Name:

Faran-Ali Khan

ID: 7395

Subject:

Differential Equations

Quiz Assignment:

Instructor:

Madam Sumaira Mazhar

Question:

Writing the equation in Augmented matrix:

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

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

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

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

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

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

$$\left[\begin{array}{cccc:c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & -16 & -18 & -7 \\ 0 & -7 & -11 & 2 & -5 \end{array}\right] \quad R_4 - 7R_2$$

$$\left[\begin{array}{cccc:c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & -16 & -18 & -7 \\ 0 & 0 & -32 & -26 & -5 \end{array}\right] \quad R_4 - 2R_3$$

$$\left[\begin{array}{cccc:c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & -16 & -18 & -7 \\ 0-0 & 0-0 & -32+32 & -26+36 & -5+14 \end{array}\right]$$

$$\left[\begin{array}{cccc:c} 1 & 3 & 5 & 2 & 2 \\ 0 & -1 & 3 & 4 & 0 \\ 0 & 0 & -16 & -18 & -7 \\ 0 & 6 & 0 & 10 & 9 \end{array}\right]$$

$$6t = 9 \Rightarrow t = 10/9$$

$$-16z - 180 = -7$$

$$-16z - 18\left(\frac{10}{9}\right) = -7$$

$-16z - 20 = -7$

$-16z = -20 - 7$

$z = -13/16$

$\rightarrow -y + 3z + 4t = 0$

$-y + 3(-13/16) + 4(10/9) = 0$

$-y - 13/16 + 40/9 = 0$

$y = 40/9 - 13/16$

$= 16 \times 40 - 13 \times 9 / 9 \times 16 = 640 - 117 / 144$

$y = 523/144$

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

$x + 3(523/144) + 5(-13/16) + 2(10/9) = 2$

$x = 1569/144 - 65/16 + 120/9 = 2$

$x = 1569 - 9 \times 65 + 20 \times 16 / 144 = 2$

$x + 1569 - 585 + 320 / 144 = 2$

$x + 1331/144 = 2$

$$a = 2 - 1331/144$$

$$a = 144 \times 2 - 1331/144$$

$$a = -1043/144.$$