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Homework :-5

CS-4661

2 A X_1 = GPA X_2 = Age X_3 = Type of Position

1 = Technical

0 = Non technical

Target $= \theta_0 + \theta_1 X_1 + \theta_2 X_2 + \theta_3 X_3 + \theta_4 X_1 X_2 + \theta_5 X_1 X_3$

now we fit the value $\theta_0 = 30$, $\theta_1 = 20$, $\theta_2 = 0.07$, $\theta_3 = -30$, $\theta_4 = 0.01$, $\theta_5 = 10$

Target $= 30 + 20X_1 + 0.07X_2 - 30X_3 + 0.01X_1X_2 + 10X_1X_3$

$\Rightarrow$ for technical position

$X_3 = 1$

$\text{Target}_{(\text{technical})} = 30 + 20X_1 + 0.07X_2 - 30 + 0.01X_1X_2 + 10X_1$ — A

$\Rightarrow$ for non-technical position $X_3 = 0$

$\text{Target}_{(\text{non technical})}$

$\text{Target}_{(\text{non-technical})} = 30 + 20X_1 + 0.07X_2 + 0.01X_1X_2$ — B

From eqn [A] and [B] we found that

$$10X_1 - 30 = 0$$

$$X_1 = \frac{30}{10}$$

$$\boxed{X_1 = 3}$$

so it only depend on the GPA value

when

$$10X_1 - 30 > 0$$

salary of Technical position is high

when

$$10X_1 - 30 < 0$$

salary of Non Technical position is high

This analysis is perfectly match with

Answer (iii)

2 | B

$$\text{Salary}_{(\text{technical})} = 30 + (20 \times 4) + (0.07 \times 27) + (0.01 \times 4 \times 27) + 10(4)$$

$$\text{Salary}_{(\text{technical})} = 122.97 \text{ K\$}$$

$$\text{Salary}_{(\text{non-technical})} = 30 + (20 \times 4) + (0.07 \times 27) + (0.01 \times 4 \times 27)$$

$$\text{Salary}_{(\text{non technical})} = 112.97 \text{ K\$}$$