

2011000305030049
EXAMINATION FEBRUARY-MARCH 2024
BACHELOR OF SCIENCE (FIFTH SEMESTER)
OPERATION RESEARCH 507-2 - 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 (FIFTH SEMESTER)**
 - b. Name of the Subject: **OPERATION RESEARCH 507-2 LEVEL 3**
 - c. Subject Code No: **2011000305030049**
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:

--	--	--	--	--	--

Student's Signature

Q.1 Answer the following

14

- 1) Define basic feasible solution? List types of basic feasible solution.
- 2) Define LPP.
- 3) How does the assignment problem differ from the transportation problem?
- 4) What is non-degenerate solution in a Transportation problem.
- 5) When does a game become fair?
- 6) What does an unbounded solution entail?
- 7) Explain Two Person Zero Sum game.

Q.2 Answer the following. (Any two)

12

- 1) A company produces two types of pens say A and B. Pen A is superior in quality while pen B is of lower quality. Net profits on pen A and pen B are Rs. 5 and Rs. 3 respectively. Raw material required for pen A is twice as that for pen B. The supply of raw material is sufficient only for 1000 pens of type B per day. Pen A requires a special nib and only 400 such nibs are available per day. For pen B only 700 nibs are available in a day. Formulate LP model so that the company can make maximum profit.

2) Solve the following LPP by simplex method.

$$\text{Max } Z = 10x_1 + 15x_2 \text{ Subject to}$$

$$3x_1 + 3x_2 \leq 36$$

$$5x_1 + 2x_2 \leq 50$$

$$2x_1 + 6x_2 \leq 60$$

$$\text{and } x_1, x_2 \geq 0$$

3) Solve using simplex method:

$$\text{Max } Z = 2x_1 + x_2, \text{ subject to}$$

$$x_1 + 2x_2 \leq 10$$

$$x_1 + x_2 \leq 6$$

$$x_1 - x_2 \leq 2$$

$$x_1 - 2x_2 \leq 1$$

$$x_1, x_2 \geq 0$$

Q.3 Answer the following. (Any Two)

12

1) Consider the following Transportation Problem:

	A	B	C	D	Supply
I	11	13	17	14	250
II	16	18	14	10	300
III	21	24	13	10	400
Demand	200	225	275	250	

Obtain initial solution by Vogel's Approximation method. Also find the optimal solution.

2) Solve the following assignment problem optimally:

	a	b	c	d	e
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	165

3) Find an optimal solution of the following transportation problem:

	A	B	C	D	Supply
I	2	3	11	7	6
II	1	0	6	1	1
III	5	8	15	9	10
Demand	7	5	3	2	

1) Solve the following assignment problem optimally

	I	II	III	IV	V	VI
A	20	23	18	10	16	20
B	50	20	17	16	15	11
C	60	30	40	55	8	7
D	6	7	10	20	100	9
E	18	19	28	17	60	70
F	9	10	20	30	40	50

2) The payoff matrix of a game is given. Find the solution of the game to the player A and B.

	B1	B2	B3	B4	B5
A1	-2	0	0	5	3
A2	3	2	1	2	2
A3	-4	-3	0	2	6
A4	5	3	-4	2	6

3) Solve the following game theory problem. Is it a fair game?

		Player B		
		B1	B2	B3
Player A	A1	8	5	8
	A2	8	6	5
	A3	7	4	5
	A4	6	5	6
