

R18

Code No: 155CQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, March - 2021

OPERATIONS RESEARCH
(Mechanical Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

1. Solve the following problem by Simplex method

Maximize $Z = 3x_1 + 2x_2$
subject to the constraints

$$2x_1 + 2x_2 \leq 40$$

$$x_1 + x_2 \leq 24$$

$$2x_1 + 3x_2 \leq 60$$

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

[15]

2. Solve the following transportation problem to minimize the total cost, obtaining the initial basic feasible solution by using VAM method. Find the optimum solution. [15]

	F1	F2	F3	F4	Available
W1	7	9	3	2	16
W2	4	4	3	5	14
W3	6	4	5	8	20
Requirement	11	9	22	8	

3. Find the sequence that minimizes the total elapsed time (in hours) required to complete the following jobs on two machines M_1 and M_2 in the order $M_1 M_2$.

Job	1	2	3	4	5	6
M_1 (Time in hours)	3	12	5	2	9	11
M_2 (Time in hours)	8	10	9	6	3	1

Also find the total elapsed time and idle times of each machine.

[15]

4. A Machine owner finds from his past records that the maintenance costs per year of a machine whose purchase price is Rs. 8000 are as given below:

Year:	1	2	3	4	5	6	7	8
Maintenance Cost:	1000	1300	1700	2200	2900	3800	4800	6000
Resale Price:	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the machine.

[15]