

Crack CSIR-NET Part A

(Most Important Questions On
Compound Interest)



1. A certain sum borrowed and paid in two annual instalments of Rs. 2227 and Rs. 2023 respectively. If rate of compound interest is 19% per annum, then find the sum borrowed.

- A. 3300 Rs.
- B. 4000 Rs.
- C. 3800 Rs.
- D. 4200 Rs.

Solution-

We know that:

If each installment is I_1 and I_2 ,

$$\text{Then, Total sum} = I_1 \times \left(\frac{100}{100+R}\right)^1 + I_2 \times \left(\frac{100}{100+R}\right)^2$$

Now, according to question,

$$\begin{aligned} \text{Total sum borrowed} &= 2227 \times \left(\frac{100}{100+19}\right) + 2023 \times \left(\frac{100}{100+19}\right)^2 \\ &= 1871.43 + 1428.57 \\ &= 3300 \text{ Rs.} \end{aligned}$$

Therefore, total sum which was borrowed = 3300 Rs.

Alternate method:

$$\text{For second year, principal} = \frac{2023}{119} \times 100 = 1700 \text{ Rs.}$$

$$\text{For first year principal} = \frac{1700+2227}{119} \times 100 = \frac{3927}{119} \times 100 = 3300 \text{ Rs.}$$

Therefore, total sum which was borrowed = 3300 Rs.

2. Arun saves Rs. 4500 at the end of each year and invests at compound interest rate of 8% per annum. How much amount will he have at end of 3 years?

- A. 14608.8 Rs.
- B. 14580 Rs.

C. 14997.6 Rs.

D. 13500 Rs.

Solution-

We know that:

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

Arun saves Rs. 4500 at the end of first year. He gets interest on it for 2 years.

$$\text{So, amount} = 4500 \times \left(\frac{100+8}{100}\right) \times \left(\frac{100+8}{100}\right)$$

$$= 5248.8 \text{ Rs.}$$

He Saves Rs. 4500 at the end of second year. He gets interest on it for 1 year.

$$\text{So, amount} = 4500 \times \left(\frac{100+8}{100}\right)$$

$$= 4860 \text{ Rs.}$$

He saves Rs. 4500 at the end of third year.

$$\text{Required, total amount} = 5248.8 + 4860 + 4500 = 14608.8 \text{ Rs.}$$

3. The difference of compound interest and simple interest for 3 years and for 2 years are in ratio 19: 6. Find the rate of interest per annum (in %).

A. $\frac{100}{3}$ %

B. $\frac{50}{3}$ %

C. $\frac{25}{3}$ %

D. $\frac{200}{3}$ %

Solution-

$$\text{Difference of CI and SI in 3 years} = P \left(\frac{R}{100} \right)^2 \left[\frac{(300 + R)}{100} \right]$$

$$\text{Difference of CI and SI in 2 years} = P \left(\frac{R}{100} \right)^2$$

According to question:

$$\frac{P \left(\frac{R}{100} \right)^2 \left[\frac{(300 + R)}{100} \right]}{P \left(\frac{R}{100} \right)^2} = \frac{19}{6}$$

$$\Rightarrow \frac{(300 + R)}{100} = \frac{19}{6}$$

$$\Rightarrow 1800 + 6R = 1900$$

$$\Rightarrow 6R = 100$$

$$\Rightarrow R = \frac{100}{6} = \frac{50}{3} \%$$

4. The difference between compound interest and simple interest on a sum for 2 years at 20% per annum, when it is compounded annually is Rs. 64. If the interest is compounded half-yearly, then difference in two interests would be how much approximately?

- A. Rs. 175
- B. Rs. 160
- C. Rs. 145
- D. Rs. 154

Solution-

As we know that $\text{Difference}(d) = \frac{(p \times r^2)}{10000}$ for 2-year period.

$$\therefore \frac{(p \times 10^2)}{10000} = 64$$

$$\Rightarrow p = \text{Rs. } 6400$$

For half-yearly, $r = \frac{20}{2} = 10\%$ and $t = 2 \times 2 = 4$ year

\therefore ATQ,

$$= [6400\{1 + (\frac{10}{100})^4\} - 6400] - [6400\{1 + (\frac{20}{100})^2\}^2 - 6400]$$

$$\begin{aligned} &= \{6400 \cdot (14641/10000) - 6400\} - \{6400 \cdot (36/25) - 6400\} \\ &= (234256/25) - (64 \times 36 \times 4) \\ &= 9370.24 - 9216 = \text{Rs. } 154 \text{ (approx.)} \end{aligned}$$

5. If the difference between the compound interest and simple interest at on a certain sum at the rate of 5% per annum for 2 years is Rs. 225, find the principle.

- (A) Rs. 75,000
- (B) Rs. 80,000
- (C) Rs. 85,000
- (D) Rs. 90,000

- A. (D)
- B. (B)
- C. (C)
- D. (A)

Solution-

Let the principle = 100

%Rate = 5%

$$\text{SI of 2yr} = 100 \times \frac{5}{100} \times 2 = 10$$

$$\text{CI of 2yr} = 100 - 100 \times \left(1 + \frac{5}{100}\right)^2 = 10.25$$

$$\text{CI} - \text{SI} = 0.25 = 225 \text{ (Given)}$$

Then 1 = 900 & 100 = 90,000 = Required principle

6. There is a 40% increase in an amount in 4 years at simple interest. What will be the compound interest on Rs. 6000 after 3 years at the same rate?

- A. Rs. 1260
- B. Rs. 1986
- C. Rs. 19860
- D. Rs. 7986

Solution-

Let principal = P unit

$$\text{Simple interest for 4 years} = \frac{40P}{100} = \frac{2}{5}P$$

We know that,

$$\text{Simple Interest} = \frac{\text{Principal} \times \text{rate} \times \text{time}}{100}$$

$$\Rightarrow \frac{2}{5}P = \frac{P \times R \times 4}{100}$$

$$\Rightarrow R = \frac{200}{20} = 10\%$$

Now, we have to find compound interest on Rs. 6000 after 3 years at 5%.

$$\text{Amount} = \text{Principal} \left(1 + \frac{\text{Rate}}{100}\right)^3$$

$$\text{Amount} = 6000 \left(1 + \frac{10}{100}\right)^3 = 6000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} = \text{Rs. } 7986$$

Hence, Required Compound Interest = Rs. 7986 – Rs. 6000 = Rs. 1986

7. What is the difference between the maturity values, if Rs. 12,500 is invested for 2 years at 20% per annum simple interest and compound interest?

- A. Rs. 750
- B. Rs. 650
- C. Rs. 550
- D. Rs. 500

Solution ||| Difference between S.I and C.I for two years = $\frac{r^2 \times P}{100^2}$

$$= \frac{12500 \times 20 \times 20}{100 \times 100}$$

= Rs.500

8.A woman invests Rs. 2000 at the start of each year at 5% compound interest per annum. How much will her investments be at the end of the 2nd year?

- A. Rs. 2205
- B. Rs. 4305
- C. Rs. 2355
- D. Rs. 4350

Solution-

Amount at the end of the 2nd year will be

$$A = 2000 \left(1 + \frac{5}{100}\right)^2 + 2000 \left(1 + \frac{5}{100}\right)^1$$

Amount = 2205 + 2100 = Rs 4305

Hence, option B is the correct answer.

9.An amount is deposited at 8% p.a. compound interest. If the first-year interest is Rs. 72, find the interest amount for the 2nd year.

- A. Rs. 77.56
- B. Rs. 77.64
- C. Rs. 77.76
- D. Rs. 85.77

Solution-

Interest for the second year = 72 + 8% of 72 = Rs 77.76

10.If the amount is 2.25 times of the sum after 2 years at compound interest (compound annually) then calculate the rate of interest per annum?

- A. 25%
- B. 30%
- C. 45%
- D. 50%

Solution- Let X be the Principal amount, R be the rate of interest per annum.

Formula of compound interest:

$$2.25X = X\left(1 + \frac{R}{100}\right)^2$$

$$2.25 = \left(1 + \frac{R}{100}\right)^2$$

$$\left(1 + \frac{R}{100}\right) = 1.5$$

$$\frac{R}{100} = 0.5$$

$$R = 50\%$$

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