Ch. 11

Compound Interest

Type-I

To Find CI when Interest is Compound Annually.

Q.1 Find the amount and the CI on ₹ 25 for 2 years at 10% per annum.

Sol:- Given that

Principal = ₹ 2500

Time = 2 years

Rate = 10%

Interest for the Ist year = $\frac{P \times R \times T}{100}$

$= \frac{2500 \times 10 \times 1}{100}$

$= 250$

Amount at the end of the Ist year = 2500 + 250 = 2750

Interest for IInd year $= \frac{2750 \times 10 \times 1}{100}$

$= 275$

Amount at the end of second year = 2750 + 275 = 3025

Amount = ₹ 3025

CI = 250 + 275 = ₹ 525

Type-II

To Find CI when Interest is compounded Half-yearly.

Find the CI on ₹ 5000 for 1 year at 8% per annum, CI half-yearly.

Rate of interest = 8% P.a. = 4% per half-year

Time = 1 year = 2 half-years

Original Principal = ₹ 5000

Interest for 1st year (half-year) = $\frac{5000 \times 4 \times 1}{100}$

= ₹ 200

Amount at the end of the first half year = (5000 + 200) = 5200

Principal for IInd year = ₹ 5200

Interest for the IInd year (half) = $\frac{5200 \times 4 \times 1}{100}$

= ₹ 208

Amount at the end of IInd half year = 5200 + 208

₹ 5408

CI = 5408 − 5000 = ₹ 408

The difference between the C.I. and S.I. on a certain sum for 2 years at 15% Per annum is ₹ 180. Find the sum.

Given that

Rate = 15%

Time = 2 years

difference between CI and SI = 180

Let be the principal ₹ P

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

$$= \frac{P \times 15 \times 2}{100}$$

$$S.I = \frac{3P}{10}$$

$$C.I = A - P$$

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

$$= P\left(1 + \frac{15}{100}\right)^2 - P$$

$$= P\left(\frac{1}{1} + \frac{3}{20}\right)^2 - P$$

$$= P \times \left(\frac{20+3}{20}\right)^2 - P$$

$$C.I = \frac{529P - 400P}{400}$$

$$C.I = \frac{129P}{400}$$

According to qus.

$\Rightarrow$ C.I. — S.I. = 180

$$\frac{129P}{400} - \frac{3P}{10} = 180$$

$$\Rightarrow \frac{9P}{400} = 180$$

$$\Rightarrow P = \frac{180 \times 400}{9}$$

$\Rightarrow$ P = ₹ 8000

Hence, the required Sum is ₹ 8000. Ans

us:- A scooter is bought at ₹ 56000. its value depreciates at the rate of 10% per annum. what will be its value after 3 years?

:- Given that

Price of scooter = ₹ 56000

Rate = 10 % P.a.

Time = 3 years

Depreciate value of Scooter $= P\left(1 - \frac{R}{100}\right)^n$

$= 56000\left(1 - \frac{10}{100}\right)^3$

$= 56000\left(\frac{10 - 1}{10}\right)^3$

$= 56\cancel{000} \times \frac{9}{\cancel{10}} \times \frac{9}{\cancel{10}} \times \frac{9}{\cancel{10}}$

$= 56 \times 729$

$= ₹\ 40824$

Hence, the required depreciate value is ₹40824

₹ 40824 Ans

Qus:- In a certain experiment the count of bacteria was increasing at the rate of 2.5% Per hour. Initially, the count was 512000. Find the backteria at the end of 2 hours.

Sol:-

Given that

Initially bacteria was count = 512000

Rate = 2.5 % or $\frac{5}{2}$ %

time = 2 hours.

Bacteria at the end of 2 hours = $P\left(1+\frac{R}{100}\right)^n$

$= 512000 \times \left(1+\frac{5}{2\times 20}\right)^2$

$= 512000 \times \left(\frac{1}{1}+\frac{1}{40}\right)^2$

$= 512000 \times \left(\frac{41}{40}\right)^2$

$= 512000 \times \frac{41}{40} \times \frac{41}{40}$

$= 537920$

Hence, the bacteria at the end of 2 hours is 537920