

Chapter 7 Percentage and Its applications Ex 7.4

Question 1.

Find the simple interest on:

(i) ₹ 350 for 2 years at 11% per annum

(ii) ₹ 20000 for $4\frac{1}{2}$ years at 8 $\frac{1}{2}$ % per annum

(iii) ₹ 648 for 8 months at 16 $\frac{2}{3}$ % per annum. Also, find the amount in each case.

Solution:

(i) Principal (P) = ₹ 350

Rate (R) = 11% p.a.

Time (T) = 2 years

$$\therefore \text{S.I.} = \frac{\text{PRT}}{100} = ₹ \frac{350 \times 11 \times 2}{100} = ₹ 77$$

Amount = P + S.I. = ₹ 350 + ₹ 77 = ₹ 427

(ii) Principal (P) = ₹ 20000

Rate (R) = $8\frac{1}{2} = \frac{17}{2}$ % p.a.

Time (T) = $4\frac{1}{2}$ years = $\frac{9}{2}$ years

$$\therefore \text{S.I.} = \frac{\text{PRT}}{100} = \frac{20000 \times 17 \times 9}{100 \times 2 \times 2} = ₹ 7650$$

and amount = P + S.I. = ₹ 20000 + ₹ 7650 = ₹ 27650

(iii) Principal (P) = ₹ 648

$$\text{Rate (R)} = 16\frac{2}{3} \% = \frac{50}{3} \% \text{ p.a.}$$

$$\text{Time (T)} = 8 \text{ months} = \frac{8}{12} = \frac{2}{3} \text{ years}$$

$$\begin{aligned} \therefore \text{S.I.} &= \frac{\text{PRT}}{100} = \frac{648 \times 50 \times 2}{100 \times 3 \times 3} \\ &= ₹ \frac{648}{9} = ₹ 72 \end{aligned}$$

Amount = P + S.I. = ₹ 648 + ₹ 72 = ₹ 720

Question 2.

Find the time when:

(i) simple interest on ₹ 2500 at 4% per annum is ₹ 200

(ii) simple interest on ₹ 12000 at 6 $\frac{1}{2}$ % per annum is ₹ 2730

Solution:

(i) S.I. = ₹ 200

Principal (P) = ₹ 2500

Rate (R) = 4% p.a.

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} \\ &= \frac{200 \times 100}{2500 \times 4} = 2 \text{ years}\end{aligned}$$

(ii) S.I. = ₹2730

Principal (P) = ₹12000

Rate (R) = $6\frac{1}{2}\%$ = $\frac{13}{2}\%$ p.a.

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} \\ &= \frac{2730 \times 100 \times 2}{12000 \times 13} = \frac{7}{2} \text{ years} \\ &= 3\frac{1}{2} \text{ years}\end{aligned}$$

Question 3.

Find the rate of interest when:

(i) simple interest on ₹ 1560 in 3 years is ₹ 585

(ii) simple interest on ₹ 1625 in 2 $\frac{1}{2}$ years is ₹ 325.

Solution:

(i) S.I. = ₹ 585

Principal (P) = ₹ 1560

Time (T) = 3 years

$$\begin{aligned}\therefore \text{Rate} &= \frac{\text{S.I.} \times 100}{P \times T} = \frac{585 \times 100}{1560 \times 3} \\ &= \frac{25}{2} = 12.5\% \text{ p.a.}\end{aligned}$$

(i) S.I. = ₹325

Principal (P) = ₹1625

Time (T) = $2\frac{1}{2} = \frac{5}{2}$ years

$$\begin{aligned}\therefore \text{Rate} &= \frac{\text{S.I.} \times 100}{P \times T} \\ &= \frac{325 \times 100 \times 2}{1625 \times 5} = 8\% \text{ p.a.}\end{aligned}$$

Question 4.

Find the principal when:

(i) simple interest at 16% per annum for 2 $\frac{1}{2}$ years is ₹ 3840

(ii) simple interest at 7 $\frac{1}{2}$ % per annum for 2 years 4 months is ₹ 2730.

Solution:

(i) S.I. = ₹ 3840

Rate (R) = 16% p.a.

$$\text{Time (T)} = 2\frac{1}{2} = \frac{5}{2} \text{ years}$$

$$\begin{aligned} \therefore \text{Principal} &= \frac{\text{S.I.} \times 100}{R \times T} \\ &= \frac{3840 \times 100 \times 2}{16 \times 5} = ₹9600 \end{aligned}$$

(ii) S.I. = ₹2730

$$\text{Rate} = 7\frac{1}{2}\% = \frac{15}{2}\% \text{ p.a.}$$

Time (T) = 2 years 4 months

$$= 2\frac{1}{3} = \frac{7}{3} \text{ years}$$

$$\begin{aligned} \therefore \text{Principal} &= \frac{\text{S.I.} \times 100}{R \times T} \\ &= \frac{2730 \times 100 \times 2 \times 3}{7 \times 15} = ₹15600 \end{aligned}$$

Question 5.

Find the rate of interest when:

(i) ₹ 1200 amounts to ₹ 1320 in 2 years

(ii) ₹ 300 amounts to ₹ 400 in 2 years.

Solution:

(i) Principal (P) = ₹ 1200

Amount (A) = ₹ 1320

S.I. = A - P = ₹ 1320 - ₹ 1200 = ₹ 120

Time (T) = 2 years

$$\begin{aligned}\text{Rate \%} &= \frac{\text{S.I.} \times 100}{P \times T} \\ &= \frac{120 \times 100}{1200 \times 2} = 5\% \text{ p.a.}\end{aligned}$$

(ii) Principal (P) = ₹300

Amount (A) = ₹400

∴ S.I. = A - P = ₹400 - ₹300 = ₹100

Time = 2 years

$$\begin{aligned}\therefore \text{Rate\%} &= \frac{\text{S.I.} \times 100}{P \times T} = \frac{100 \times 100}{300 \times 2} \\ &= \frac{50}{3} \% = 16\frac{2}{3} \% \text{ p.a.}\end{aligned}$$

Question 6.

Find the time when:

(i) ₹ 1250 amounts to ₹ 1950 at 16% per annum

(ii) ₹ 6540 amounts to ₹ 8447.50 at 12½ per annum.

Solution:

(i) Principal (P) = ₹ 1250

Amount (A) = ₹ 1950

S.I. = A - P = ₹ 1950 - ₹ 1250 = ₹ 700

Rate = 16% p.a.

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} \\ &= \frac{700 \times 100}{1250 \times 16} = \frac{7}{2} \text{ years} \\ &= 3 \frac{1}{2} \text{ years}\end{aligned}$$

(ii) Principal (P) = ₹ 6540

Amount (A) = ₹ 8447.50

S.I. = A - P = ₹ 8447.50 - 6540.00 = ₹ 1907.50

$$\text{Rate (R)} = 12 \frac{1}{2} = \frac{25}{2} \% \text{ p.a.}$$

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} = \frac{1907.50 \times 100 \times 2}{6540 \times 25} \\ &= \frac{3815}{1635} = \frac{7}{3} = 2 \frac{1}{3} \text{ years} \\ &= 2 \text{ years, 4 months}\end{aligned}$$

Question 7.

₹ 14000 is invested at 4% per annum simple interest. How long will it take for the amount to reach ₹ 16240?

Solution:

Principal (P) = ₹ 14000

Amount (A) = ₹ 16240

S.I. = A - P = ₹ 16240 - ₹ 14000 = ₹ 2240

Rate (R) = 4%

$$\begin{aligned}\therefore \text{Time} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} \\ &= \frac{2240 \times 100}{14000 \times 4} = 4 \text{ years}\end{aligned}$$

Question 8.

An amount of money invested trebled in 6 years. Find the rate of interest earned.

Solution:

Time (T) = 6 years

Let principal = ₹ 100

Then amount = ₹ 100 × 3 = ₹ 300

S.I. = A - P = ₹ 300 - ₹ 100 = ₹ 200

$$\begin{aligned}\therefore \text{Rate} &= \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}} = \frac{200 \times 100}{100 \times 6} \\ &= \frac{100}{3} \% = 33 \frac{1}{3} \% \text{ p.a.}\end{aligned}$$

Question 9.

Find the principal when:

(i) final amount is ₹ 4500 at 20% per annum for 5 years

(ii) final amount is ₹ 2420 at 4% per annum for 2½ years.

Solution:

(i) Amount (A) = ₹ 4500

Rate (R) = 20%

Time (T) = 5 years

Let principal (P) = ₹ 100

$$\begin{aligned}\text{Then S.I.} &= \frac{PRT}{100} \\ &= \frac{100 \times 20 \times 5}{100} = ₹100\end{aligned}$$

and amount = P + S.I = ₹ 100 + ₹ 100 = ₹ 200

If amount is ₹ 200 then principal = ₹ 100

and if amount is ₹ 4500 then principal

$$= \frac{100}{200} \times 4500$$

$$= ₹ 2250$$

(iii) Amount (A) = ₹ 2420

Rate (R) = 4% p.a.

Time (T) = $2\frac{1}{2} = \frac{5}{2}$ years

Let principal = ₹ 100

$$\text{Then S.I.} = \frac{PRT}{100} = \frac{100 \times 4 \times 5}{100 \times 2} = ₹10$$

Amount = P + S.I. = ₹ 100 + ₹ 10 = ₹ 110

If amount is ₹ 110 then principal = ₹ 100

If amount is ₹ 2420, then principal

$$= \frac{100 \times 2420}{110}$$

$$= ₹ 2200$$