

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, ODISHA

Mid Semester Examination-B.TECH

(Dept. of Production Engineering)

yogesh

Sub-IM &OR
Full marks -20

Time-2 Hrs
Semester-5th

(Answer Question No 1 and any three Questions)

1. Answer the following in brief.

[1 × 5]

- a. What are the characteristics of the standard form of LPP ?
- b. Define Non degenerate basic feasible solution.
- c. What is an unbalanced transportation problem?
- d. How the degeneracy in transportation problem can be resolved?
- e. Write down the matrix form of Linear Programming Problem .

2. Solve the following LPP by graphical method

[5]

Minimize $Z=20X_1+10X_2$

Subject to, $X_1+2X_2 \leq 40$

$3X_1+X_2 \geq 30$

$4X_1+3X_2 \geq 60$

240

3. Use simplex method to solve the LPP

[5]

Min $Z=X_2-3X_3+2X_5$

Subject to $3X_2-X_3+2X_5 \leq 7$

$-2X_2+4X_3 \leq 12$

$-4X_2+3X_3+8X_5 \leq 10$

$X_2, X_3, X_5 \geq 0$

-11

$2 \times \frac{2}{5}$

$-\frac{1}{10} + \frac{9}{10}$

$\frac{1}{10}$
 $\frac{1}{5}$
 $\frac{1}{10}$

$2 \times \frac{4}{5}$
 $8 + \frac{1}{5}$
 $1 + \frac{1}{2}$
 $-\frac{3}{2} + \frac{1}{2}$
 $-\frac{3}{2} + \frac{1}{2}$
 $0 + \frac{1}{2}$
 $-\frac{1}{2}$

$-\frac{4}{5} + \frac{12}{10}$

4. Find the initial solution to the following TP using VAM [5]

	D1	D2	D3	D4	Supply
O1	21	16	25	13	11
O2	17	18	14	23	13
O3	32	17	18	41	19
Demand	6	10	12	15	

5. Solve the following transportation problem starting with the initial solution obtained by NWCR. [5]

	P	Q	R	S	Supply
A	21	16	25	13	11
B	17	18	14	23	13
C	32	17	18	41	19
Demand	6	10	12	15	

6. Use Penalty method to [5]

$$\text{Maximize } Z = 3X_1 + 2X_2$$

$$\text{s.t. } 2X_1 + X_2 \leq 2$$

$$3X_1 + 4X_2 \geq 12$$

$$X_1, X_2 \geq 0$$