

TOPIC

Economics – Section VI – Question 11

QUESTION

A mechanical engineer bought a car for \$20,000. She expects it to have a \$3,000 resale value at the end of 10 years. Fixed costs are \$300 per year and running costs are \$0.20/mile. The engineer drives 12,000 miles per year. At a 6% interest rate, the average annual cost computed by the method of straight-line depreciation plus average interest most nearly is

- (A) \$3,000
- (B) \$5,141
- (C) \$7,163
- (D) \$20,000

HINT

$$\text{Straight-line depreciation} = \frac{P-S}{n}$$
$$\text{Average interest} = (P - S) \left(\frac{i}{2} \right) \left(\frac{n+1}{n} \right) + Si$$

SOLUTION

$$\begin{aligned} \text{Straight-line depreciation} \\ &= \frac{P - S}{n} \\ &= \frac{20000 - 3000}{10} \\ &= \$1700 \end{aligned}$$

$$\begin{aligned} \text{Average interest} \\ &= (P - S) \left(\frac{i}{2} \right) \left(\frac{n+1}{n} \right) + Si \\ &= (20000 - 3000) \left(\frac{0.06}{2} \right) \left(\frac{10+1}{10} \right) + 3000 \times 0.06 \\ &= 561 + 180 \\ &= \$ 741 \end{aligned}$$

$$\begin{aligned} \text{Fixed plus running costs} \\ &= 300 + 0.20 (12000) \\ &= \$2700 \end{aligned}$$

$$\begin{aligned} \text{Average annual cost} \\ &= 1700 + 741 + 2700 \\ &= \$5,141 \end{aligned}$$

ANSWER

(B)

CONTRIBUTOR

Ram Pendyala