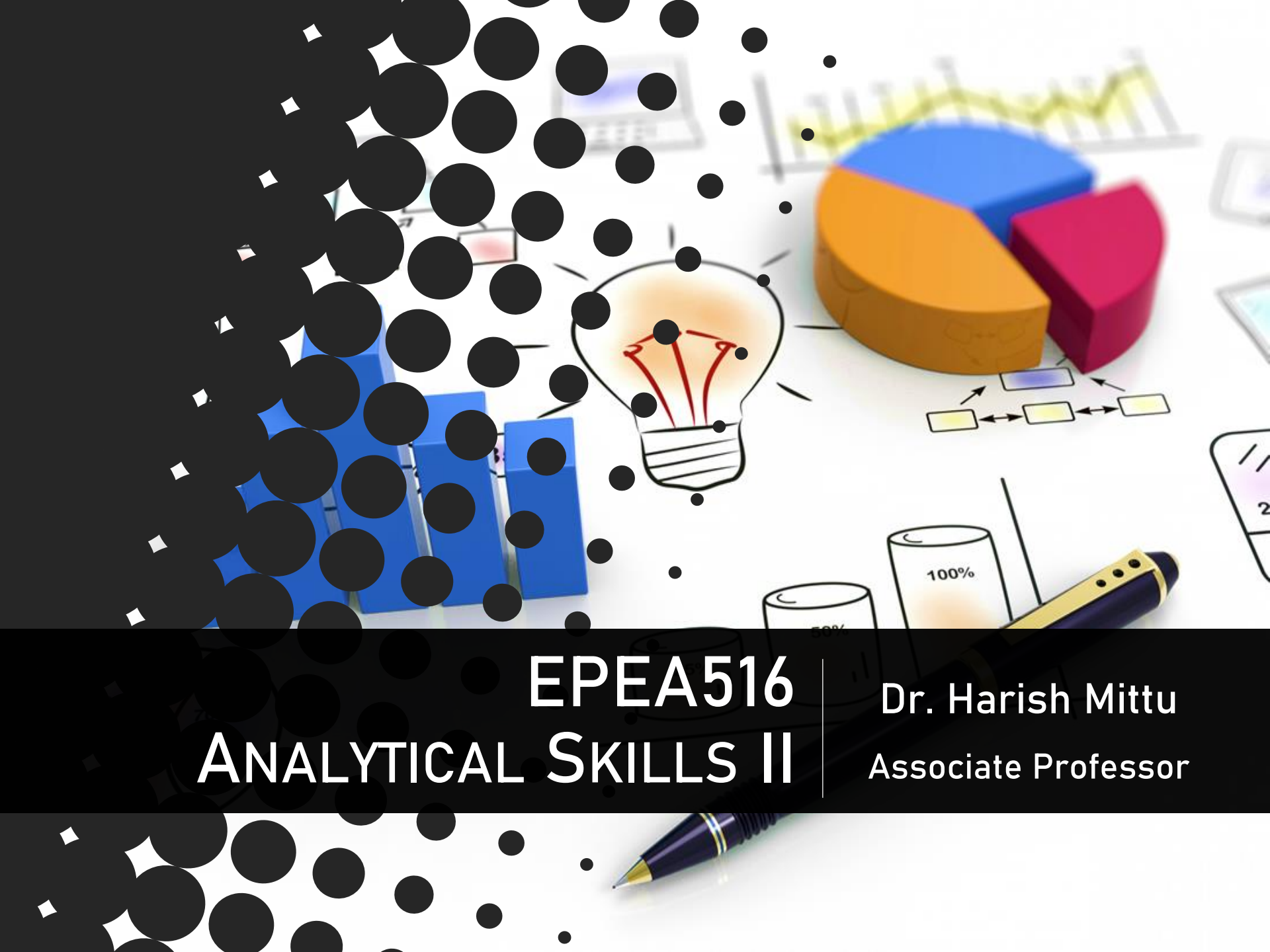

EPEA516
Analytical Skills II

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Learning Outcomes

After this lecture, you will be able to

- solve problems based on principal computation.

Problem 1

- A man earns Rs. 450 as interest in 3 years on a certain money invested in a company at the rate of 5% p.a. Calculate the principal invested by the man in the company.
- S.I. = Rs. 450, R = 5% p.a., T = 3 years, and P = ?
- $P = \frac{S.I. \times 100}{R \times T}$

30 150

- $P = \frac{450 \times 100}{5 \times 3}$
- P = Rs. 3000

Problem 2

- What principal will amount to Rs. 2500 at 2% p.a. in $12\frac{1}{2}$ years.
- A = Rs. 2500, R = 2% p.a., T = $12\frac{1}{2}$ years = $\frac{25}{2}$ years, and P = ?
- $P = \frac{A \times 100}{100 + R \times T}$
- $P = \frac{2500 \times 100}{100 + \cancel{2} \times \frac{25}{\cancel{2}}}$

Problem 2

- $P = \frac{2500 \times 100}{100 + 25}$
- $P = \frac{250000}{125}$ 2000
- P = Rs. 2000

Problem 3

- Calculate the annual instalment that will discharge a debt of Rs.6500 due in 5 years at 3% p.a. simple interest.
- A = Rs. 6500, R = 3% p.a., T = 5 years, and Annual instalment = ?
- $P = \dfrac{A \times 100}{100 \times T + \dfrac{R \times T \times (T-1)}{2}}$
- $P = \dfrac{6500 \times 100}{100 \times 5 + \dfrac{3 \times 5 \times (5-1)}{2}}$
- $P = \dfrac{6500 \times 100}{100 + \dfrac{15 \times \cancel{(4)}\ 2}{\cancel{2}}}$

Problem 3

- $P = \frac{6500 \times 100}{100 + 30}$
- $P = \frac{650000}{130}$ 5000
- P = Rs. 5000

Problem 4

- Calculate principal if it amounts to Rs. 5000 in 2 years and to Rs. 6000 in 3 years at simple interest.
- A_1 =Rs.5000, A_2=Rs.6000, T_1=2 years, T_2 =3 years, and P = ?
- $$P = \frac{[A_1T_2 - A_2T_1]}{[T_2 - T_1]}$$

$$= \frac{[5000 \times 3 - 6000 \times 2]}{[3 - 2]}$$

Problem 4

- $P = \frac{[15000 - 12000]}{[3 - 2]}$

$= \frac{[3000]}{[1]}$

= Rs. 3000

Problem 5

- Calculate the sum if it amounts to Rs. 500 at 8% p.a. and amounts to Rs. 400 at 4% p.a.
- A_1 =Rs. 500, A_2=Rs. 400, R_1= 8% p.a., R_2 = 4% p.a., and P = ?
- $$P = \frac{[A_2R_1 - A_1R_2]}{[R_1 - R_2]}$$

$$= \frac{[400 \times 8 - 500 \times 4]}{[8 - 4]}$$

$$= \frac{[3200 - 2000]}{[4]}$$

Problem 5

- $P = \frac{[3200 - 2000]}{[4]}$

$= \frac{[1200]}{[4]}$ 300

$= Rs.\ 300$

Problem 6

- What will be the original sum of moneny if annual income is Rs. 2400, $\frac{1}{2}$ of it is invested at 1%, $\frac{1}{4}$ at 3% and the rest at 5%.
- A = 2400, R_1 = 1% p.a., R_2 = 3% p.a., R_3 = 5% p.a., and P = ?
- $\frac{1}{a} = \frac{1}{2}$, $\frac{1}{b} = \frac{1}{4}$
- $\frac{1}{c} = 1 - (\frac{1}{a} + \frac{1}{b}) = 1 - (\frac{1}{2} + \frac{1}{4})$
- $\frac{1}{c} = 1 - (\frac{2 + 1}{4})$

Problem 6

- $\frac{1}{c} = 1 - (\frac{3}{4}) = (\frac{4-3}{4})$
- $\frac{1}{c} = (\frac{1}{4})$
- A =Rs. 2400, R_1= 1% p.a., R_2= 3% p.a., R_3= 5% p.a., and P = ?
- a = 2, b = 4 , c = 4
- Original Sum of Money (P)

$$= \frac{A \times 100}{\frac{R_1}{a} + \frac{R_2}{b} + \frac{R_3}{c}}$$

$$= \frac{2400 \times 100}{\frac{1}{2} + \frac{3}{4} + \frac{5}{4}}$$

Problem 6

- Original Sum of Money $= \dfrac{2400 \times 100}{\frac{1}{2} + \frac{3}{4} + \frac{5}{4}}$

$$= \frac{240000}{\frac{2 + 3 + 5}{4}}$$

$$= \frac{240000}{\frac{10}{4}}$$

$$= \frac{240000 \times 4}{10}$$

$$= \text{Rs. } 96000$$

Problem 7

- Calculate the sum if the simple interest on a certain sum of money for 6 years at 10% p.a. is Rs. 30 less than the simple interest on the same sum for 5 years at 8% p.a.
- Difference in S.I. = Rs. 30, R_1 = 10% p.a., T_1 = 6 years, T_2 = 5 years, R_2 = 8% p.a., and P = ?
- S. I. = $\frac{P \times R \times T}{100}$

Problem 7

- Difference in S.I. = $\left[\frac{P \times R_1 \times T_1}{100} - \frac{P \times R_2 \times T_2}{100}\right]$
- Difference in S.I. = $P\left[\frac{R_1 \times T_1}{100} - \frac{R_2 \times T_2}{100}\right]$
- $P = \frac{\text{Difference in S.I.}}{\left[\frac{R_1 \times T_1}{100} - \frac{R_2 \times T_2}{100}\right]}$

Problem 7

- Difference in S.I. = Rs. 30, R_1 = 10% p.a., R_2 = 8% p.a.,

  T_1 = 6 years, T_2 = 5 years, and P = ?

- $$P = \frac{\text{Difference in S.I.}}{\left[\frac{R_1 \times T_1}{100} - \frac{R_2 \times T_2}{100}\right]}$$

- $$P = \frac{30}{\left[\frac{10 \times 6}{100} - \frac{8 \times 5}{100}\right]}$$

- $$P = \frac{30}{\left[\frac{60 - 40}{100}\right]} = \frac{30 \times 100^{5}}{[20]_{1}}$$

- P = Rs. 150

Conclusion

- $P = \frac{S.I. \times 100}{R \times T}$
- If a certain sum in T years at R% per annum amounts to Rs. A, then $P = \frac{A \times 100}{100 + R \times T}$
- The annual payment that will discharge a debt of Rs. A due in T years at R% per annum is $P = \frac{A \times 100}{100 \times T + \frac{R \times T \times (T-1)}{2}}$

Conclusion

- If a certain sum of money P lent out at S.I. amounts to A_1 in T_1 years and to A_2 in T_2 years, then

$$P = \frac{[A_1T_2 - A_2T_1]}{[T_2 - T_1]}$$

- If a certain sum of money P lent out for a certain time T amounts to A_1 at R_1% per annum and to A_2 at R_2% per annum, then

$$P = \frac{[A_2R_1 - A_1R_2]}{[R_1 - R_2]}$$

Conclusion

- Original Sum of Money (P) $= \dfrac{A \times 100}{\frac{R_1}{a} + \frac{R_2}{b} + \frac{R_3}{c}}$

- $P = \dfrac{\text{Difference in S.I.}}{\left[\frac{R_1 \times T_1}{100} - \frac{R_2 \times T_2}{100}\right]}$

Summary

- Computation of Principal

That’s all for now…