Quiz

Differential Equation

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Given data

Pakistani, Egyptian, & American Cotton Ratio

A	:	B	:	C
1	:	2	:	1
2	:	1	:	1
2	:	0	:	2

A, B, & C cost ⇒ 40, 50 & 60 /Rs

Solution

the given data in linear Equation.

$$x + 2y + z = 40$$
$$2x + y + z = 50$$
$$2x + \quad + 2z = 60$$

Now we use Gauss-Jordan Elimation to find the value of x, y, & z.

(PT-0)

* where x, y & z are the cost of a "kg" of each country.

$$x + 2y + z = 40$$
$$2x + y + z = 50$$
$$2x + 2z = 60$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 40 \\ 2 & 1 & 1 & 50 \\ 2 & 0 & 2 & 60 \end{array}\right]$$

$$\left[\begin{array}{ccc:c} 1 & 2 & 1 & 40 \\ 0 & -3 & -1 & -30 \\ 0 & -4 & 0 & -20 \end{array}\right] \sim \begin{array}{l} R_2 - 2R_1 \\ R_3 - 2R_1 \end{array}$$

$$\left[\begin{array}{ccc:c} 1 & 2 & 1 & 40 \\ 0 & 1 & 1/3 & 10 \\ 0 & -4 & 0 & -20 \end{array}\right] \sim -\frac{1}{3} R_2$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 40 \\ 0 & 1 & 1/3 & 10 \\ 0 & 0 & 4/3 & 20 \end{array}\right] \sim R_2 \to 4/R_2$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 40 \\ 0 & 1 & 1/3 & 10 \\ 0 & 0 & 1 & 15 \end{array}\right] \sim 3/4\, R_2$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 0 & 25 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 15 \end{array}\right] \sim \begin{array}{l} R_1 - R_2 \\ R_2 - 1/3\, R_2 \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 15 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 15 \end{array}\right] \sim R_1 - 2R_2$$

So we find the value value of $x, y, \& z$

$$\boxed{\begin{array}{l} x = 15 \\ y = 5 \\ z = 15 \end{array}}$$

Ans