

**GE 401**  
**ENGINEERING ECONOMY**  
**CHAPTER 8**  
**Cost Concepts**  
 Quiz No.1 for group no.18446

- ❖ A company has estimated that the total production cost ( TC ) and selling price ( SP ) for a given product are as follows :

$$\begin{aligned} TC(t) &= 50t + 50,000 \quad \text{SR} \\ SP(t) &= 200 - 0.02t \quad \text{SR/unit} \end{aligned}$$

Where  $t$  is number of units produced annually. It is required to :

- 1) Calculate the revenue and profit when revenue is maximum .
- 2) Calculate average and total profit when profit is maximum .
- 3) Evaluate marginal and average cost at  $t = 10,000$  units .

• **Solution :**

1)  $TC(t) = 50t + 50,000$  ;  $TP(t) = 150t - 0.02t^2 - 50,000$   
 $TR(t) = 200t - 0.02t^2$   
 $\frac{dTR(t)}{dt} = 0 \Rightarrow 200 - 0.04t = 0 \Rightarrow t = 5000 \text{ Unit}$   
 $\therefore TR(5000) = 200(5000) - 0.02(5000)^2 = 500,000 \text{ SR}$   
 $TP(5000) = 150(5000) - 0.02(5000)^2 - 50,000 = 200,000 \text{ SR}$

2)  $\frac{dTP(t)}{dt} = 0 \Rightarrow 150 - 0.04t = 0 \Rightarrow t = 3750 \text{ Unit}$   
 $ATP = 150 - 0.02t - 50,000/t$   
 $ATP(3750) = 150 - 0.02(3750) - \frac{50,000}{3750} = 61.667 \text{ SR/unit}$   
 $TP(3750) = 150(3750) - 0.02(3750)^2 - 50,000 = 231,250 \text{ SR}$

3)  $t = 10,000 \text{ units}$   
 $MTC(t) = \frac{dTC(t)}{dt} = 50$   
 $ATC(t) = \frac{TC(t)}{t} = 50 + \frac{50,000}{t}$   
 $\therefore MTC(10,000) = 50 \text{ SR}$   
 $ATC(10,000) = 50 + \frac{50,000}{10,000} = 55 \text{ SR/unit}$