

Operations Research (MT 4031)

Sessional-II Exam

Date: April 4th 2024

Total Time (Hrs.): 1

Course Instructor(s)

Total Marks: 30

Dr. Misbah Irshad, Dr. Uzma Bashir,
Dr. Shazia Javed, Dr. Ayesha Razzaq, Miss Aisha
Rasheed, Mr. Yasir

Total Questions: 3

Roll NO

Student Signature

Do not write below this line.

Attempt all the questions.

Q1: verify that the following linear programming problem is both non optimal and infeasible, use generalized simplex algorithm to find an optimal feasible solution.

$$\begin{aligned} \text{Max } z &= 6x_1 - 2x_2 \\ \text{subject to} \quad & -x_1 + x_2 \leq -2 \\ & 2x_1 + 3x_2 \leq 5 \\ & x_1, x_2 \geq 0. \end{aligned}$$

feasibility

$$2 - 6x_1 + 2x_2 = 0$$

$$x_1 = 5/2$$

$$s_1 = 1/2$$

[3+7 marks]

Q2: A company manufactures a type of product in three different production plants: P_1 , P_2 and P_3 . Each of these production plants can produce up to 1500 units per month. The company supplies four customers who require each 900, 1200, 1100 and 1300 units per month. The unit transportation costs from each production plant to each customer are displayed below:

	1	2	3	4	
P_1	30	10	25	20	1500
P_2	15	25	30	10	1500
P_3	20	30	15	20	1500
	900	1200	1100	1300	

6000
53250

- Set up a transportation model.
- Find the optimal plan to meet the customers' demands while satisfying production restrictions, when an initial basic solution of the problem is given as:

$$x_{11} = 300, x_{12} = 1200, x_{21} = 200, x_{23} = 1300, x_{31} = 400, x_{33} = 1100.$$

[marks-3+7]

Q3: Solve the following problem of assigning 3 jobs to 4 workers, where each worker can be assigned one and only one job. Justify the arguments you use to reach a decision. The cost of assignment is given in the table below. **[10- marks]**

Jobs	Workers			
	1	2	3	4
1	18	24	28	32
2	8	13	17	19
3	10	15	19	22