<sub>2</sub></b>	8	10	2
<b>A<sub>3</sub></b>	2	9	1

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