Q4) solve the following LPP by big-M method and prove that the problem has no feasible solution

$$\max z = 5x_1 + 11x_2$$

st
$$2x_1 + x_2 \le 4$$
$$3x_1 + 4x_2 \ge 24$$
$$2x_1 - 3x_2 \ge 6$$
$$\cancel{2x_1} \quad x_1, x_2 \ge 0$$

→ introducing slack, surplus and artificial variables

$$\max z = 5x_1 + 11x_2 + 0x_3 + 0x_4 + 0x_5 - Mx_6 - Mx_7$$

st
$$2x_1 + x_2 + x_3 = 4$$
$$3x_1 + 4x_2 - x_4 + x_6 = 24$$
$$2x_1 - 3x_2 - x_5 + x_7 = 6$$
$$x_1, x_2, x_3, x_4, x_5, x_6, x_7 \ge 0$$

			c_j	5	11	0	0	0	$-M$	$-M$	
C_B	B	x_B	b	a_1	a_2	a_3	a_4	a_5	a_6	a_7	Remark
0	a_3	x_3	4	$\boxed{2}$	1	1	0	0	0	0	min −ve $z_j - c_j = -5M-5$
$-M$	a_6	x_6	24	3	4	0	−1	0	1	0	∴ a_1 enter
$-M$	a_7	x_7	6	2	−3	0	0	−1	0	1	$\min\left(\frac{4}{2}, \frac{24}{3}, \frac{6}{2}\right) = \frac{4}{2}$
			$z_j - c_j$	$-5M-5$ ↑	$-M-11$	0	M	M	0	0	∴ a_3 exist 2 key
5	a_1	x_1	2	1	$1/2$	$1/2$	0	0	0	0	
$-M$	a_6	x_6	18	0	$5/2$	$-3/2$	−1	0	1	0	
$-M$	a_7	x_7	2	0	−4	−1	0	−1	0	1	
			$z_j - c_j$	0	$\frac{3M}{2} - \frac{17}{2}$	$\frac{5M}{2} + \frac{5}{2}$	M	M	0	0	

→ all $z_j - c_j \ge 0$, but artificial vectors a_6, a_7 appears in the basis at positive level

∴ There is no feasible solution