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Page No. Date

OR

Assignment - II

Q1. Max. $Z = 2x_1 + 3x_2$

Values/Constraints : $-3x_1 + x_2 \leq 1$

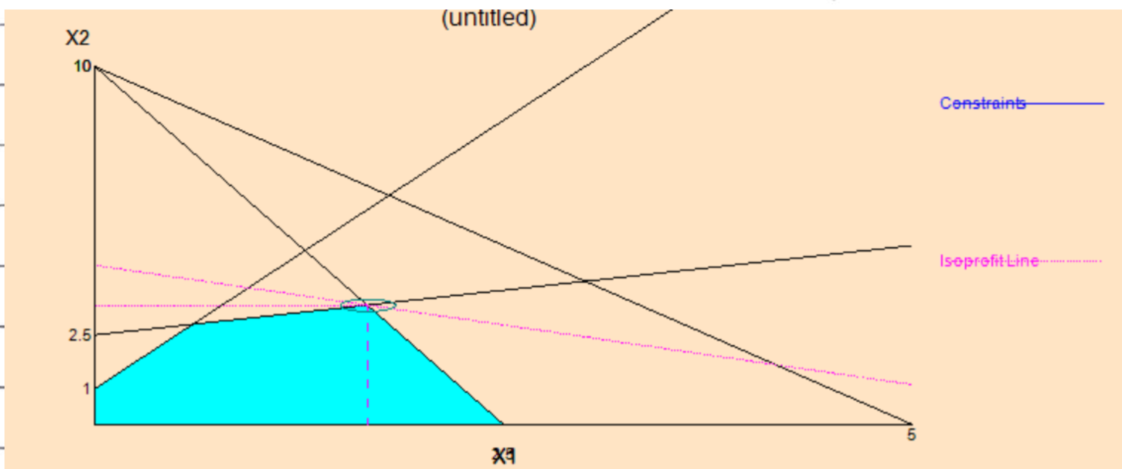
$4x_1 + 2x_2 \leq 20$

$4x_1 + x_2 \leq 10$

$-x_1 + 2x_2 \leq 5$

$x_1, x_2 \geq 0$

Graph:



Point Wise Check

① For $(0,0)$
$Z = 0$

② For $(0,1)$
$Z = 3$

③ For $(0.6, 2.8)$
$Z = 9.6$

④ For $(\cancel{3.33}\ 1.66, 3.33)$
$Z = \cancel{16.65}\ 13.33$

⑤ ~~For (3,4)~~
~~$Z = 18$~~

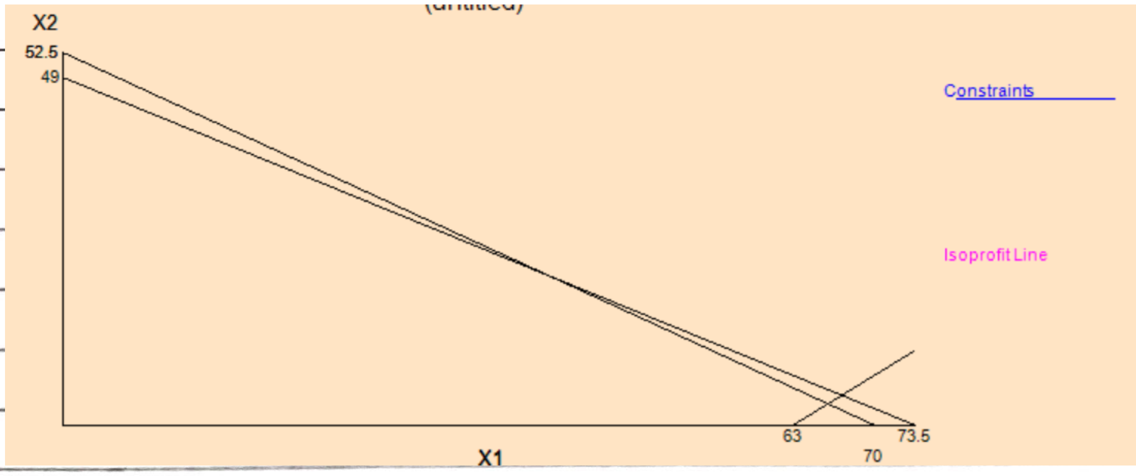
⑥ For $(2.5, 0)$
$Z = 5$

Since Max^m of Z
$\therefore$ The optimal Point is $(\cancel{3.33}\ 1.66, 3.33)$, i.e. $Z = \cancel{16.65}\ 13.33$

Q2. Max. $Z = 5x_1 + 7x_2$

Values / Constraint : $2x_1 + 3x_2 \geq 147$
$3x_1 + 4x_2 \geq 210$
$x_1 - x_2 \geq 63$
$x_1, x_2 \geq 0$

Graph:



Point Wise Check

① For $(0, 52.5)$ $z = 367.5$

② For $(42, 21)$ $z = 357$

③ For $(67.2, 4.2)$ $z = 365.4$

Since Max^m of z

∴ The optimal Point is $(0, 52.5)$, i.e., $z = 367.5$

Q3 Max. $z = x_1 + 2x_2$

Values/Constraint: $x_1 + 3x_2 \leq 8$

$x_1 + x_2 \leq 4$

$x_1, x_2 \geq 0$

① Normal Form

$x_1 + 3x_2 \leq 8$

$x_1 + x_2 \leq 4$

Augmented Form

$x_1 + 3x_2 + x_3 \;\; = 8$

$x_1 + x_2 \;\; + x_4 = 4$

② CPF are : ① $(0, 0)$ ② $(0, 8/3)$ ③ ~~(8, 0)~~ ③ $(2, 2)$ ④ $(4, 0)$ ⑥ ~~(0, 4)~~

Finding BF

① For $(0,0)$ BF: $(0, 0, 8, 4)$ $z = 0$

② For $(0, 8/3)$ BF: $(0, 8/3, 0, 4/3)$ $z = 16/3 = 5.33$

~~③ For (8, 0) BF: (8, 0, 0, -4) z = 8~~

③ For $(2, 2)$ BF: $(2, 2, 0, 0)$ $z = 6$

④ For $(4, 0)$ BF: $(4, 0, 4, 0)$ $z = 4$

$(2, 2, 0, 0)$

∴ Optimal soln is of BF ~~(0, 8/3, 0, 4/3)~~ with $z = 6$

③ When $x_1, x_2 = 0$ BF is $(0, 0, 8, 4)$ which is also a simultaneous soln.

④ Here, Feasible Points are :-

① $(0,0)$ ③ $(2,2)$

② $(0, 8/3)$ ④ $(4,0)$

And, Non-Feasible Points are:

① $(8,0)$ ② $(0,4)$

Now,

For $(8,0)$ BF: $(8,0,0,-4)$

For $(0,4)$ BF: $(0,4,-4,0)$

⑤ Putting x_2 & $x_3 = 0$ as Non-Basic, we get BF: $(8,0,0,-4)$ which is also an infeasible solution of an infeasible corner point.

Q4. Max. $z = x_1 + 2x_2$

$x_1 + 3x_2 \leq 8$ $x_1 + x_2 \leq 4$ $x_1, x_2 \geq 0$

CPF are: $(0,0)$, $(4,0)$, $(2,2)$, $(0, 8/3)$

For $(0,0)$ $z = 0$

For $(4,0)$ $z = 4$

For $(2,2)$ $z = 6$

For $(0, 8/3)$ $z = 5.33$

$\therefore$ $(2,2)$ is optimal soln with $z = 6$.

Q6. Normal Form

$Z = 3x_1 + 5x_2 + 6x_3$

$2x_1 + x_2 + x_3 \le 4$

$x_1 + 2x_2 + x_3 \le 4$

$x_1 + x_2 + 2x_3 \le 4$

$x_1 + x_2 + x_3 \le 3$

$x_1, x_2, x_3 \ge 0$

Augmented Form

$Z = 3x_1 + 5x_2 + 6x_3 + 0x_4 + 0x_5 + 0x_6 + 0x_7$

$2x_1 + x_2 + x_3 + x_4 = 4$

$x_1 + 2x_2 + x_3 + x_5 = 4$

$x_1 + x_2 + 2x_3 + x_6 = 4$

$x_1 + x_2 + x_3 + x_7 = 3$

① Simplex Table [1st Iteration]

		C_J	(3	5	6	0	0	0	0)
C_B	y_B	x_B	y_1	y_2	y_3	y_4	y_5	y_6	y_7
0	y_4	4	2	1	1	1	0	0	0
0	y_5	4	1	2	1	0	1	0	0
0	y_6	4	1	1	2^*	0	0	1	0
0	y_7	3	1	1	1	0	0	0	1
		$Z_J =$	0	0	0	0	0	0	0
		Net Eval^n $C_J - Z_J =$	3	5	6	0	0	0	0

$\because$ All Net Eval^n $\not\le 0$

$\therefore$ Optimal Soln has not been obtained.

Entering Var. = Most +ve Net Eval^n Var.

$= y_3$, i.e, 6

Leaving Var. $= \min \left\{ \frac{x_B}{y_{3J}} \right\} = \min \left\{ \frac{4}{1}, \frac{4}{1}, \frac{4}{2}, \frac{3}{1} \right\}$

$= \min \{4, 4, 2, 3\}$

$= y_6$, i.e, 2

② Simplex Method [2^{nd} Iter^n]

C_B	y_B	x_B	y_1	y_2	y_3	y_4	y_5	y_6	y_7	
	C_J		(3	5	6	0	0	0	0)	
0	y_4	2	3/2	1/2	0	1	0	-1/2	0	$-y_{62}$
0	y_5	2	1/2	$3/2^*$	0	0	1	-1/2	0	$-y_{32}$
6	y_3	2	1/2	1/2	1	0	0	1/2	0	
0	y_7	1	1/2	1/2	0	0	0	-1/2	1	$-y_{32}$
	Z_J =	12	3	3	6	0	0	3	0	
	Net Eval^n $C_J - Z_J$ =		0	2	0	0	0	-3	0	

∵ All Net Eval^n $\nleq 0$

∴ Optimal Sol^n has not been obtained.

~~Entering Var~~ = Entering Var. = y_2

Leaving Var. = $\min\left\{\frac{x_B}{y_{2J}}\right\} = \min\{4, 4/3, 4, 2\}$

$= \min\{4, 1.33, 4, 2\}$

$= y_5$

③ Simplex Method [3^{rd} Iter^n]

C_B	y_B	x_B	y_1	y_2	y_3	y_4	y_5	y_6	y_7
	C_J		(3	5	6	0	0	0	0)
0	y_4	1.33	1.33	0	0	1	-0.33	-0.33	0
5	y_2	1.33	0.33	1	0	0	0.67	-0.33	0
6	y_3	1.33	0.33	0	1	0	-0.33	0.67	0
0	y_7	0.33	0.33	0	0	0	-0.33	-0.33	1
	Z_J =	14.66	3.67	5	6	0	1.33	2.33	0
	Net Eval^n $C_J - Z_J$ =		-0.67	0	0	0	-1.33	-2.33	0

Table.

Iter^n No.	Basic Var.	y_1	y_2	y_3	y_4	y_5	y_6	y_7	RHS
	z	-3	-5	-6	0	0	0	0	0
	y_4	2	1	1	1	0	0	0	4
1	y_5	1	2	1	0	1	0	0	4
	y_6	1	1	2*	0	0	1	0	4
	y_7	1	1	1	0	0	0	1	3
	z	0	-2	0	0	0	3	0	12
	y_4	1.5	0.5	0	1	0	-0.5	0	2
2	y_5	0.5	1.5*	0	0	1	-0.5	0	2
	y_3	0.5	0.5	1	0	0	0.5	0	2
	y_7	0.5	0.5	0	0	0	-0.5	1	1
	z	0.67	0	0	0	1.33	2.33	0	14.67
	y_4	1.33	0	0	1	-0.33	-0.33	0	1.33
3	y_2	0.33	1	0	0	0.67	-0.3	0	1.33
	y_3	0.33	0	1	0	-0.33	0.67	0	1.33
	y_7	0.33	0	0	0	-0.33	-0.33	1	0.33

Q7

a. True,

In a particular solution/iteration of the simplex method, if there is a tie for leaving basic variable, then all the tied basic variable reach 0 simultaneously as the entering basic variable is increased and therfore all such variable ~~t~~ will have 0 value in the new BF soln.

b. True,

If there is no leaving basic variable at some iteration, then the value of the objective function can be increased as much as possible by increasing the value of entering basic variable. In this case no optimal soln exist.

c. False,

In the final optimal table the values of the coefficients of all basic variable in row 0 should be always 0.

d. False,

The optimization problem has multiple soln. if the graph of the objective function is parallel to the one of the ~~a~~ constraints irrespective of whether the basic feasible region is bounded or not. Therefore for a problem ~~the~~ to have multiple optimal solution, the problem may or may not be having a bounded feasible soln.

Q8. $Z = 4x_1 + 5x_2 + 3x_3 - M\bar{x}_7$

$x_1 + x_2 + 2x_3 - x_4 + \bar{x}_7 = 20$

$15x_1 + 6x_2 - 5x_3 + x_5 = 50$

$x_1 + 3x_2 + 5x_3 + x_6 = 30$

Iter^n No.	Basic Var.	Co-eff Of x_1	x_2	x_3	x_4	x_5	x_6	$\bar{x}_7$	RHS
	Z	-1	-1	-2	1	0	0	0	-20
1	$\bar{x}_7$	1	1	2	-1	0	0	1	20
	x_5	15	6	-5	0	1	0	0	50
	x_6	1	3	5	0	0	1	0	30
	Z	-0.6	0.2	$\cancel{0.2}6$	1	0	0.4	0	-8
2	$\bar{x}_7$	0.6	-0.2	$\cancel{-0.2}0$	-1	0	-0.4	1	8
	x_5	16	9	$\cancel{9}0$	0	1	1	0	80
	x_3	0.2	0.6	$\cancel{0.6}1$	0	0	0.2	0	6
	Z	0	0.54	0	1	0.0375	0.437	0	-5
3	$\bar{x}_7$	0	-0.538	0	-1	-0.038	-0.438	1	5
	x_1	1	0.56	0	0	0.06	0.06	0	5
	x_3	0	0.49	1	0	-0.013	0.187	0	5

Here, value of $\bar{x}_7 = 5$, i.e. $\bar{x}_7 > 0$

$\therefore$ It does not possess any feasible soln.

Q9.

1. False,
when a LP model has equality contraint an artificial variable is introduced which is not feasible for orginal model.

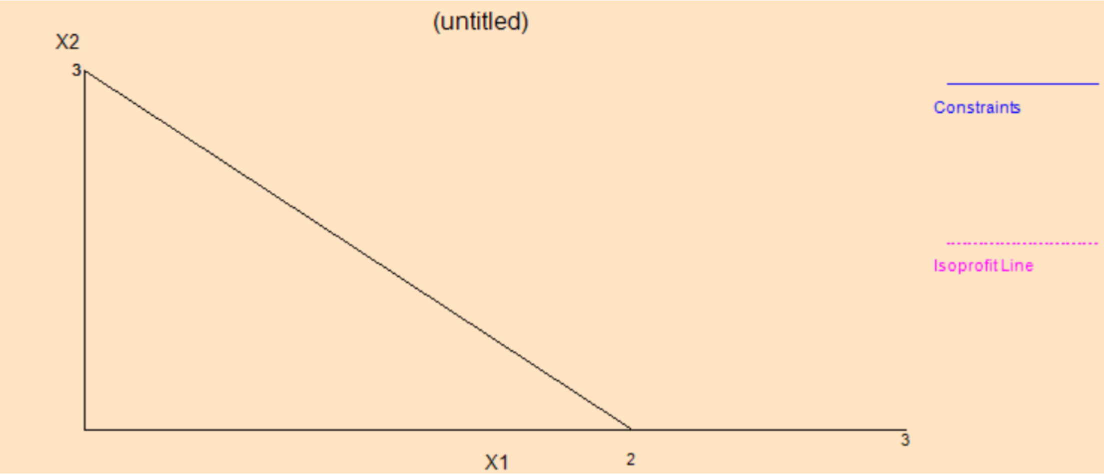
2. False,
if an introduced artificial problem is not equal to 0 then it has no feasible solution.

3. False, 2-phase & big M method has the requirement of same no. of iteration.

Q10. Max $z = 5x_1 + 4x_2$

$$3x_1 + 2x_2 \leq 6$$
$$2x_1 - x_2 \geq 6$$
$$x_1, x_2 \geq 0$$

a. Graph: Not Feasible.



c. $Z = 5x_1 + 4x_2 - M\bar{x}_5$

$3x_1 + 2x_2 + x_3 = 6$

$2x_1 - x_2 - x_4 + \bar{x}_5 = 6$

$$\begin{array}{rcccccl} & -5 & -4 & 0 & 0 & M & 0 \\ -M[& 2 & -1 & 0 & -1 & 1 & 6\,] \\ \hline \end{array}$$

$(-5-2M) + (-4+M] + M = 6M$

Table.

Iter^n No.	Basic Eq^n	Eq^n No.	x_1	x_2	x_3	x_4	x_5	RHS
	Z	0	$-2M-5$	$M-4$	0	M	0	$-6M$
0	x_3	1	3	2^*	1	0	0	6
	$\bar{x}_5$	2	2	-1	0	-1	1	6
	Z	0	$-\frac{7}{2}M+1$	0	$-\frac{M}{2}+2$	M	0	$-4M+12$
1	x_2	1	$3/2$	1	$1/2$	0	0	3
	$\bar{x}_5$	2	$7/2$	0	$1/2$	-1	1	9

$\because$ Min^m is x_3 which is non-basic

$\therefore$ Not feasible.

Q11. Min $z = 3x_1 + 2x_2 + 4x_3$

$2x_1 + x_2 + 3x_3 = 60$

$3x_1 + 3x_2 + 5x_3 \geq 120$

$x_1, x_2, x_3 \geq 0$

1. $3x_1 + 3x_2 + 5x_3 - x_4 + \bar{x}_6 = 120$

$2x_1 + x_2 + 3x_3 + \bar{x}_5 = 60$

$z = 3x_1 + 2x_2 + 4x_3 + M\bar{x}_5 + M\bar{x}_6$

$$
\begin{array}{llllllll}
Z & -3 & -2 & -4 & & -M & -M & = 0 \\
M[\,2 & 1 & 3 & & 1 & & & = 60] \\
M[\,3 & 3 & 5 & -1 & & 1 & & = 120] \\
\hline
Z & +(5M-3) & +(4M-2) & +(8M-4) & -M & & & = 180M
\end{array}
$$

Table.

Iterⁿ No.	Basic Var	Z	$\bar{x}_1$	x_2	x_3	x_4	$\bar{x}_5$	$\bar{x}_6$	RHS
	Z	1	-5M+3	-4M+2	-8M+4	M	0	0	-180M
0	$\bar{x}_5$	0	2*	1	3	0	1	0	60
	$\bar{x}_6$	0	3	3	5	-1	0	1	120
	Z	1	0.33M+0.33	-1.33M+0.67	0	M	2.67M-1.33	0	-20M-80
1	x_3	0	0.67	0.33	1	0	0.33	0	20
	$\bar{x}_6$	0	-0.33	1.33*	0	-1	-1.67	1	20
	Z	1	0.5	0	0	0.5	M-0.5	M-0.5	-90
2	x_3	0	0.75	0	1	0.25	0.75	-0.25	15
	x_2	0	-0.25	1	0	-0.75	-1.25	0.75	15

Optimal solⁿ is obtained at $x_1 = 0$, $x_2 = 15$, $x_3 = 15$ & $z = 90$

$\bar{x}_6$	RHS
0	-180M
0	60
1	120
1.33 0	-20M-80
0	20
1	20
M-0.5	-90
-0.25	15
0.25	15

$z = 90$

Q2. Min, $z = 3x_1 + 2x_1 + 7x_3$

$-x_1 + x_2 = 10$

$2x_1 + x_2 + x_3 \geq 10$

$x_1, x_2, x_3 \geq 0$

1. $-x_1 + x_2 + \bar{x}_5 = 10$

$2x_1 - x_2 + x_3 - x_4 + \bar{x}_6 = 10$

$z = 3x_1 + 2x_2 + 7x_3 + M\bar{x}_5 + M\bar{x}_6$

$z \quad -3 \quad -2 \quad -7 \quad -M \quad -M \quad = 0$

$M(-1 \quad +1 \quad +1 \quad = 10)$

$M(2 \quad -1 \quad +1 \quad -1 \quad +1 \quad = 10)$

$z + (M-3) + -2 + (M-7) - M = 20M$

Table

Iter^n No.	Basic Var	z	x_1	x_2	x_3	x_4	$\bar{x}_5$	$\bar{x}_6$	RHS
	z	1	-M+3	2	-M+7	M	0	0	-20M
0	$\bar{x}_5$	0	-1	1	0	0	1	0	10
	$\bar{x}_6$	0	2*	-1	1	-1	0	1	10
	z	1	-3M+5	0	7-M	2M-2	M	0	-20
1	$\bar{x}_5$	0	0	0.5*	0.5	-0.5	1	0.5	15
	x_1	0	1	-0.5	0.5	-0.5	0	0.5	5
	z	1	0	0	2	5	M-7	M-5	-120
2	x_2	0	0	1	1	-1	2	1	30
	x_1	0	1	0	1	-1	1	1	20

Optimal Sol^n occurs at (20, 30, 0) & z = 120

Q13. $\text{Max}^m, z = x_1 - 7x_2 + 3x_3$

$2x_1 + x_2 - x_3 \leq 4$

$4x_1 - 3x_2 \leq 2$

$-3x_1 + 2x_2 + x_3 \leq 3$

1 Table.

Iter^n No.	Basic Var.	Co-eff Of z	x_1	x_2	x_3	x_4	x_5	x_6	RHS
	z	1	-1	7	-3	0	0	0	0
0	x_4	0	2	1	-1	1	0	0	4
	x_5	0	4	-3	0	0	1	0	2
	x_6	0	-3	2	1*	0	0	1	3
	z	1	-10	13	0	0	0	0	9
1	x_4	0	-1	3	0	1	0	1	7
	x_5	0	4*	-3	0	0	1	0	2
	x_3	0	-3	2	1	0	0	1	3
	z	1	0	5.5	0	0	2.5	3	14
2	x_4	0	0	2.25	0	1	0.25	1	7.5
	x_1	0	1	-0.75	0	0	0.25	0	0.5
	x_3	0	0	-0.25	1	0	0.25	1	4.5

2 $x_1 = 0.5,\ x_2 = 0,\ x_3 = 4.5$

$z = x_1 - 7x_2 + 3x_3$

$= 0.5 + 3(4.5)$

$= 14$

2. The shadow price for resource 1, 2, 3 are 0, 2.5 & 3.

Shadow Paints are 5/2, 3.

Q14. $z = 5x_1 + 4x_2 - x_3 + 3x_4$

$3x_1 + 2x_2 - 3x_3 + x_4 \leq 24$

$3x_1 + 3x_2 + x_3 + 3x_4 \leq 36$

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

1 Table

Iter^n No.	Basic Var	Z	x_1	x_2	x_3	x_4	x_5	x_6	RHS
	Z	1	-5	-2	1	-3	0	0	0
0	x_5	0	3*	2	-3	1	1	0	24
	x_6	0	3	3	1	3	0	1	36
	Z	1	0	1.33	-4	-1.34	1.67	0	~~40~~ 40
1	x_1	0	0	0.67	-1	0.33	0.33	0	8
	x_6	0	0	1	4*	2	-1	1	12
	Z	1	0	2.33	0	0.67	0.67	1	52
2		0	0	0.92	0	0.83	0.83	0.25	11
		0	0	0.25	1	0.2	-0.25	0.25	3

∴ Optimal Sol^n is (11, 0, 3, 0) & z = 52.

2. Shadow price for 1 & 2 are 0.67 & 1.

Shadow Points are: 2/3 & 1.

MATRIX METHOD

Q1. $\text{Max}^m,\ z = 8x_1 + 4x_2 + 6x_3 + 3x_4 + 9x_5$

$x_1 + 2x_2 + 3x_3 + 3x_4 \le 180$

$4x_1 + 3x_2 + 2x_3 + x_4 + x_5 \le 270$

$x_1 + 3x_2 + x_4 + 3x_5 \le 180$

$x_1, x_2, x_3, x_4, x_5 \ge 0$

$$\begin{bmatrix} 3 & 1 & 0 \\ 2 & 4 & 1 \\ 8 & 1 & 3 \end{bmatrix}^{-1} = \frac{1}{27}\begin{bmatrix} 11 & -3 & 1 \\ -6 & 9 & -3 \\ 2 & -3 & 10 \end{bmatrix}$$

a. $$\begin{pmatrix} x_3 \\ x_1 \\ x_5 \end{pmatrix} = B^{-1}b = \frac{1}{27}\begin{bmatrix} 11 & -3 & 1 \\ -6 & 9 & -3 \\ 2 & -3 & 10 \end{bmatrix}\begin{bmatrix} 180 \\ 270 \\ 180 \end{bmatrix} = \begin{bmatrix} 50 \\ 30 \\ 60 \end{bmatrix}$$

$$z = cx = (8\ 4\ 6\ 3\ 9)\begin{pmatrix} 30 \\ 0 \\ 50 \\ 0 \\ 30 \end{pmatrix} = 990$$

b. Shadow Price, $C_B B^{-1} = \frac{1}{27}(6\ 8\ 9)\begin{pmatrix} 11 & -3 & 1 \\ -6 & 9 & -1 \\ 2 & -3 & 10 \end{pmatrix} = \begin{pmatrix} 0.38 \\ 1 \\ 0.67 \end{pmatrix}$

Q2. Max^m, $z = 5x_1 + 8x_2 + 7x_3 + 4x_4 + 6x_5$

$2x_1 + 3x_2 + 3x_3 + 2x_4 + 2x_5 \le 20$

$3x_1 + 5x_2 + 4x_3 + 2x_4 + 4x_5 \le 30$

$x_1, x_2, x_3, x_4, x_5 \ge 0$

$C = (5 \ 8 \ 7 \ 4 \ 6 \ 0 \ 0)$ $\quad A = \begin{pmatrix} 2 & 3 & 3 & 2 & 2 & 1 & 0 \\ 3 & 5 & 4 & 2 & 4 & 0 & 1 \end{pmatrix}$

$b = \begin{pmatrix} 20 \\ 30 \end{pmatrix}$

Iter^n 0

$B = B^{-1} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ $\quad x_B = \begin{pmatrix} x_6 \\ x_7 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 20 \\ 30 \end{pmatrix} = \begin{pmatrix} 20 \\ 30 \end{pmatrix}$

$C_B = (0, 0)$ Row 0 $= (-5 \ -8 \ -7 \ -4 \ -6 \ 0 \ 0)$

$\therefore x_2$ enters

Revised x_2 co-eff : $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 3 \\ 5 \end{pmatrix} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ $\quad \therefore x_7$ leaves

Iter^n 1

$B^{-1}_{new} = \begin{pmatrix} 1 & 3 \\ 0 & 5 \end{pmatrix}^{-1} = \begin{pmatrix} 1 & 3/5 \\ 0 & 1/5 \end{pmatrix}$ $\quad x_B = \begin{pmatrix} x_6 \\ x_2 \end{pmatrix} = \begin{pmatrix} 1 & -3/5 \\ 0 & 1/5 \end{pmatrix}\begin{pmatrix} 20 \\ 30 \end{pmatrix}$

$= \begin{pmatrix} 2 \\ 6 \end{pmatrix}$

$C_B = (0 \ 8)$ Revised Row 0 $= (0 \ \ 8/5)\begin{pmatrix} 2 & 3 & 3 & 2 & 2 & 1 & 0 \\ 3 & 5 & 4 & 2 & 4 & 0 & 1 \end{pmatrix}$

$- (5 \ 8 \ 7 \ 4 \ 6 \ 0 \ 0)$

$= (-1/5 \ \ 0 \ \ -3/5 \ \ -4/5 \ \ -2/5 \ \ 0 \ \ 8/5)$

$\therefore x_4$ enters

Revised x_4 co-eff : $\begin{pmatrix} 1 & -3/5 \\ 0 & 1/5 \end{pmatrix}\begin{pmatrix} 2 \\ 2 \end{pmatrix} = \begin{pmatrix} 4/5 \\ 2/5 \end{pmatrix}$ $\quad \therefore x_6$ leaves.

Iterⁿ 2

$$B_{new}^{-1} = \begin{pmatrix} 2 & 3 \\ 2 & 5 \end{pmatrix}^{-1} = \begin{pmatrix} 5/4 & -3/4 \\ -1/2 & 1/2 \end{pmatrix}$$

$$x_B = \begin{pmatrix} x_4 \\ x_2 \end{pmatrix} = \begin{pmatrix} 5/4 & -3/4 \\ -1/2 & 1/2 \end{pmatrix} \begin{pmatrix} 20 \\ 30 \end{pmatrix} = \begin{pmatrix} 5/2 \\ 5 \end{pmatrix} \qquad c_B = (4\ 8)$$

Revised Row 0:

$$(1\ 1) \begin{pmatrix} 2 & 3 & 3 & 2 & 2 & 1 & 0 \\ 3 & 5 & 4 & 2 & 4 & 0 & 1 \end{pmatrix} - (3\ 8\ 7\ 4\ 6\ 0\ 0)$$

$$= (0\ 0\ 0\ 0\ 0\ 1\ 1)$$

$\therefore$ Current Solⁿ is Optimal

Optimal Soln: $(0, 5, 0, 5/2, 0)$

$z = 50$