

**GE 401**  
**ENGINEERING ECONOMY**  
**CHAPTER 8**  
**Cost Concepts**

Quiz No.1 for group no.6255

❖ The total cost ( in SR ) for certain product is given by :

$$TC(x) = 50,000 + 20.2x + 0.0001x^2 \quad \text{SR}$$

Where  $x$  is the number of parts produced annually .

Assuming that the sales price is SR 35/part, it is required to determine :

- 1) The annual production quantity that minimizes the average cost ? And what is this minimum average cost ?
- 2) What is the maximum annual profit that can be made ?
- 3) Within what range of production can the company make a profit ?

• **Solution :**

$$1) \quad \begin{aligned} TC(x) &= 50,000 + 20.2x + 0.0001x^2 \\ TR(x) &= 35x \\ AC(x) &= \frac{50,000}{x} + 20.2 + 0.0001x \end{aligned}$$

$$\frac{dAC(x)}{dx} = 0 \Rightarrow -\frac{50,000}{x^2} + 0.0001 = 0 \Rightarrow x = 22,360.68 \text{ parts}$$

$$AC(22,360.68) = \frac{50,000}{22,360.68} + 20.2 + 0.0001(22,360.68)$$

$$= 24.67 \text{ SR/part}$$

2)

$$TR - TC = TP \Rightarrow 14.8x - 50,000 - 0.0001x^2$$

$$\frac{dTP(x)}{dx} = 0 \Rightarrow 14.8 - 0.0002x = 0 \Rightarrow x = 74,000 \text{ parts.}$$

$$TP(74,000) = 14.8(74,000) - 50,000 - 0.0001(74,000)^2$$

$$TP(74,000) = 497,600 \text{ SR/year.}$$

3)

Break - Even

$$TR - TC = 0$$

$$35x - 50,000 - 20.2x - 0.0001x^2 = 0$$

$$14.8x - 50,000 - 0.0001x^2 = 0$$

$$x_1 = 3459.23 \text{ parts.}$$

$$x_2 = 144541 \text{ parts}$$