Solution Sessional II

Q:1

$$\max Z = 6x_1 - 2x_2$$

Putting in standard form.

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

$$-x_1 + x_2 + x_3 = -2$$

$$2x_1 + 3x_2 + x_4 = 5$$

$$x_1, x_2, x_3, x_4 \geq 0.$$

Putting in tableau form

(3)

Basic	Z	x_1	x_2	x_3	x_4	Sol	
		→ non optimal					
Z	1	[-6]	2	0	0	0	
x_3	0	-1	1	1	0	[-2]	→ infeasible
x_4	0	2	3	0	1	5	

x_1 has -ve Z-coefficient and can be selected as entering var.

∴ Solution is non optimal.

the value of $x_3 = -2$, indicating infeasibility.

Applying generalized Simplex.

x_3 leaves, x_1 enters.

Basic	x_1	x_2	x_3	x_4	Sol	Ratio
(3) z	0	-4	-6	0	12	
x_1	1	-1	-1	0	2	2
← x_4	0	5	(2)	1	1	1/2

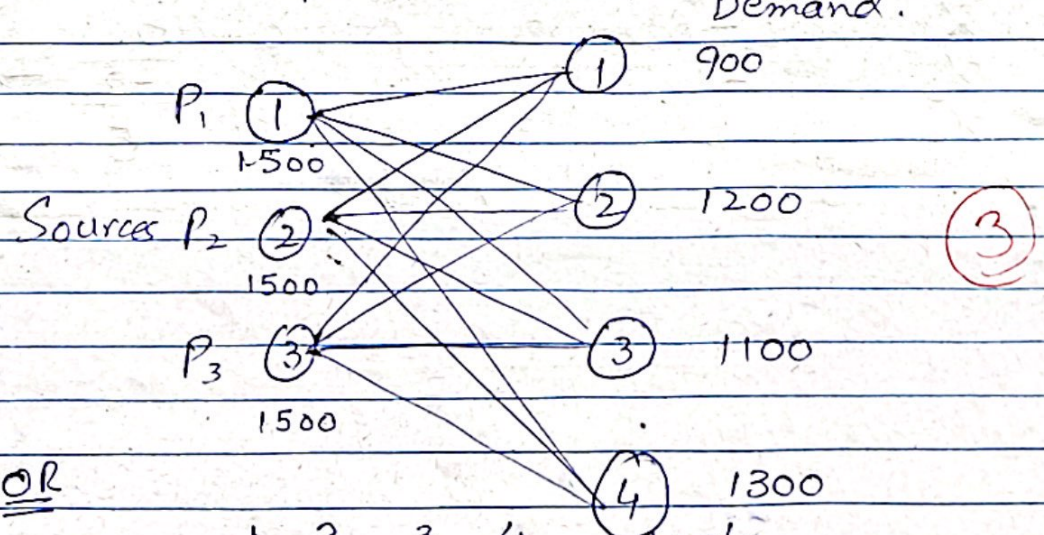
Apply simplex method.

(3) z	0	1	0	3	15
x_1	1	3/2	0	1/2	5/2
x_3	0	5/2	1	1/2	1/2

(1) $x_1 = 5/2$, $x_2 = 0$, $z_{max} = 15$

Q:2

(a) Transportation model



OR

	1	2	3	4	Supply
1	30	10	25	10	1500
2	15	25	30	10	1500
3	20	30	15	20	1500
					1300
D	900	1200	1100	1300	

100 unit = 1 unit of supply and demand

	$v_1=30$	$v_2=10$	$v_3=25$	$v_4=25$	
$u_1=0$	(30) 3	(10) 12	(25) [0]	(20) [5] x_{14}	15
$u_2=-15$	(15) 2	(25) [-30]	(30) [-20]	(10) 13	15
$u_3=-10$	(20) 4	(30) [-30]	(15) 11	(20) [-5]	15
	9	12	11	13	

multipliers - (2)
loop - (1)
non basic (2)

For each basic var, write $u_i + v_j = c_{ij}$ to compute u_i and v_j.

For each non basic var, compute $\bar{c}_{ij} = u_i + v_j - c_{ij}$

x_{14} enters, x_{11} leaves

	$v_1=25$	$v_2=10$	$v_3=20$	$v_4=20$	
$u_1=0$	(30) [-5]	(10) 12	(25) [-5]	(20) 3	15
$u_2=-10$	(15) 5	(25) [-25]	(30) [-20]	(10) 10	15
$u_3=-5$	(20) 4	(30) [-25]	(15) 11	(20) [-5]	15
	9	12	11	13	

multipliers - (1 mark)

optimal and feasible

Transportation cost = (1 mark)

$120 + 60 + 45 + 100 + 80 + 165 = 570$ units.

18	24	28	32
8	13	17	19
10	15	19	22
0	0	0	0

Row Reduced matrix

0	6	10	14
0	5	9	11
0	5	9	12
0	0	0	0

I Modified Matrix

0	6	10	14
0	5	9	11
0	5	9	12
0	0	0	0

N < n i.e. 2 < 4

II Modified Matrix

0	1	5	9
0	0	4	6
0	0	4	7
5	0	0	0

N < n i.e. 3 < 4

III Modified Matrix

0	1	1	5
0	0	0	2
0	0	0	3
9	4	0	0

N = n

Zero assignment

Multiple assignments exists

Solution -I

0	1	1	5
~~0~~	0	~~0~~	2
~~0~~	~~0~~	0	3
9	4	~~0~~	0

Optimal assignment W – A X – B Y – C
Cost 18 13 19

Minimum cost = 18 + 13 + 19 = Rs 50

Solution -II

0	1	1	5
~~0~~	~~0~~	0	2
~~0~~	0	~~0~~	3
9	4	~~0~~	0

Optimal assignment W – A X – C Y – B
Cost 18 17 15

Minimum cost = 18 + 17 + 15 = Rs 50