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(Affiliated to CBSE Up to +2 Level)

CLASS: 8TH

Subject: Mathematics

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Compound Interest in Maths

Compound Interest

Future Value Formula (compound interest)

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

Where:

A = resulting amount (future value)

P = amount of principal (present value)

r = annual interest rate

n = number of compounding periods per year

t = time (in years)

1. Let Principal = P, Rate = R% per annum, Time = *n* years.

2. When interest is compound Annually:

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

3. When interest is compounded Half-yearly:

$$\text{Amount} = P \left[1 + \frac{(R/2)}{100} \right]^{2n}$$

4. When interest is compounded Quarterly:

$$\text{Amount} = P \left[1 + \frac{(R/4)}{100} \right]^{4n}$$

5. When interest is compounded Annually but time is in fraction, say $3\frac{2}{5}$ years.

$$\text{Amount} = P \left(1 + \frac{R}{100} \right)^3 \times \left(1 + \frac{\frac{2}{5}R}{100} \right)$$

6. When Rates are different for different years, say $R_1\%$, $R_2\%$, $R_3\%$ for 1st, 2nd and 3rd year respectively.

$$\text{Then, Amount} = P \left(1 + \frac{R_1}{100} \right) \left(1 + \frac{R_2}{100} \right) \left(1 + \frac{R_3}{100} \right).$$

7. Present worth of Rs. *x* due *n* years hence is given by:

$$\text{Present Worth} = \frac{x}{\left(1 + \frac{R}{100} \right)^n}.$$

Q1.

Answer :

Principal amount, $P = \text{Rs } 6000$

Rate of interest, $R = 9\%$ per annum

Time, $n = 2$ years.

The formula for the amount including the compound interest is given below :

$$A = \text{Rs. } P \left(1 + \frac{R}{100}\right)^n$$

$$\Rightarrow A = \text{Rs. } 6000 \left(1 + \frac{9}{100}\right)^2$$

$$\Rightarrow A = \text{Rs. } 6000 \left(\frac{100+9}{100}\right)^2$$

$$\Rightarrow A = \text{Rs. } 6000 \left(\frac{109}{100}\right)^2$$

$$\Rightarrow A = \text{Rs. } 6000 (1.09 \times 1.09)^2$$

$$\Rightarrow A = \text{Rs. } 7128.6$$

i.e., the amount including the compound interest is Rs 7128.6.

\therefore Compound interest = Rs $(7128.6 - 6000) = \text{Rs } 1128.6$