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Section — B

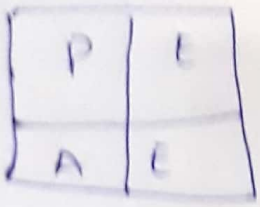
Quiz — 02

Subject — B.E

Dep — (Electrical)

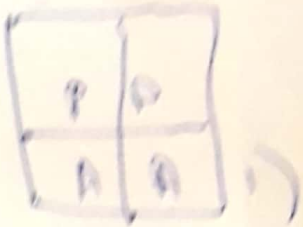
Sol

1 : 2 : 1 = 2 : 1 : 1 = 2 : 0 : 2



B_1

B_2



B_3

let x, y and z be the costing of Pakistani Egyptian and American cotton respectively according to given condition.

$$\frac{1}{4}x + \frac{2}{4}y + \frac{1}{4}z = 40$$

$$\frac{2}{4}x + \frac{1}{4}y + \frac{1}{4}z = 50$$

$$\frac{2}{4}x + \frac{2}{4}z = 60$$

$$x + 2y + z = 160$$

$$2x + y + z = 200$$

$$x + z = 120$$

(2)

In matrix form we can

$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 160 \\ 200 \\ 120 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix} \quad x = \begin{bmatrix} x \\ y \\ z \end{bmatrix} \quad b = \begin{bmatrix} 160 \\ 200 \\ 120 \end{bmatrix}$$

$$Ax = b$$

$$A \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

$$A_1 \begin{bmatrix} 160 & 2 & 1 \\ 200 & 1 & 1 \\ 100 & 0 & 1 \end{bmatrix}$$

$$A_2 \begin{bmatrix} 1 & 160 & 1 \\ 2 & 200 & 1 \\ 1 & 100 & 1 \end{bmatrix}$$

$$A_3 \begin{bmatrix} 1 & 2 & 160 \\ 2 & 1 & 200 \\ 1 & 0 & 120 \end{bmatrix}$$

$$|A| = \begin{vmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{vmatrix}$$

$$= 1(1\times1 - 0\times1) - 2(2\times1 - 1\times1) + 1(2\times1 - 1\times1)$$

$$= -2$$

$$|A_1| \begin{vmatrix} 160 & 2 & 1 \\ 200 & 1 & 1 \\ 160 & 0 & 1 \end{vmatrix} = 160(1\times1 - 0\times1) - 2(200\times1 - 120\times1)$$

$$|A_1| = -120$$

$$|A_2| = \begin{vmatrix} 1 & 160 & 1 \\ 2 & 200 & 1 \\ 1 & 120 & 1 \end{vmatrix}$$

$$= -1(200\times1 - 120\times1) - 160(2\times1 - 1\times1) + 1(2\times1 - 1\times200)$$

$$|A_2| = -40$$

$$|A_3| \begin{vmatrix} 1 & 2 & 160 \\ 2 & 1 & 200 \\ 1 & 1 & 120 \end{vmatrix}$$

$= 1(1 \times 120) - 0 \times 200) - 2(2 \times 120 - 1 \times 200) + 160(2 \times 100 - 1 \times 1)$

$|A_3| = -120$

According to cramer Rule

$x = \frac{|A_1|}{|A|} = \frac{-120}{-2} = 60$

$y = \frac{|A_2|}{|A|} = \frac{-40}{-2} = 20$

$z = \frac{|A_3|}{|A|} = \frac{-120}{-2} = 60$

$(x, y, z) = (60, 20, 60)$