



## Concept of Compound Interest

### Understanding Notes:

- Compound Interest (CI) is the interest calculated not only on the original principal but also on the interest added to it over time.
- In simple words, in Compound Interest, the interest becomes part of the principal for the next period.
- It is widely used in banks, investments, and loans.
- In Compound Interest, the amount grows faster compared to Simple Interest.

### Important Points:

- **Principal (P):** Original sum of money.
- **Rate (R):** Interest rate per year.
- **Time (T):** Time in years.
- **Amount (A):** Total money after adding interest.
- Compound Interest (CI) = Amount – Principal
- Formula for Amount when interest is compounded annually:

$$A = P \times \left(1 + \frac{R}{100}\right)^t$$

- Compound Interest = A – P
- When compounded half-yearly, rate becomes  $\frac{R}{2}$  and time becomes 2T.

### Different Types of Examples with Solutions:

#### Example Easy (1year, annual compounding)

- Find the Compound Interest on ₹5000 at 8% per annum for 1 year.

**Solution:** Amount =  $5000 \times \left(1 + \frac{8}{100}\right)^1$

$$= 5000 \times \left(\frac{108}{100}\right)$$

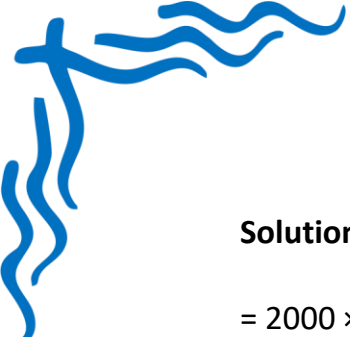
$$= 5000 \times 1.08$$

$$= ₹5400$$

$$CI = 5400 - 5000 = ₹400$$

#### Example Easy (2 years, annual compounding)

- Find the Compound Interest on ₹2000 at 5% per annum for 2 years.



**Solution:** Amount =  $2000 \times \left(1 + \frac{5}{100}\right)^2$

$$= 2000 \times \left(\frac{105}{100}\right)^2$$

$$= 2000 \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right)$$

$$= 2000 \times \frac{441}{400}$$

$$= ₹2205$$

$$CI = 2205 - 2000 = ₹205$$

**Example Moderate (Find Amount first, then CI)**

➤ **Principal = ₹6000, Rate = 10% per annum, Time = 2 years. Find CI.**

**Solution:** Amount =  $6000 \times \left(1 + \frac{10}{100}\right)^2$

$$= 6000 \times \left(\frac{110}{100}\right)^2$$

$$= 6000 \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right)$$

$$= 6000 \times \frac{121}{100}$$

$$= ₹7260$$

$$CI = 7260 - 6000 = ₹1260$$

**Example Moderate (Half-yearly compounding)**

➤ **Find the Compound Interest on ₹8000 at 8% per annum compounded half-yearly for 1 year.**

**Solution:** Rate per half year =  $\frac{8}{2} = 4\%$

$$\text{Time} = 1 \times 2 = 2 \text{ half-years}$$

$$\text{Amount} = 8000 \times \left(1 + \frac{4}{100}\right)^2$$

$$= 8000 \times \left(\frac{104}{100}\right)^2$$

$$= 8000 \times \left(\frac{26}{25}\right) \times \left(\frac{26}{25}\right)$$

$$= 8000 \times \frac{676}{625}$$

$$= ₹8652.80$$

$$CI = 8652.80 - 8000 = ₹652.80$$



### Example Moderate (Find principal when CI and Amount given)

➤ **Compound Interest for 2 years at 5% p.a. is ₹512.50. Find the principal.**

**Solution:** Let Principal = P

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

$$= P \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right)$$

$$= P \times \frac{441}{400}$$

$$\text{Now, CI} = A - P = 512.50$$

$$\text{So, } A = P + 512.50$$

Thus,

$$P \times \frac{441}{400} = P + 512.50$$

Multiply both sides by 400:

$$441P = 400P + 205000$$

$$441P - 400P = 205000$$

$$41P = 205000$$

$$P = \frac{205000}{41}$$

$$P = ₹5000$$

### Summary Points:

- In Compound Interest, interest is added to the principal every year or period.
- Formula:  $A = P \times \left(1 + \frac{R}{100}\right)^T$
- $CI = A - P$
- For half-yearly compounding, divide rate by 2 and multiply time by 2.
- Compound Interest grows faster than Simple Interest over time.