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Ans. to the Ques. No: 01

$$x - 4y + z = 6$$

$$4x - y + 2z = -1$$

$$2x + 2y - 3z = 20$$

$$D = \begin{vmatrix} 1 & -4 & 1 \\ 4 & -1 & 2 \\ 2 & 2 & -3 \end{vmatrix} = 1(3-4) + 4(-12-4) + 1(8+2) \\ = -1 - 64 + 10 = -55$$

$$D_x = \begin{vmatrix} 6 & -4 & 1 \\ -1 & -1 & 2 \\ -20 & 2 & -3 \end{vmatrix} = 6(3-4) + 4(3+40) + 1(-2-10) \\ = -6 + 172 - 22 = 144$$

$$D_y = \begin{vmatrix} 1 & 6 & 1 \\ 4 & -1 & 2 \\ 2 & -20 & -3 \end{vmatrix} = 1(3+40) - 6(12-4) + 1(-80-2) = 61$$

$$D_2 = \begin{vmatrix} 1 & -4 & 6 \\ 4 & -11 & -1 \\ 2 & 2 & -20 \end{vmatrix} = 1(20+2) + 4(-80+2) + 6(8+2) \\ = 22 - 312 + 60 = -230$$

$$x = \frac{D_x}{D} = \frac{144}{-55} = -\frac{144}{55}$$

$$y = \frac{D_y}{D} = \frac{61}{-55} = -\frac{61}{55}$$

$$z = \frac{D_z}{D} = \frac{-230}{-55} = \frac{46}{11}$$

$$\therefore x = -\frac{144}{55}, y = -\frac{61}{55}, z = \frac{46}{11} \quad \text{Ans.}$$

$$(01-2-1)(0p+8)p + (p-8)1 = \begin{vmatrix} 1 & p-1 & 2 \\ 2 & 1 & 1 \\ 8- & 2 & 01- \end{vmatrix} = 10$$

$$10 = (208-1)(p-21)2 - (0p+8)1 = \begin{vmatrix} 1 & 2 & 1 \\ 2 & 1 & p \\ 8- & 2 & 01- \end{vmatrix} = 10$$

$$\frac{27}{11} \lambda_1 - 3\lambda_2 + \lambda_3 = 4 \quad \frac{08}{11} = 18$$

$$2\lambda_1 - \lambda_2 = -2$$

$$4\lambda_1 - 3\lambda_3 = 8 \quad \frac{08}{11} = 18$$

$$D = \begin{vmatrix} 1 & -3 & 1 \\ 2 & -1 & 0 \\ 4 & 0 & -3 \end{vmatrix} = 1(3-0) + 3(-6-0) + 1(0+4) = 3 - 18 + 4 = -11$$

$$D_{\lambda_1} = \begin{vmatrix} 4 & -3 & -1 \\ 2 & -1 & 0 \\ 0 & 0 & -3 \end{vmatrix} = 4(3-0) + 3(6-0) + 1(0-0) = 12 + 18 = 30$$

$$D_{\lambda_2} = \begin{vmatrix} 2 & 4 & 2 \\ 2 & -2 & 0 \\ 4 & 0 & -3 \end{vmatrix} = 1(6-0) - 4(-6-0) + 1(0+8) = 6 + 24 + 8 = 38$$

$$D_{\lambda_3} = \begin{vmatrix} 1 & -3 & 4 \\ 2 & -1 & -2 \\ 4 & 0 & 8 \end{vmatrix} = 1(0-0) + 3(0+8) + 4(0+4) = 24 + 16 = 40$$

$$\lambda_1 = \frac{30}{-11} = -\frac{30}{11}, \lambda_2 = \frac{38}{-11} = -\frac{38}{11}, \lambda_3 = \frac{40}{-11} = -\frac{40}{11}$$

$$\therefore \lambda_1 = -\frac{30}{11}, \lambda_2 = -\frac{38}{11}, \lambda_3 = -\frac{40}{11} \text{ Ans.}$$

$$(p+0) + (0-2-8)p + (0-8)p = \begin{vmatrix} 1 & 8 & 1 \\ 0 & 1 & 1 \\ 8 & 0 & p \end{vmatrix} = 0$$

$$11 - (8p + 81 - 8p) = 0 \Rightarrow 11 - 80 = -69$$

$$(28) -\lambda_1 - 4\lambda_2 + 2\lambda_3 + \lambda_4 = -32$$

$$2\lambda_1 - \lambda_2 + 7\lambda_3 + 9\lambda_4 = 19$$

$$(0-0) + (0-2-8)p + (0-8)p + 1\lambda_2 + 3\lambda_3 + 1\lambda_4 = 11$$

$$0p = 81 + 21 = 102$$

$$(8+0) D = \begin{vmatrix} -1 & -4 & 2 & -10 \\ 2 & 1 & 7 & 9 \\ -18 & 15 & 3 & 0 \\ 1 & -2 & 1 & 8 \end{vmatrix} = 10$$

$$(p+0) + (8+0)p + (0-0)p = \begin{vmatrix} -1 & 7 & 9 \\ 1 & 3 & 1 \\ -2 & 1 & 4 \end{vmatrix} + 9 \begin{vmatrix} 2 & 7 & 9 \\ 1 & 3 & 1 \\ 1 & 1 & -9 \end{vmatrix}$$

$$= \begin{vmatrix} 2 & -1 & 9 \\ 1 & 1 & 1 \\ 1 & -2 & 9 \end{vmatrix}$$

$$= -1 \begin{vmatrix} 2 & -1 & 7 \\ -1 & 1 & 3 \\ 1 & -2 & 1 \end{vmatrix} = -10$$

$$= -90 - 332 + 16 - 17 = -423$$

$$D_{21} = \begin{vmatrix} -32 & -4 & 2 & 1 \\ 14 & -1 & 7 & 9 \\ 12 & 1 & 3 & 1 \\ -4 & -2 & 1 & -4 \end{vmatrix}$$

$$= 32 \begin{vmatrix} -1 & 7 & 9 \\ 11 & 3 & 1 \\ -2 & 1 & -4 \end{vmatrix} + 4 \begin{vmatrix} 14 & 7 & 9 \\ 11 & 3 & 1 \\ -4 & -1 & -4 \end{vmatrix}$$

$$= \begin{vmatrix} 14 & -1 & 9 \\ 11 & 1 & 1 \\ -4 & 2 & -4 \end{vmatrix} - \begin{vmatrix} 14 & -1 & 7 \\ 11 & 1 & 3 \\ -4 & -2 & 1 \end{vmatrix}$$

$$= -2880 + 1220 - 460 + 5$$

$$= -3340 + 12225$$

$$= -2115$$

$$D_{\lambda_2} = \begin{bmatrix} -1 & -32 & 2 & 1 \\ 2 & 14 & 7 & 9 \\ -1 & 11 & 3 & 1 \\ 1 & -4 & 1 & -4 \end{bmatrix}$$

$$= -1 \begin{bmatrix} 14 & 7 & 9 \\ 11 & 3 & 1 \\ -4 & 1 & -4 \end{bmatrix} + 32 \begin{bmatrix} 2 & 7 & 9 \\ 3 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 14 & 9 \\ -1 & 11 & 3 \\ 1 & -4 & 1 \end{bmatrix}$$

$$\Delta = -305 - 2656 - 370 - 53 = -3384$$

$$D_{\lambda_3} = \begin{bmatrix} -1 & -32 & 1 \\ 2 & 14 & 9 \\ -1 & 11 & 1 \\ 1 & -2 & -4 & -4 \end{bmatrix}$$

$$= -1 \begin{bmatrix} -1 & 14 & 9 \\ 1 & 11 & 1 \\ -2 & -4 & -4 \end{bmatrix} + 4 \begin{bmatrix} 2 & 14 & 9 \\ -1 & 11 & 1 \\ 1 & -4 & -4 \end{bmatrix}$$

$$-32 \begin{bmatrix} 2 & -1 & 9 \\ 1 & 1 & 1 \\ 1 & -2 & -4 \end{bmatrix} = -1 \begin{bmatrix} 2 & -1 & 11 \\ 1 & 1 & 11 \\ 1 & -2 & -4 \end{bmatrix} =$$

$$= -230 - 740 - 2556 - 43 = -1269$$

$$D_{24} = \begin{bmatrix} -1 & -4 & 2 & -32 \\ 2 & -1 & 7 & 19 \\ -1 & 1 & 3 & 11 \\ 1 & -2 & 1 & -4 \end{bmatrix}$$

$$= 1 \begin{bmatrix} -1 & 7 & 19 \\ 1 & 3 & 11 \\ -2 & 1 & -4 \end{bmatrix} + 4 \begin{bmatrix} 2 & 7 & 19 \\ -1 & 3 & 11 \\ 1 & 1 & -4 \end{bmatrix}$$

$$= 2 \begin{bmatrix} 2 & -1 & 14 \\ -1 & 1 & 11 \\ 1 & -2 & -4 \end{bmatrix}$$

$$= 32 \begin{bmatrix} 2 & -1 & 7 \\ -1 & 1 & 3 \\ 1 & -2 & 1 \end{bmatrix}$$

$$= \cancel{25} 2$$

$$= -5 - 212 + 86 + 608$$

$$= 699 - 212 = 487$$

$$\lambda_1 = \frac{-2115}{-423} = 5$$

$$\lambda_2 = \frac{-3384}{-423} = 8$$

$$\lambda_3 = \frac{-1269}{-423} = 3$$

$$\lambda_4 = \frac{487}{-423} = -\frac{6}{5}$$

$$\lambda_1 = 5, \lambda_2 = 8, \lambda_3 = 3, \lambda_4 = -\frac{6}{5} \quad \text{Ans.}$$

$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

$$8 + 3 + 5 = 16$$