



A collage of various analytical chemistry and data visualization elements. It includes a lightbulb with a brain-like filament, a 3D pie chart, a flowchart with arrows, laboratory glassware like test tubes and flasks, and a smartphone displaying data. The background features a dark area with floating black circles and diamonds.

# EPEA516 ANALYTICAL SKILLS II

Dr. Harish Mittu  
Associate Professor

# Learning Outcomes



After this lecture, you will be able to

- solve problems based on relation between compound and simple interest.

# Problem 1

- What will be the difference between simple and compound interest on a sum of Rs. 30,000 put for 2 years at 5% p.a.?
- P = Rs. 30,000
- R = 5% p.a.
- n = 2 years
- C.I. – S.I. = ?
- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$

# Problem 1

- $P = 30,000$ ;  $R = 5\%$  p.a.;  $n = 2$  years; and  $C.I. - S.I. = ?$

- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$

$$= 30000 \times \left[ \frac{5}{100} \right]^2$$

$$= \frac{30000 \times 5 \times 5}{10000}$$

$$C.I. - S.I. = \text{Rs. } 75$$

## Problem 2

- If the difference between compound interest & simple interest on a certain sum of money for 2 years at 5% p.a. is Rs. 100, find the sum.

- $n = 2$
  - $R = 5\%$  p.a.
  - $C.I. - S.I. = \text{Rs. } 100$
  - $P = ?$
- 
- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$

## Problem 2

- $n = 2$ ,  $R = 5\%$  p.a., C.I. – S.I. = Rs. 100, and  $P = ?$

- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$

- $100 = P \left[ \frac{5}{100} \right]^2$

- $100 = P \left[ \frac{5 \times 5}{100 \times 100} \right]$

- $\frac{\cancel{100}^{\cancel{20}^4}}{\cancel{5}^{\cancel{5}}} = P$

- $P = \text{Rs. } 40,000$

## Problem 3

- Find the rate percent if the difference between the compound interest and simple interest on Rs. 40,000 for 2 years is Rs. 100.

- P = Rs. 40,000
- n = 2
- C.I. – S.I. = Rs. 100
- R = ?

- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$

## Problem 3

- $P = \text{Rs. } 40,000$ ;  $n = 2$ ;  $C.I. - S.I. = \text{Rs. } 100$ ; and  $R = ?$
- $C.I. - S.I. = P \left[ \frac{R}{100} \right]^2$
- $\cancel{100} = \cancel{40000} \times \left[ \frac{R}{100} \right]^2$
- $\frac{1}{400} = \left[ \frac{R}{100} \right]^2$
- $\frac{1}{20 \times 20} = \left[ \frac{R}{100} \right]^2$
- $\left[ \frac{1}{20} \right]^2 = \left[ \frac{R}{100} \right]^2$

# Problem 3

$$\bullet \left[ \frac{1}{20} \right]^2 = \left[ \frac{R}{100} \right]^2$$

$$\bullet \left[ \frac{1}{20} \right]^2 = \left[ \frac{R}{100} \right]^2$$

$$\bullet \frac{1}{20} = \frac{R}{100} \quad 5$$

$$\bullet R = 5\% \text{ p.a.}$$

## Problem 4

- Find the rate percent if the S.I. on a certain sum of money for 2 years is Rs. 4,000 and difference between the compound interest and simple interest is Rs. 100.
- $n = 2$
- $C.I. - S.I. = \text{Rs. } 100$
- $S.I. = \text{Rs. } 4,000$
- $R = ?$
- $C.I. - S.I. = \frac{R \times S.I.}{2 \times 100}$

## Problem 4

- $n = 2$ ; C.I. – S.I. = Rs. 100; S.I. = Rs. 4,000; and R = ?
- $C.I. - S.I. = \frac{R \times S.I.}{2 \times 100}$
- $100 = \frac{R \times 4000}{2 \times 100}$
- $R = \frac{5}{\frac{100 \times 2 \times 100}{4000}}$
- $R = 5\%$  p.a.

## Problem 5

- What will be the difference between simple and compound interest on a sum of Rs. 8,000 put for 3 years at 5% p.a.?
- P = 8,000
- R = 5% p.a.
- n = 3 years
- C.I. – S.I. = ?
- $C.I. - S.I. = P \left\{ \left[ \frac{R}{100} \right]^3 + 3 \left[ \frac{R}{100} \right]^2 \right\}$

## Problem 5

- $P = 8,000$ ;  $R = 5\%$  p.a.;  $n = 3$  years; and  $C.I. - S.I. = ?$

$$\begin{aligned} \bullet C.I. - S.I. &= P \left\{ \left[ \frac{R}{100} \right]^3 + 3 \left[ \frac{R}{100} \right]^2 \right\} \\ &= 8000 \left\{ \left[ \frac{\cancel{5}}{\cancel{100}} \right]^3 + 3 \left[ \frac{\cancel{5}}{\cancel{100}} \right]^2 \right\} \\ &= 8000 \left[ \frac{1}{8000} + \frac{3}{400} \right] \\ &= \cancel{8000} \left[ \frac{1 + 60}{8000} \right] \end{aligned}$$

$$C.I. - S.I. = \text{Rs. } 61$$

## Problem 6

- The difference between the compound interest and simple interest on a certain sum of money for 3 years at 10% p.a. is Rs. 93. Find the sum.

- $n = 3$
- $R = 10\% \text{ p.a.}$
- $C.I. - S.I. = \text{Rs. } 93$
- $P = ?$

$$C.I. - S.I. = P \left\{ \left[ \frac{R}{100} \right]^3 + 3 \left[ \frac{R}{100} \right]^2 \right\}$$

## Problem 6

- $n = 3$ ,  $R = 10\%$  p.a., C.I. – S.I. = Rs. 93, and  $P = ?$
- $C.I. - S.I. = P \left\{ \left[ \frac{R}{100} \right]^3 + 3 \left[ \frac{R}{100} \right]^2 \right\}$
- $93 = P \left\{ \left[ \frac{10}{100} \right]^3 + 3 \left[ \frac{10}{100} \right]^2 \right\}$
- $93 = P \left[ \frac{1}{1000} + \frac{3}{100} \right]$
- $93 = P \left[ \frac{1 + 30}{1000} \right]$

## Problem 6

$$\bullet 93 = P \left[ \frac{1 + 30}{1000} \right]$$

$$\bullet 93 = P \left[ \frac{31}{1000} \right]$$

$$\bullet P = \frac{93 \times 1000}{31}$$

$$\bullet P = \text{Rs. } 3000$$

## Problem 7

- The difference between compound and simple interests on a certain sum of money at the interest rate of 10% per annum for  $1\frac{1}{2}$  years is Rs. 183, when the interest is compounded semi-annually. Find the sum of money.

- $n = 3$  ( $1\frac{1}{2}$  years = 3 half years)

- $R = 10\%$  p.a. ( $\frac{R}{2} = \frac{10}{2}\% = 5\%$  half yearly)

- $C.I. - S.I. = \text{Rs. } 183$

- $P = ?$

# Problem 7

- $n = 3, \frac{R}{2} = 5\%, C.I. - S.I. = \text{Rs. } 183$ , and  $P = ?$

$$\bullet C.I. - S.I. = P \left\{ \left[ \frac{\frac{R}{2}}{100} \right]^3 + 3 \left[ \frac{\frac{R}{2}}{100} \right]^2 \right\}$$

$$\bullet 183 = P \left\{ \left[ \frac{\frac{5}{100}}{20} \right]^3 + 3 \left[ \frac{\frac{5}{100}}{20} \right]^2 \right\}$$

$$\bullet 183 = P \left[ \frac{1}{8000} + \frac{3}{400} \right]$$

$$\bullet 183 = P \left[ \frac{1 + 60}{8000} \right]$$

## Problem 7

- $183 = P \left[ \frac{1 + 60}{8000} \right]$
- $183 = P \left[ \frac{61}{8000} \right]$
- $P = \frac{183 \times 8000}{61}$
- $P = \text{Rs. } 24000$

# Conclusion

- For 2 years at R% per annum

- In terms of P and R

- $$\text{C.I.} - \text{S.I.} = P \left[ \frac{R}{100} \right]^2$$

- In terms of S.I. and R

- $$\text{C.I.} - \text{S.I.} = \frac{R \times \text{S.I.}}{2 \times 100}$$

# Conclusion

- For 3 years at R% per annum

- In terms of P and R

$$\bullet \boxed{C.I. - S.I. = P \left\{ \left[ \frac{R}{100} \right]^3 + 3 \left[ \frac{R}{100} \right]^2 \right\}}$$

- In terms of S.I. and R

$$\bullet \boxed{C.I. - S.I. = \frac{S.I.}{3} \left\{ \left[ \frac{R}{100} \right]^2 + 3 \left[ \frac{R}{100} \right] \right\}}$$

# Summary

- Computation of
  - Difference between C.I. and S.I.
  - Principal
  - Rate

That's all for now...