Ques Solve Max $z = 3x_1 + 2x_2$ by Big-M method

s.t.

$$2x_1 + x_2 \leq 2$$
$$3x_1 + 4x_2 \geq 12$$
$$x_1, x_2 \geq 0$$
$$2x_1 + x_2 + x_3 = 2$$
$$3x_1 + 4x_2 - x_4 + x_5 = 12$$

			3	2	0	0	0	
B	C_B	x_B	y_1	y_2	y_3	y_4	y_5	Min ratio
y_3	0	2	2	[1]	1	0	0	2 →
y_5	-0M	12	3	4	0	-1	1	3
		Z=-12M	-3M-3	-4M-2	0	M	0	
				↑				
y_2	2	2	2	1	1	0	0	
y_5	-M	4	-5	0	-4	-1	1	
		Z=-4M+4	5M+1	0	4M+2	M	0	

Here all the net evulations is non-negative and artificial variable appear in the basis not at 0 level Hence the given LPP does not passes any feasible solution.

Ques Use Penality method to solve.

Min $z = 2x_1 + x_2$

S.T

$$3x_1 + x_2 = 3$$
$$4x_1 + 3x_2 \geq 6$$
$$x_1 + 2x_2 \leq 3$$
$$x_1, x_2 \geq 0$$

$$3x_1 + x_2 + x_6 = 3$$
$$4x_1 + 3x_2 - x_3 + x_4 = 6$$
$$x_1 + 2x_2 + x_5 = 3$$

$$\text{Max } z = -2x_1 - x_2$$

			-2	-1	0	0	0	0	
B	C_B	x_B	y_1	y_2	y_3	y_4	y_5	y_6	Min ratio
y_4	-M	3	3	1	0	0	0	1	
y_5	0	6	4	3	-1	1	0	0	
y_6	0	3	1	2	0	0	1	0	
		$Z = C_B x_B$	-3M+2	-3M+1	0	0	0	-3M	

$= -3M$

Ques Use simplex method to solve

$$\text{Max } z = 5x_1 + 3x_2$$

s.t

$$x_1 + x_2 \leq 2$$
$$5x_1 + 2x_2 \leq 10$$
$$3x_1 + 0x_2 \leq 12$$
$$x_1, x_2 \geq 0$$

(2) Use Simplex method

$$\text{Max } z = 3x_1 + 2x_2 + 5x_3$$

s.t

$$x_1 + 2x_2 + x_3 \leq 430$$
$$3x_1 + 2x_3 \leq 460$$
$$x_1 + 4x_3 \leq 420$$
$$x_1, x_2, x_3 \geq 0$$

Ques Use Two Phase Method to solve

$$\text{Max } z = 5x_1 + 8x_2$$

s.t

$$3x_1 + 2x_2 \geq 3$$
$$x_1 + 4x_2 \geq 4$$
$$x_1 + x_2 \leq 5.$$
$$x_1, x_2 \geq 0$$

Ques $\text{Min } z = x_1 + x_2 + x_3$ (Use Two Phase Method)

s.t

$$x_1 - 3x_2 + 4x_3 = 5$$
$$x_1 - 2x_2 \leq 3$$
$$2x_2 + x_3 \geq 4$$

Ques By Big M Method to solve

$$\text{Max } z = 2x_1 + 3x_2$$

s.t

$$x_1 + 2x_2 \leq 4$$
$$x_1 + x_2 = 3$$
$$x_1, x_2 \geq 0$$