

**Department of Mechanical Engineering**

**VII Semester**

**I – Test (6/9/2018)**

**Subject- Operations Research**

**Time -1 Hr.**

**M. M.- 30**

1. Following are the LP model and its associated optimal simplex tableau. **(CO1 & CO2)**

*Maximize*       $Z \text{ (Profit)} = 10X_1 + 12X_2 - 2X_3$

Subject to

$X_1 + 2X_2 - X_3 \leq 320$  (labour hour)

$3X_1 + X_2 \leq 350$  (raw material)

$X_3 \leq 10$  (overtime hour)

$X_1, X_2, X_3 \geq 0$

$X_1$	$X_2$	$X_3$	$S_1$	$S_2$	$S_3$	Z	Solution
0	1	0	3/5	-1/5	3/5	0	128
1	0	0	-1/5	2/5	-1/5	0	74
0	0	1	0	0	1	0	10
0	0	0	26/5	8/5	16/5	1	2256

- a. Determine the optimal solution of the problem. (3)
  - b. Determine the unit worth of each resource. (3)
  - c. Find the new optimal solution when 200 additional units of raw material are acquired a day, but daily overtime cannot be more than 8 hours. (6)
  - d. If the profit per unit of product is increased from Rs. 12 to Rs. 25, determine the associated optimum solution. (6)
2. Find optimal solution of the following transportation problem. **(CO3)** (12)

Plants	Warehouses				Capacity
	P	Q	R	S	
A	3	4	12	8	7
B	2	1	7	2	2
C	6	9	16	10	10
Demand	8	5	3	3	