CHAPTER 9 – SIMPLE AND COMPOUND INTEREST

Question 1.

Find the interest and the amount on:

(i) ₹ 750 in 3 years 4 months at 10% per annum.

Solution:

Given P = ₹ 750

Time (T) = \frac{3 \frac{4}{12} \text{ years}}{3 \frac{1}{3} \text{ years}}

Rate (R)=10%

Interest (I) = \frac{PRT}{100} = \frac{750 \times 10 \times 10}{100} = 750\text{ years}

(ii) ₹ 5000 at 8% per year from 23rd December 2011 to 29th July 2012.

Solution:

Principal (P) = ₹ 5000

Rate (R) = 8% p.a

Time (T) = 23 December 2011 to 29 July 2012

8  31 29  31  30  31  30  29

Total 219 days

\therefore \text{Interest} = \frac{PRT}{100} = \frac{5000 \times 8 \times 219}{100 \times 365} = 240\text{ years}

\therefore \text{Amount} = P + I = ₹ 5000 + 240 = ₹ 5240

(iii) ₹ 2,600 in 2 years 3 months at 1% per month.

Solution:

Here p = ₹ 2600
Time (T) = 2 Years 3 month = 27 months

Rate (R) = 1 per month

\[ \therefore \text{Interest} = \frac{P \times T \times R}{100} = \frac{2600 \times 27 \times 1}{100} \]

\[ = 26 \times 27 = Rs. 702 \]

\[ \therefore \text{Amount} = 2600 + 702 = Rs. 3302 \]

(iv) Rs. 4,000 in \( 1\frac{1}{3} \) years at 2 paise per rupee per month.

**Solution:**

Here \( P = Rs. 4000, \text{Time (T)} = 1 \frac{1}{3} \) year

\[ = 1 \text{ year} + \frac{12}{3} \text{ months} = 16 \text{ months} \]

Rate (R) = 2 paise per rupee per month = 2% per month

\[ \therefore \text{Interest (I)} = \frac{P \times T \times R}{100} = \frac{4000 \times 16 \times 2}{100} = 40 \times 32 = Rs. 1280 \]

\[ \therefore \text{Amount (A)} = P + 1 = Rs. 4000 + Rs. 1280 = Rs. 5280 \]

**Question 2**

Rohit borrowed Rs. 24,000 at 7.5 percent per year. How much money will he pay at the end of 4th years to clear his debt?

**Solution:**

Principal (P) = Rs. 24000

Rate (R) = 7.5% P.A.

Time (T) = 4 Years

\[ \text{S.I.} = \frac{P \times T \times R}{100} \]

\[ = Rs. \frac{24000 \times 4 \times 7.5}{100} \]

\[ = Rs. 240 \times 4 \times 7.5 \]
Amount needed to clear the debt at the end of 4th year

= Rs.24000 + Rs.7200 = Rs.31200

Question 3.

The interest on a certain sum of money is Rs. 1,480 in 2 years and at 10 per cent per year. Find the sum of money.

Solution:

Let \( P = Rs. \, X \)

Time (\( T \)) = 2 Years

Rate (\( R \)) = 0%

\[
\text{Interest} = \frac{P \times T \times R}{100} = \frac{X \times 10 \times 2}{100} = \frac{x}{5}
\]

\[
\frac{x}{5} = Rs.1480 \quad \text{(Given)}
\]

\[
\therefore \, x = 1480 \times 5 = Rs.7400
\]

Hence the money Rs.7400

Question 4.

On what principal will the simple interest be Rs. 7,008 in 6 years 3 months at 5% per year?

Solution:

Let principal = Rs.\( P \)

Time (\( T \)) = 6 Years 3 month = 6 Year + \( \frac{3}{12} \) Year

\[
\text{Year} = \frac{75}{12} = \frac{25}{4} \quad \text{year} = 6 \frac{1}{4} \quad \text{years}
\]

Rate (\( R \)) = 5%

Simple interest = Rs. 7,008

We know that

\[
\text{Simple interest} = \frac{P \times T \times R}{100}
\]
Question 5.

Find the principal which will amount to Rs. 4,000 in 4 years at 6.25% per annum.

Solution:

Let Principal = Rs \( P \), Time (T) = 4 Years

Rate = \( 6\frac{1}{4} = \frac{25}{4} \) %

Simple Interest = \( \frac{P \times T \times R}{100} \)

\[
7,008 = \frac{P \times 25 \times 5}{4 \times 100} \Rightarrow P = \frac{7008 \times 100 \times 4}{25 \times 5}
\]

\[
= \frac{7008 \times 16}{5} = \frac{112128}{5} = \text{Rs. } 22425.60
\]

Question 6.

(i) At what rate per cent per annum will Rs. 630 produce an interest of Rs. 126 in 4 years?

Solution:

\[
P = \text{Rs. } 630, I = \text{Rs. } 126, T = 4
\]

\[
R = \frac{100 \times I}{P \times T} = \frac{100 \times 126}{630 \times 4} = \frac{100}{20} = 5\%
\]

(ii) At what rate per cent per year will a sum double itself in \( 6\frac{1}{4} \) years?

Solution:

Let \( P = \text{Rs. } 100 \)

\[
\therefore \text{Amount} = 2 \times \text{Rs. } 100 = \text{Rs. } 100
\]
Interest = A - P

= Rs.200 - Rs.100 = Rs.100

\[ T = 6\frac{1}{4} \text{ years} = \frac{25}{4} \text{ years} \]

\[ R = \frac{100 \times I}{P \times T} = \frac{100 \times 100}{100 \times \frac{25}{10}} \% = \frac{100 \times 100}{100} \times \frac{4}{25} = 16\% \]

Question 7.

(i) In how many years will Rs. 950 produce Rs. 399 as simple interest at 7%?

Solution:

\[ P = Rs.950 \]
\[ S.I = Rs.3900 \]
\[ R = 7\% \]

We know that:

\[ T = \frac{100 \times I}{P \times R} = \frac{100 \times 399}{950 \times 7} \]
\[ = \frac{10 \times 21}{5 \times 7} = 2 \times 3 = 6 \text{ Years} \]

(ii) Find the time in which Rs. 1200 will amount to Rs. 1536 at 3.5% per year.

Solution:

\[ A = Rs.1536 \]
\[ P = Rs.1200 \]

\[ I = A - P \]
\[ = Rs.1536 - Rs.1200 = Rs.336 \]

We know that

\[ T = \frac{100 \times I}{P \times R} \text{ (Formula)} \]
\[ = \frac{100 \times 336}{1200 \times 3.5} = \frac{10 \times 336}{1200 \times 35} \]
\[ = \frac{10}{35} \]
\[ = \frac{2}{7} \text{ years} \]
Question 8.

The simple interest on a certain sum of money is $\frac{3}{6}$ of the sum in 64 years. Find the rate percent charged.

Solution:

Let $P = \text{Rs}.8$

$S.I = \text{Rs.} \frac{3}{6} \times 8$

$= \text{Rs}.3$

$T = \frac{6}{4} \text{ years} = \frac{25}{4} \text{ Years}$

We know that:

$$R = \frac{100 \times I}{P \times T}$$

$$= \frac{100 \times 3}{8 \times \frac{25}{4}} = \frac{100 \times 3}{8 \times 25} = 2 \times 3 \quad \text{(Formula)}$$

$= 6\%$

Question 9.

What sum of money borrowed on 24th May will amount to Rs.10210.20 on 17th October of the same year at 5 percent per annum simple interest?

Solution:

$A = \text{Rs}.10210.20$

$R = 5\% \ P.A$

$T = \text{May} + \text{June} + \text{July} + \text{August} + \text{Sept} + \text{Oct}$

$= 7 + 30 + 31 + 31 + 30 + 17$

$= \frac{146}{365} \text{ days} = \frac{2}{5} \text{ Year}$

We know that:

$P + I = A$
(Formula for finding principal)

\[ P + \frac{P \times R \times T}{100} = A \]

\[ P \left(1 + \frac{5 \times 5}{100}\right) = Rs.10210 \cdot 2 \]

\[ P \left(1 + \frac{R \times T}{100}\right) = A \]

\[ P \left(1 + \frac{R \times T}{100}\right) = Rs.10210 \cdot 20 \]

\[ P \left(\frac{102}{100}\right) = Rs.10210 \cdot 20 \]

\[ P = Rs.10210 \cdot 20 \times \frac{100}{102} \]

\[ P = Rs.\frac{1021020}{102} \]

\[ P = Rs.10010 \]

\[ \therefore \text{Money to be borrowed} = Rs.10010 \]

**Question 10.**

In what time will the interest on a certain sum of money at 6% be \(\frac{5}{8}\) of itself?

**Solution:**

Let \(P = Rs.8\)

Interest = \(Rs.8\times\frac{5}{8} = Rs.5\) (Converting the mixed fraction into normal one)

\(R = 6\%\)

\[ T = \frac{100 \times 1}{P \times R} \]

\[ = \frac{100 \times 5}{8 \times 6} \]

\[ = \frac{500 \cdot 125}{48 \cdot 12} \text{ Years} \]

\[ = 10 \frac{5}{12} \text{ Years} \]

\[ = 10 \text{ Years 5 months} \]
\[ \therefore \frac{5}{12} \text{ year} = \frac{5}{12} \times 12 \text{ months} = 5 \text{ months} \]

Time = 10 years 5 months