

# Compound Interest

## Ex 11D

Q1.

**Answer :**

(c) Rs. 832

$$\begin{aligned}A &= P \times \left(1 + \frac{R}{100}\right)^n \\&= \text{Rs. } 5000 \times \left(1 + \frac{8}{100}\right)^2 \\&= \text{Rs. } 5000 \times \left(\frac{108}{100}\right)^2 \\&= \text{Rs. } 5000 \times \left(\frac{27}{25}\right)^2 \\&= \text{Rs. } 5000 \times \left(\frac{27}{25}\right) \times \left(\frac{27}{25}\right) \\&= \text{Rs. } (8 \times 27 \times 27) \\&= \text{Rs. } 5832 \\ \therefore \text{Interest} &= \text{amount} - \text{principal} = \text{Rs } (5832 - 5000) = \text{Rs } 832\end{aligned}$$

Q2.

**Answer :**

(b) Rs. 3310

$$\begin{aligned}A &= P \times \left(1 + \frac{R}{100}\right)^n \\&= \text{Rs. } 10000 \times \left(1 + \frac{10}{100}\right)^3 \\&= \text{Rs. } 10000 \times \left(\frac{110}{100}\right)^3 \\&= \text{Rs. } 10000 \times \left(\frac{11}{10}\right)^3 \\&= \text{Rs. } 10000 \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right) \\&= \text{Rs. } (10 \times 11 \times 11 \times 11) \\&= \text{Rs. } 13310 \\ \therefore \text{Compound interest} &= \text{amount} - \text{principal} = \text{Rs } (13310 - 10000) = \text{Rs } 3310\end{aligned}$$

Q3.

**Answer :**

(a) Rs 1872

$$\begin{aligned}\text{Here, } A &= P \times \left(1 + \frac{R}{100}\right)^1 \times \left(1 + \frac{\frac{1}{2}R}{100}\right) \\&= \text{Rs } 10000 \times \left(1 + \frac{12}{100}\right) \times \left(1 + \frac{\frac{1}{2} \times 12}{100}\right) \\&= \text{Rs } 10000 \times \left(\frac{100+12}{100}\right) \times \left(\frac{100+6}{100}\right) \\&= \text{Rs } 10000 \times \left(\frac{112}{100}\right) \times \left(\frac{106}{100}\right) \\&= \text{Rs } 10000 \times \left(\frac{28}{25}\right) \times \left(\frac{53}{50}\right) \\&= \text{Rs } (8 \times 28 \times 53) \\&= \text{Rs } 11872\end{aligned}$$

$$\therefore \text{Compound interest} = \text{amount} - \text{principal} = \text{Rs } \left(11872 - 10000\right) = \text{Rs } 1872$$

Q4.

**Answer :**

(c) Rs 961

$$\begin{aligned}\text{Here, } A &= P \times \left(1 + \frac{R}{100}\right)^2 \times \left(1 + \frac{\frac{1}{4}R}{100}\right) \\&= \text{Rs. } 4000 \times \left(1 + \frac{10}{100}\right)^2 \times \left(1 + \frac{\frac{1}{4} \times 10}{100}\right) \\&= \text{Rs. } 4000 \times \left(\frac{100+10}{100}\right)^2 \times \left(\frac{40+1}{40}\right) \\&= \text{Rs. } 4000 \times \left(\frac{110}{100}\right)^2 \times \left(\frac{41}{40}\right) \\&= \text{Rs. } 4000 \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right) \times \left(\frac{41}{40}\right) \\&= \text{Rs. } (11 \times 11 \times 41) \\&= \text{Rs. } 4961\end{aligned}$$

$$\therefore \text{Compound interest} = \text{amount} - \text{principal} = \text{Rs } \left(4961 - 4000\right) = \text{Rs } 961$$

Q5.

**Answer :**

(b) Rs. 5051

$$\begin{aligned}\text{Here, } A &= \text{Rs. } P \times \left(1 + \frac{p}{100}\right) \times \left(1 + \frac{q}{100}\right) \times \left(1 + \frac{r}{100}\right) \\&= \text{Rs. } 25000 \times \left(1 + \frac{5}{100}\right) \times \left(1 + \frac{6}{100}\right) \times \left(1 + \frac{8}{100}\right) \\&= \text{Rs. } 25000 \times \left(\frac{105}{100}\right) \times \left(\frac{106}{100}\right) \times \left(\frac{108}{100}\right) \\&= \text{Rs. } 25000 \times \left(\frac{21}{20}\right) \times \left(\frac{53}{50}\right) \times \left(\frac{27}{25}\right) \\&= \text{Rs. } (21 \times 53 \times 27) \\&= \text{Rs. } 30051\end{aligned}$$

$$\therefore \text{Compound interest} = \text{amount} - \text{principal} = \text{Rs. } \left(30051 - 25000\right) = \text{Rs. } 5051$$

Q6.

**Answer :**

(b) Rs. 510

Rate of interest compounded half yearly =  $\frac{8}{2}\% = 4\%$

Time = 1 year = 2 half years

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

$$= \text{Rs. } 6250 \times \left(1 + \frac{4}{100}\right)^2$$

$$= \text{Rs. } 6250 \times \left(\frac{104}{100}\right)^2$$

$$= \text{Rs. } 6250 \times \left(\frac{26}{25}\right) \times \left(\frac{26}{25}\right)$$

$$= \text{Rs. } (10 \times 26 \times 26)$$

$$= \text{Rs. } 6760$$

$$\therefore \text{Compound interest} = \text{amount} - \text{principal} = \text{Rs. } (6760 - 6250) = \text{Rs. } 510$$

Q7.

**Answer :**

(a) Rs.1209

Time = 6 months = 2 quater years

Rate compounded quarter yearly =  $\frac{6}{4}\% = \frac{3}{2}\%$

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

$$= \text{Rs. } 40000 \times \left(1 + \frac{3}{100 \times 2}\right)^2$$

$$= \text{Rs. } 40000 \times \left(\frac{203}{200}\right)^2$$

$$= \text{Rs. } 40000 \times \left(\frac{203}{200}\right) \times \left(\frac{203}{200}\right)$$

$$= \text{Rs. } (203 \times 203)$$

$$= \text{Rs. } 41209$$

$$\therefore \text{Compound interest} = \text{amount} - \text{principal} = \text{Rs. } 41209 - \text{Rs. } 40000 = \text{Rs. } 1209$$

Q8.

**Answer :**

(b) 26460

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

$$= \text{Rs. } 24000 \times \left(1 + \frac{5}{100}\right)^2$$

$$= \text{Rs. } 24000 \times \left(\frac{105}{100}\right)^2$$

$$= \text{Rs. } 24000 \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right)$$

$$= \text{Rs. } (60 \times 21 \times 21)$$

$$= \text{Rs. } 26460$$

Q9.

**Answer :**

(c) Rs. 43740

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

$$= \text{Rs. } 60000 \times \left(1 - \frac{10}{100}\right)^3$$

$$= \text{Rs. } 60000 \times \left(\frac{90}{100}\right)^3$$

$$= \text{Rs. } 60000 \times \left(\frac{9}{10}\right) \times \left(\frac{9}{10}\right) \times \left(\frac{9}{10}\right)$$

$$= \text{Rs. } (60 \times 9 \times 9 \times 9)$$

$$= \text{Rs. } 43740$$

Q10.

**Answer :**

(b) Rs. 62500

$$\begin{aligned}\text{Here, } A &= P \times \left(1 - \frac{R}{100}\right)^n \\ &= P \times \left(1 - \frac{20}{100}\right)^2 \\ &= P \times \left(\frac{80}{100}\right)^2 \\ &= P \times \left(\frac{4}{5}\right) \times \left(\frac{4}{5}\right) \\ \Rightarrow 40000 &= \frac{16P}{25} \\ \therefore P &= \frac{40000 \times 25}{16} = \text{Rs } 62500\end{aligned}$$

Q11.

**Answer :**

(a) 25000

Let  $P$  be the population 3 years ago.

Now, present population = 33275

$$\begin{aligned}\Rightarrow 33275 &= P \times \left(1 + \frac{10}{100}\right)^3 \\ \Rightarrow 33275 &= P \times \left(\frac{110}{100}\right)^3 \\ \Rightarrow 33275 &= P \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right) \times \left(\frac{11}{10}\right) \\ \Rightarrow 33275 &= \frac{1331P}{1000} \\ \therefore P &= \frac{33275 \times 1000}{1331} = 25000\end{aligned}$$

Q12.

**Answer :**

(d) Rs 1261

$$\begin{aligned}\text{Here, SI} &= \frac{P \times 5 \times 3}{100} \\ \Rightarrow 1200 &= \frac{P \times 5 \times 3}{100} \\ \Rightarrow P &= \frac{1200 \times 100}{5 \times 3} = \text{Rs } 8000\end{aligned}$$

$$\begin{aligned}\text{Amount at the end of 3 years} &= \text{Rs } 8000 \times \left(1 + \frac{5}{100}\right)^3 \\ &= \text{Rs } 8000 \times \left(\frac{105}{100}\right)^3 \\ &= \text{Rs } 8000 \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right) \\ &= \text{Rs } (21 \times 21 \times 21) \\ &= \text{Rs } 9261 \\ \therefore \text{CI} &= A - P = \text{Rs } (9261 - 8000) = \text{Rs } 1261\end{aligned}$$

Q13.

**Answer :**

(d) Rs 480

$$\begin{aligned}\text{We have: } 510 &= \left\{ P \times \left(1 + \frac{25}{100 \times 2}\right)^2 \right\} - P \\ \Rightarrow 510 &\Rightarrow \left\{ P \times \left(\frac{8+1}{8}\right)^2 \right\} - P \\ \Rightarrow 510 &= \left\{ P \times \left(\frac{9}{8}\right) \times \left(\frac{9}{8}\right) \right\} - P \\ \Rightarrow 510 &= \left(\frac{81P}{64} - P\right) \\ \Rightarrow 510 &= \left(\frac{81P - 64P}{64}\right) \\ \Rightarrow 510 &= \frac{17P}{64} \\ \therefore P &= \frac{510 \times 64}{17} = \text{Rs } 1920 \\ \text{Now, SI} &= \frac{P \times R \times T}{100} \\ &= \text{Rs } \frac{1920 \times 2 \times 25}{100 \times 2} = \text{Rs } 480\end{aligned}$$

Q14.

**Answer :**

(d) Rs 4096

$$\text{We have Rs 4913} = \left\{ P \times \left( 1 + \frac{25}{100 \times 4} \right)^3 \right\}$$

$$\Rightarrow \text{Rs 4913} = \left\{ P \times \left( \frac{16+1}{16} \right)^3 \right\}$$

$$\Rightarrow \text{Rs 4913} = \left\{ P \times \left( \frac{17}{16} \right) \times \left( \frac{17}{16} \right) \times \left( \frac{17}{16} \right) \right\}$$

$$\Rightarrow \text{Rs 4913} = \frac{4913P}{4096}$$

$$\Rightarrow P = \text{Rs } \frac{4913 \times 4096}{4913} = \text{Rs 4096}$$

Q15.

**Answer :**

(c) 6%

$$\text{Here, } A = P \times \left( 1 + \frac{R}{100} \right)$$

$$= \text{Rs. 7500} \times \left( 1 + \frac{R}{100} \right)^2$$

$$= \text{Rs. 7500} \times \left( 1 + \frac{R}{100} \right)^2$$

However, amount = Rs. 8427

$$\text{Now, Rs. 8427} = \text{Rs. 7500} \times \left( 1 + \frac{R}{100} \right)^2$$

$$\Rightarrow \frac{\text{Rs. 8427}}{\text{Rs. 7500}} = \left( 1 + \frac{R}{100} \right)^2$$

$$\Rightarrow \left( \frac{53}{50} \right)^2 = \left( 1 + \frac{R}{100} \right)^2$$

$$\Rightarrow \left( 1 + \frac{R}{100} \right) = \left( \frac{53}{50} \right)$$

$$\Rightarrow \frac{R}{100} = \frac{53}{50} - 1$$

$$\Rightarrow \frac{R}{100} = \frac{53-50}{50} = \frac{3}{50}$$

$$\therefore R = \frac{300}{50} = 6\%$$