BS(CS)-5A Assignment No 2

(L.A)

Name: Affan Ahmad Enroll: 03-134221-003

Q No 1)

(a)

$$x + 2y + z = 2$$
$$2x - 2y + 3z = 1$$
$$x + 2y + (a^2 - 3)z = a$$

Sol:

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 2 \\ 2 & -2 & 3 & 1 \\ 1 & 2 & (a^2-3) & a \end{array}\right]$$

$-2R_1 + R_2 = R_2$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 2 \\ 0 & -6 & 1 & 3 \\ 1 & 2 & (a^2-3) & a \end{array}\right]$$

$-1R_1 + R_3 = R_3$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 2 \\ 0 & -6 & 1 & 3 \\ 0 & 0 & (a^2-4) & -(2+a) \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 2 \\ 0 & 1 & 1/6 & 3/2 \\ 0 & 0 & (a^2-4) & a-2 \end{array}\right]$$

No solution

$$\begin{cases} q^2 - 4 = 0 \\ q - 4 \neq 0 \end{cases} \rightarrow \begin{cases} q^2 = 4 \rightarrow q = \pm\sqrt{4} \\ q \neq 4 \end{cases}$$

$$q = \pm\sqrt{4}$$

one solutions

$$q^2 - 4 \neq 0 \rightarrow q \neq \pm\sqrt{4}$$

Many solutions

$$\begin{cases} q^2 - 4 = 0 \\ q - 4 = 0 \end{cases} \quad \begin{cases} q = \pm\sqrt{4} \\ q = 4 \end{cases}$$

(Q No 2)

let, x be the no of lilies
y be the no of roses
z be the no of daisies

$$3x + 2y + 0.5z = 24 \quad — ①$$

Then $x + y + z = 12$

$$x = 12 - y - z \quad — ②$$

substitute ② in ①

$$3(12 - y - z) + 2y + 0.5z = 24$$

$$36 - y - 2.5z = 24$$

$$y = 12 - 2.5z \quad — ③$$

z can be any positive number
if

$z = 2$ then $y = 12 - 5 = 7$, and $x = 12 - 7 - 2 = 3$

$z = 4$ then $y = 12 - 10 = 2$ and $x = 12 - 2 - 4 = 6$

CamScanner

Q No3)

Let : T = spending on TV

R = " " Radio

M = " " magazines

condition, we have

$$T + (R+M) = 60,00000$$

$$T - (R+M) = 0$$

$$T = R + M$$

$$R + M = \frac{60,00000}{2} = 30,00000 \quad \text{—} \textcircled{1}$$

$$T + M = 5R$$

$$30,00000 + M = 5R$$

$$5R - M = 30,00000 \quad \text{—} \textcircled{2}$$

Add eq ① and ②

$$R + \cancel{M} = 30,00000$$

$$5R - \cancel{M} = 30,00000$$

$$6R = 60,00000$$

$$\boxed{R = 10,00000}$$

$\boxed{T = 30,00000}$ and $\boxed{M = 20,00000}$

Q.No. 4)

C: $x_2 + 300 = 400 + x_3$

A: $x_3 + 750 = x_4 + 250$ inflow = outflow

B: $x_4 + 200 = x_1 + 300$

D: $x_1 + 100 = x_2 + 400$

A: $x_3 - x_4 = -500$

B: $x_1 - x_4 = -100$

C: $x_2 - x_3 = 100$

D: $x_1 - x_2 = 300$

$$\left[\begin{array}{cccc|c} 0 & 0 & 1 & -1 & -500 \\ 1 & 0 & 0 & -1 & -100 \\ 0 & 1 & -1 & 0 & 100 \\ 1 & -1 & 0 & 0 & 300 \end{array}\right]$$

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 300 \\ 1 & 0 & 0 & -1 & -100 \\ 0 & 1 & -1 & 0 & 100 \\ 0 & 0 & 1 & -1 & -500 \end{array}\right]$$

interchange

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 300 \\ 0 & 0 & 1 & -1 & -500 \\ 1 & 0 & 0 & -1 & -100 \\ 0 & 1 & -1 & 0 & 100 \end{array}\right]$$

① $-R_3+R_1 : R_3$
and interchange

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 300 \\ 0 & 1 & 0 & -1 & -400 \\ 0 & 0 & 1 & -1 & -500 \\ 0 & 1 & -1 & 0 & 100 \end{array}\right]$$

② $-R_4+R_2 = R_4$
③ $R_4+R_3 = R_4$

$$\left[\begin{array}{cccc|c} 1 & -1 & 0 & 0 & 300 \\ 0 & 1 & 0 & -1 & -400 \\ 0 & 0 & 1 & -1 & -500 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

Let D: $\boxed{x_4 = S}$

$x_1 - x_2 = 300$

$x_2 - x_4 = -400 \longrightarrow x_2 - S = -400 \rightarrow \boxed{x_2 = -400+S}$

$x_3 - x_4 = -500$

$\boxed{x_3 = -500+S}$

(b) $\boxed{x_4 = 100}$ if $x_4 = 100$

$\rightarrow x_2 - 100 = -400$

$x = -400 + 100$

$\boxed{x_2 = -300}$

$x_1 + 300 = 300$

$\boxed{x_1 = 0}$

$\boxed{x_3 = -400}$

$\boxed{x_3 = 0}$ if $x_3 = 0$

$0 - x_4 = -500$

$\cancel{-}x_4 = \cancel{-}500$

$\boxed{x_4 = 500}$

$x_2 - 500 = -400$

$x_2 = -400 + 500$

$\boxed{x_2 = 100}$

$x_1 - 100 = 300$

$x_1 = 300 + 100$

$\boxed{x_1 = 400}$