Assignment - 3

Q1:- Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three years, and at the rate of 14% p.a. for the period beyond five years. If he pays total interest of ₹ 11,400 at the end of nine years, how much money did he borrow?

Sol → Let the amount be x.

$$\Rightarrow \left(\frac{x \times 6 \times 2}{100}\right) + \left(\frac{x \times 9 \times 3}{100}\right) + \left(\frac{x \times 14 \times 4}{100}\right) = 11,400$$

$$\Rightarrow \frac{3x}{25} + \frac{27x}{100} + \frac{14x}{25} = 11,400$$

$$\Rightarrow \frac{12x + 27x + 56x}{100} = 11,400$$

$$\Rightarrow \frac{95x}{100} = 11,400$$

$$\Rightarrow 95x = 11,400 \times 100$$

$$\Rightarrow 95x = 11,40,000$$

$$\Rightarrow x = \frac{11,40,000}{95} = 12000$$

$\boxed{x = 12000}$ Ans.

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Q2:- David invested certain amount in three different schemes A, B and C with the rate of interest 10% p.a., 12% p.a. and 15% p.a. respectively. If the total interest accrued in one year was ₹ 3200/- and the amount invested in scheme C was 150% of the amount invested in scheme A and 240% of the amount invested in scheme B, what was the amount invested in scheme B?

→ Let A = x, B = y, x = z.

$$\Rightarrow \frac{x \times 10 \times 1}{100} + \frac{y \times 12 \times 1}{100} + \frac{z \times 15 \times 1}{100} = 3200$$

$$\Rightarrow 10x + 12y + 15z = 320000 \quad -(1)$$

$$z = \frac{240y}{100} = \frac{12y}{5} \quad -(2)$$

$$z = \frac{150x}{100} = \frac{3x}{2}$$

$$\Rightarrow \frac{12y}{5} = \frac{3x}{2} \Rightarrow 24y = 15x \Rightarrow x = \frac{24y}{15} = \frac{8y}{5}$$

from (1) and (2)

$$10x + 2y + 15z = 320000$$

$$\Rightarrow 10\left(\frac{8y}{5}\right) + 12y + 15\left(\frac{12y}{5}\right) = 320000$$

$$\Rightarrow y = 5000.$$

Q3:- The difference between the compound interest and simple interest accrued on an amount ₹18000 in 2 years was ₹405. What was the rate of interest p.a.

Sol. Let Rate of Interest be R.

$$\Rightarrow \left[18000\left(1+\frac{R}{100}\right)^2 - 18000\right] - \left[\frac{18000 \times R \times 2}{100}\right] = 405$$

$$\Rightarrow \left[18000\left[\left(\frac{1+R}{100}\right)^2 - 1\right]\right] - \left[180 \times 2R\right] = 405$$

$$\Rightarrow \left[18000\right.$$

$$\Rightarrow 18000\left[\left(1+\frac{r}{100}\right)^2 - 1 - \frac{2r}{100}\right] = 405$$

$$\Rightarrow 18000\left[\frac{(100+R)^2 - 10,000 - 200R}{100^2}\right] = 405$$

$$\Rightarrow 18000\left[\frac{10000 + R^2 - 10000 - 200R + 200R}{10,000}\right] = 405$$

$$\Rightarrow 18000\left[\frac{R^2}{10000}\right] = 405$$

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$\Rightarrow 18\left[\frac{R^2}{10}\right] = 405$

$\Rightarrow 18R^2 = 405 \times 10$

$\Rightarrow 18R^2 = 4050$

$\Rightarrow R^2 = \frac{4050}{18} = 225$

$\Rightarrow R^2 = 225 = \boxed{R = 15\%}$

Q4⇒ The difference between compound interest and simple interest on a sum for 2 years at 10% p.a., when the interest is compounded annually is ₹16. If the interest were compounded half yearly, the difference in two interest would be?

Sol.⇒ $C.I. - S.I. = 16$

$A - P - S.I. = 16$

$\Rightarrow P\left(1+\frac{R}{100}\right)^n - P - \frac{PRT}{100} = 16$

$\Rightarrow P\left(1+\frac{10}{100}\right)^2 - 1 - \frac{10 \times 2}{100}\Big] = 16$

$\Rightarrow P\left[\frac{121}{120} - 1 - \frac{1}{5}\right] = 16$

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$\Rightarrow P\left[\frac{121-100-20}{100}\right]=16$

$\Rightarrow P=\left[\frac{121-120}{100}\right]=16$

$\Rightarrow P=1600$

$C.I.-S.I=P\left(1+\frac{R}{2\times100}\right)^{2n}-P-\frac{PRT}{100}$

$=1600\left(1+\frac{15}{100}\right)^{4}-1600-\frac{1600\times10\times2}{100}$

$=1600\left(\frac{21\times21\times21\times21}{20\times20\times20\times20}\right)-1600-320$

$=\frac{21\times21\times21\times21}{20\times5}-1600-320$

$=\frac{(21)^4}{100}-1600-320$

$=\frac{19481}{100}-1920$

Difference $=24.81$

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