Student ID: 14210

Title :- Construction Financial Management

Course Code:- CE-602

Discipline :- MS Civil Engineering

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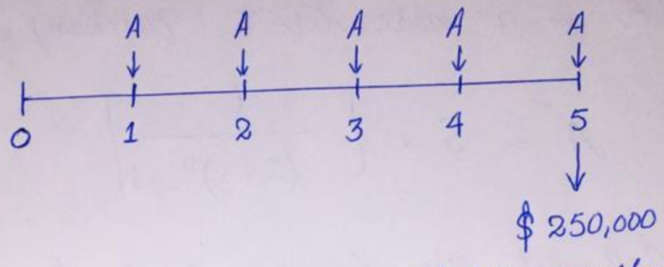
Solution (01) :- The problem can be presented by diagrammatically as follow :



(Fig) Sum of \$ 250,000 accumulated by 5 uniform periodic annual payments.

We have to bear in mind that the excavator always costs \$ 250,000, whether now or after 5 years, as the inflation-free assumption has been made.

Applying eq : $250{,}000 = A \times \left[\dfrac{(1+i)^n - 1}{i}\right] = A \times 5.42$

(5.42 is found by substituting $i = 0.04$ & $n = 5$)

$$A = \frac{250{,}000}{5.42}$$

$$A = \$\,46157$$

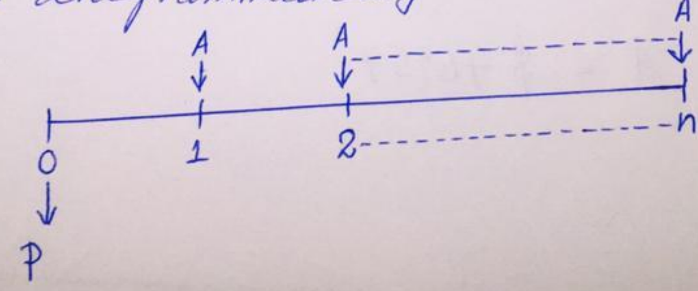
In fact, we can Calculate the Sinking fund (A) in a more direct (quicker) way:

$$A = S \times \left[\frac{i}{(1+i)^n - 1} \right]$$

Calculate the Sinking fund \$46,157.

The value of $\left[\frac{i}{(1+i)^n - 1} \right]$

∴ The previous Two Subsections, the relationship between the final accumulated Sum and a principle sum investment or a Series of Uniform installment investment are discussed. This Subsection discusses the relationship between an initial loan (P) and the Subsequent Uniform Series of payments to offset against the loan (P). The Situation can be Presented in diagrammatically.



Since; Equation: $S = P(1 \times i)^n$

$$S = A\left[\frac{(1+i)^n - 1}{i}\right]$$

Solving the above Two equation by eliminating S, we obtain

$$A = P \times \left(\frac{i(1+i)^n}{(1+i)^n - 1}\right)$$

The value of $\left[\frac{i(1+i)^n}{(1+i)^n - 1}\right]$

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Problem (02) Solution :-

P = Selling price per Unit = \$ 900

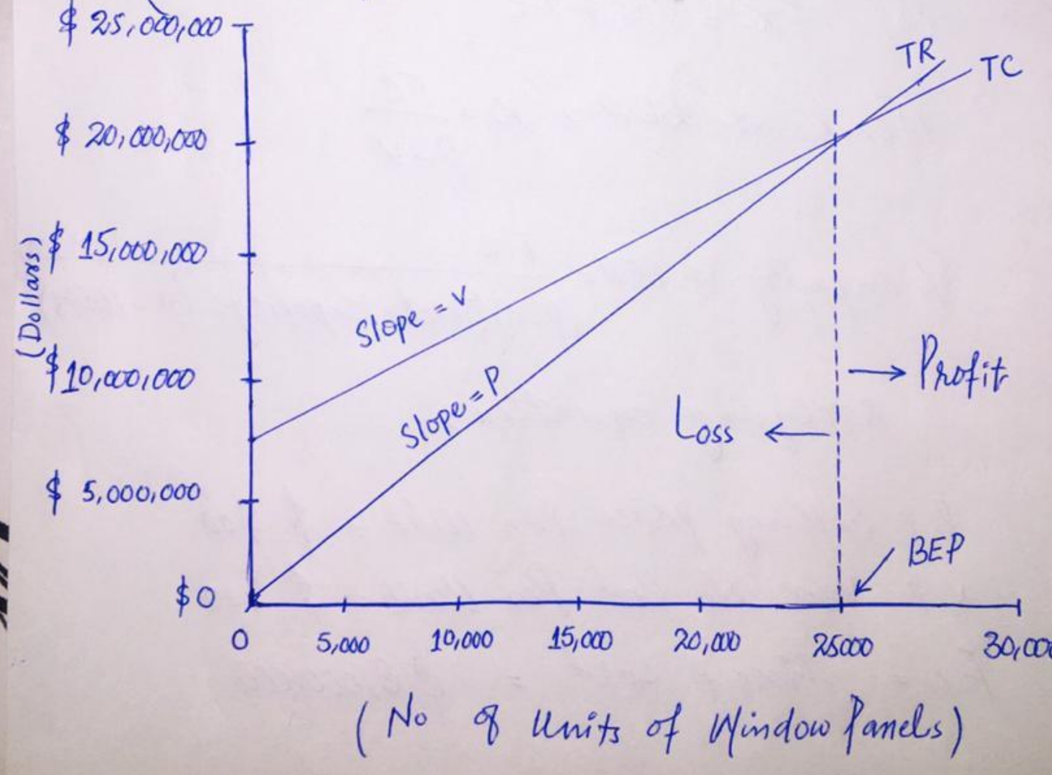
V = Variable Cost per Unit = \$ 500

Fc = fixed cost = \$ 8,000,000

We can express our analysis

Volume	X = 18,000	X = 20,000	X = 22,000
TR (Total Revenues)	\$ 900 × 18000 = \$ 16,200,000	\$ 900 × 20,000 = \$ 18,000,000	\$ 900 × 22,000 = \$ 19,800,000
Vc (Variable Cost)	\$ 500 × 18,000 = \$ 9000,000	\$ 500 × 20,000 = \$ 10,000,000	\$ 500 × 22,000 = \$ 11,000,000
Fc (Fixed Cost)	\$ 8,000,000	\$ 8,000,000	\$ 8,000,000
Tc (Total Cost)	\$ 17,000,000	\$ 18,000,000	\$ 19,000,000
Net Income	(\$ 800,000) Loss	0 BEP	\$ 800,000 Profit

(Cost-Volume-Profit analysis (or) Break-even analysis) we can see that breaking-even occurs when the volume "x" is 20,000 units. If "x" is smaller than 20,000 units, the company will suffer a loss. If "x" is greater than 20,000 units, the company will have a profit. For example, if this company has a total (maximum) capacity of making 25,000 units of window panels in a year, then it will have a maximum profit of $ 2,000,000. Verification of it is left to the readers. Since the break-even point is at 20,000 units, we say that the BEP is at 80% of the company's capacity. (i-e 20,000/25000 = 80%)



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Mathematically Presentation;

We are going to derive a mathematical formula for Calculating the value of "x" at BEP.

$$TR = Px$$

$$TC = Vc + Fc$$

or $TC = vx + Fc$

At BEP, $TR = TC$

So; $Px = Vx + FC$

Hence; at BEP: $x = \frac{FC}{P-V}$

$$\% \text{ Capacity at BEP} = \frac{FC}{(P-V)(\text{Total-Capacity-in-Units})} \times 100\%$$

Applying equation;

P = Selling price per unit = \$ 900

v = Variable Cost per Unit = \$ 500

Fc = fixed cost = \$ 8,000,000

Using Equation;

$$x = \frac{8,000,000}{900-500}$$

$$x = 20000 \text{ Units}$$

Equation; % Capacity of the company at BEP

$$= \frac{8,000,000}{(900-500)(25000)}$$

$$= 0.8 \text{ or } 80\%$$

The Construction material company sells one unit of the window panels it makes and gets ($900) for it. Since the variable cost of that unit amounts to ($500) and because ($900 - $500 = $400 so $400) remains as a contribution per unit towards paying off the fixed cost. The concept of contribution is an important one in cost-volume-profit analysis. Contribution is for paying off the fixed cost. if Contribution can cover fixed cost, there will be profit, and vice versa. We will see an example that applies the concept of contribution.