Quiz . no :- 1

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① Writing the Equation in Augmented matrix form

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 2 & 1 & 9 & 6 & -3 \\ 3 & 2 & 4 & 8 & 1 \end{array}\right] \qquad R_3 - 2R_1$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 2-2 & 1-6 & 9-10 & 6-4 & -3-4 \\ 3 & 2 & 4 & 8 & 1 \end{array}\right].$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & -5 & -1 & 2 & -7 \\ 3 & 2 & 4 & 8 & 1 \end{array}\right] \qquad R_4 - 3R_1$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & -5 & -1 & 2 & -7 \\ 3-3 & 2-9 & 4-15 & 8-6 & 1-6 \end{array}\right].$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & -5 & -1 & 2 & -7 \\ 0 & -7 & -11 & 2 & -5 \end{array}\right] \qquad R_3 - 5R_2$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0+0 & -5+5 & -1-15 & 2-20 & -7-0 \\ 0 & -7 & -11 & 2 & -5 \end{array}\right].$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 & : & 2 \\ 0 & -1 & 3 & 4 & : & 0 \\ 0 & 0 & -16 & -18 & : & -7 \\ 0 & -7 & -11 & 2 & : & -5 \end{bmatrix} \quad R_4 - 7R_2$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 & : & 2 \\ 0 & -1 & 3 & 4 & : & 0 \\ 0 & 0 & -16 & -18 & : & -7 \\ 0-0 & -7+7 & -11+21 & 2-28 & : & -5-0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 & : & 2 \\ 0 & -1 & 3 & 4 & : & 0 \\ 0 & 0 & -16 & -18 & : & -7 \\ 0 & 0 & -32 & -26 & : & -5 \end{bmatrix} \quad R_4 - 2R_3$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 & : & 2 \\ 0 & -1 & 3 & 4 & : & 0 \\ 0 & 0 & -16 & -18 & : & -7 \\ 0-0 & 0-0 & -32+32 & -26+36 & : & -5+14 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 3 & 5 & 2 & : & 2 \\ 0 & -1 & 3 & 4 & : & 0 \\ 0 & 0 & -16 & -18 & : & -7 \\ 0 & 0 & 0 & 10 & : & 9 \end{bmatrix}$$

$\Rightarrow \quad 10t = 9 \quad \boxed{t = 10/9}$

$\Rightarrow \quad -16z - 18t = -7$

$-16z - 18(10/9) = -7$

$-16z - 20 = -7$

$-16z = +20 - 7$

$\boxed{z = -13/16}$

$$-y + 3x + 4t = 0$$

$$-y + 3\left(-\frac{13}{16}\right) + 4\left(\frac{10}{9}\right) = 0$$

$$-y - \frac{13}{16} + \frac{40}{9} = 0$$

$$\therefore y = \frac{40}{9} - \frac{13}{16}$$

$$= \frac{16 \times 40 - 13 \times 9}{9 \times 16} = \frac{640 - 117}{144}$$

$$\boxed{y = \frac{523}{144}}$$

$$x + 3y + 5z + 2t = 2$$

$$x + 3\left(\frac{523}{144}\right) + 5\left(\frac{-13}{16}\right) + 2\left(\frac{10}{9}\right) = 2$$

$$x + \frac{1569}{144} - \frac{65}{16} + \frac{20}{9} = 2$$

$$x + \frac{1569 - 9\times65 + 20\times16}{144} = 2$$

$$x + \frac{1569 - 585 + 320}{144} = 2$$

$$x + \frac{1331}{144} = 2$$

$$x = 2 - \frac{1331}{144}$$

$$x = \frac{144\times2 - 1331}{144} \Rightarrow \boxed{x = \frac{-1043}{144}}$$