

1. Calculate the amount and the compound interest for each of the following:

(a) ₹ 7,500 at 12% p.a. in 3 years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 7,500$, Rate, $r = 12\%$ p.a., Time, $t = 3$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (7,500 \times 12 \times 1)/100 \\ &= ₹ 900\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 7,500 + 900 \\ &= ₹ 8,400\end{aligned}$$

Therefore, new principal is ₹ 8,400.

Now, for the second year, $t = 1$ year, $p = ₹ 8,400$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (8,400 \times 12 \times 1)/100 \\ &= ₹ 1,008\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 8,400 + 1,008 \\ &= ₹ 9,408\end{aligned}$$

Therefore, new principal is ₹ 9,408.

Now, for the second year, $t = 1$ year, $p = ₹ 9,408$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (9,408 \times 12 \times 1)/100 \\ &= ₹ 1,128.96\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 9,408 + 1,128.96 \\ &= ₹ 10,536.96\end{aligned}$$

We know that,

$$\begin{aligned}\text{C.I.} &= \text{Interest in first year} + \text{interest in second year} + \text{interest in third year} \\ &= ₹ (900 + 1,008 + 1,128.96) \\ &= ₹ 3,036.96\end{aligned}$$

(b) ₹ 13,500 at 10% p.a. in 2 years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 13,500$, Rate, $r = 10\%$ p.a., Time, $t = 2$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (13,500 \times 10 \times 1)/100 \\ &= ₹ 1,350\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 13,500 + 1,350 \\ &= ₹ 14,850\end{aligned}$$

Therefore, new principal is ₹ 14,850.

Now, for the second year, $t = 1$ year, $p = ₹ 14,850$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (14,850 \times 10 \times 1)/100 \\ &= ₹ 1,485\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 14,850 + 1,485 \\ &= ₹ 16,335\end{aligned}$$

We know that,

$$\begin{aligned}\text{C.I.} &= \text{Interest in first year} + \text{interest in second year} \\ &= ₹ (1,350 + 1,485) \\ &= ₹ 2,835\end{aligned}$$

(c) ₹ 17,500 at 12% p.a. in 3 years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 17,500$, Rate, $r = 12\%$ p.a., Time, $t = 3$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (17,500 \times 12 \times 1)/100 \\ &= ₹ 2,100\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 17,500 + 2,100 \\ &= ₹ 19,600\end{aligned}$$

Therefore, new principal is ₹ 19,600.

Now, for the second year, $t = 1$ year, $p = ₹ 19,600$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (8,400 \times 12 \times 1)/100 \\ &= ₹ 1,008\end{aligned}$$

Then, $A = P + \text{S.I.}$

$$= 19,600 + 2,352$$
$$= ₹ 21,952$$

Therefore, new principal is ₹ 21,952.

Now, for the second year, $t = 1$ year, $p = ₹ 21,952$

$$\text{S.I.} = (P \times r \times t)/100$$
$$= (21,952 \times 12 \times 1)/100$$
$$= ₹ 2,634.24$$

Then, $A = P + \text{S.I.}$

$$= 21,952 + 2,634.24$$
$$= ₹ 7,086.24$$

We know that,

C.I. = Interest in first year + interest in second year + interest in third year

$$= ₹ (2,100 + 2,352 + 2,634.24)$$
$$= ₹ 7,086.24$$

(d) ₹ 23,750 at 12% p.a. in $2\frac{1}{2}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 23,750$, Rate, $r = 12\%$ p.a., Time, $t = 2\frac{1}{2}$ years

For the first year, $t = 1$ year

$$\text{We know that, S.I.} = (P \times r \times t)/100$$
$$= (23,750 \times 12 \times 1)/100$$
$$= ₹ 2,850$$

Then, $A = P + \text{S.I.}$

$$= 23,750 + 2,850$$
$$= ₹ 26,600$$

Therefore, new principal is ₹ 26,600.

Now, for the second year, $t = 1$ year, $p = ₹ 26,600$

$$\text{S.I.} = (P \times r \times t)/100$$
$$= (26,600 \times 12 \times 1)/100$$
$$= ₹ 3,192$$

Then, $A = P + \text{S.I.}$

$$= 26,600 + 3,192$$
$$= ₹ 29,792$$

Therefore, new principal is ₹ 29,792.

Now, for the third year, $t = \frac{1}{2}$ year, $p = ₹ 29,792$.

$$\text{S.I.} = (P \times r \times t)/100$$

$$= (29,792 \times 12 \times 1)/(100 \times 2)$$
$$= ₹ 1,787.52$$

Then, $A = P + S.I.$

$$= 29,792 + 1,787.52$$
$$= ₹ 31,579.52$$

We know that,

$$\text{C.I.} = \text{Interest in first year} + \text{interest in second year} + \text{interest in third year}$$
$$= ₹ (2,850 + 3,192 + 1,787.52)$$
$$= ₹ 7,829.52$$

(e) ₹ 30,000 at 8% p.a. in $2\frac{1}{2}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 30,000$, Rate, $r = 8\%$ p.a., Time, $t = 2\frac{1}{2}$ years

For the first year, $t = 1$ year

$$\text{We know that, } S.I. = (P \times r \times t)/100$$
$$= (30,000 \times 8 \times 1)/100$$
$$= ₹ 2,400$$

Then, $A = P + S.I.$

$$= 30,000 + 2,400$$
$$= ₹ 32,400$$

Therefore, new principal is ₹ 32,400.

Now, for the second year, $t = 1$ year, $p = ₹ 32,400$

$$S.I. = (P \times r \times t)/100$$
$$= (32,400 \times 8 \times 1)/100$$
$$= ₹ 2,592$$

Then, $A = P + S.I.$

$$= 32,400 + 2,592$$
$$= ₹ 34,992$$

Therefore, new principal is ₹ 34,992.

Now, for the third year, $t = \frac{1}{2}$ year, $p = ₹ 34,992$.

$$S.I. = (P \times r \times t)/100$$
$$= (34,992 \times 8 \times 1)/(100 \times 2)$$
$$= ₹ 1,399.68$$

Then, $A = P + S.I.$

$$= 34,992 + 1,399.68$$
$$= ₹ 36,391.68$$

We know that,

$$\begin{aligned} \text{C.I.} &= \text{Interest in first year} + \text{interest in second year} + \text{interest in third year} \\ &= ₹ (2,400 + 2,592 + 1,399.68) \\ &= ₹ 6,391.68 \end{aligned}$$

(f) ₹ 10,000 at 8% p.a. in $2\frac{1}{4}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 10,000$, Rate, $r = 8\%$ p.a., Time, $t = 2\frac{1}{4}$ years

For the first year, $t = 1$ year

$$\begin{aligned} \text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (10,000 \times 8 \times 1)/100 \\ &= ₹ 800 \end{aligned}$$

$$\begin{aligned} \text{Then, } A &= P + \text{S.I.} \\ &= 10,000 + 800 \\ &= ₹ 10,800 \end{aligned}$$

Therefore, new principal is ₹ 10,800.

Now, for the second year, $t = 1$ year, $p = ₹ 10,800$

$$\begin{aligned} \text{S.I.} &= (P \times r \times t)/100 \\ &= (10,800 \times 8 \times 1)/100 \\ &= ₹ 864 \end{aligned}$$

$$\begin{aligned} \text{Then, } A &= P + \text{S.I.} \\ &= 10,800 + 864 \\ &= ₹ 11,664 \end{aligned}$$

Therefore, new principal is ₹ 11,664.

Now, for the third year, $t = \frac{1}{2}$ year, $p = ₹ 11,664$.

$$\begin{aligned} \text{S.I.} &= (P \times r \times t)/100 \\ &= (11,664 \times 8 \times 1)/(100 \times 2) \\ &= ₹ 233.28 \end{aligned}$$

$$\begin{aligned} \text{Then, } A &= P + \text{S.I.} \\ &= 11,664 + 233.28 \\ &= ₹ 11,897.28 \end{aligned}$$

We know that,

$$\begin{aligned} \text{C.I.} &= \text{Interest in first year} + \text{interest in second year} + \text{interest in third year} \\ &= ₹ (800 + 864 + 233.28) \\ &= ₹ 1,897.28 \end{aligned}$$

(g) ₹ 20,000 at 9% p.a. in $2\frac{1}{3}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 20,000$, Rate, $r = 9\%$ p.a., Time, $t = 2\frac{1}{3}$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (20,000 \times 9 \times 1)/100 \\ &= ₹ 1,800\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 20,000 + 1,800 \\ &= ₹ 21,800\end{aligned}$$

Therefore, new principal is ₹ 21,800.

Now, for the second year, $t = 1$ year, $p = ₹ 21,800$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (21,800 \times 9 \times 1)/100 \\ &= ₹ 1,962\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 21,800 + 1,962 \\ &= ₹ 23,762\end{aligned}$$

Therefore, new principal is ₹ 23,762.

Now, for the third year, $t = 1/3$ year, $p = ₹ 23,762$.

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (23,762 \times 9 \times 1)/(100 \times 3) \\ &= ₹ 712.86\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 23,762 + 712.86 \\ &= ₹ 24,474.86\end{aligned}$$

We know that,

$$\begin{aligned}\text{C.I.} &= \text{Interest in first year} + \text{interest in second year} + \text{interest in third year} \\ &= ₹ (1,800 + 1,962 + 712.86) \\ &= ₹ 4,474.86\end{aligned}$$

(h) ₹ 25,000 at $8\frac{2}{5}\%$ p.a. in $1\frac{1}{3}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 25,000$, Rate, $r = 8\frac{2}{5}\%$ p.a. = $42/5$, Time, $t = 1\frac{1}{3}$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (25,000 \times 42 \times 1)/(100 \times 5) \\ &= ₹ 2,100\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 25,000 + 2,100 \\ &= ₹ 27,100\end{aligned}$$

Therefore, new principal is ₹ 27,100.

Now, for the second year, $t = 1/3$ year, $p = ₹ 27,100$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (27,100 \times 42 \times 1)/(100 \times 5 \times 3) \\ &= ₹ 758.80\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 27,100 + 758.80 \\ &= ₹ 27,858.80\end{aligned}$$

We know that,

$$\begin{aligned}\text{C.I.} &= \text{Interest in first year} + \text{interest in second year} \\ &= ₹ (2,100 + 758.80) \\ &= ₹ 2,858.80\end{aligned}$$

(i) ₹ 40,000 at $5\frac{1}{4}$ p.a. in $1\frac{1}{3}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 25,000$, Rate, $r = 5\frac{1}{4}$ p.a. = $21/4$ %, Time, $t = 1\frac{1}{3}$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (40,000 \times 21 \times 1)/(100 \times 4) \\ &= ₹ 2,100\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 40,000 + 2,100 \\ &= ₹ 42,100\end{aligned}$$

Therefore, new principal is ₹ 42,100.

Now, for the second year, $t = 1/3$ year, $p = ₹ 42,100$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (42,100 \times 21 \times 1)/(100 \times 4 \times 3) \\ &= ₹ 736.75\end{aligned}$$

Then, $A = P + \text{S.I.}$

$$= 42,100 + 736.75$$
$$= ₹ 42,836.75$$

We know that,

$$\text{C.I.} = \text{Interest in first year} + \text{interest in second year}$$
$$= ₹ (2,100 + 736.75)$$
$$= ₹ 2,836.75$$

(j) ₹ 76,000 at 10% p.a. in 2½ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 10,000$, Rate, $r = 8\%$ p.a., Time, $t = 2\frac{1}{2}$ years

For the first year, $t = 1$ year

$$\text{We know that, S.I.} = (P \times r \times t)/100$$
$$= (76,000 \times 10 \times 1)/100$$
$$= ₹ 7,600$$

$$\text{Then, } A = P + \text{S.I.}$$
$$= 76,000 + 7,600$$
$$= ₹ 83,600$$

Therefore, new principal is ₹ 83,600.

Now, for the second year, $t = 1$ year, $p = ₹ 83,600$

$$\text{S.I.} = (P \times r \times t)/100$$
$$= (83,600 \times 10 \times 1)/100$$
$$= ₹ 8,360$$

$$\text{Then, } A = P + \text{S.I.}$$
$$= 83,600 + 8,360$$
$$= ₹ 91,960$$

Therefore, new principal is ₹ 91,960.

Now, for the third year, $t = \frac{1}{2}$ year, $p = ₹ 91,960$.

$$\text{S.I.} = (P \times r \times t)/100$$
$$= (91,960 \times 10 \times 1)/(100 \times 2)$$
$$= ₹ 4,598$$

$$\text{Then, } A = P + \text{S.I.}$$
$$= 91,960 + 4,598$$
$$= ₹ 96,558$$

We know that,

$$\text{C.I.} = \text{Interest in first year} + \text{interest in second year} + \text{interest in third year}$$
$$= ₹ (7,600 + 8,360 + 4,598)$$

$$= ₹ 96,558$$

(k) ₹ 22,500 at 12% p.a. in $1\frac{3}{4}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 22,500$, Rate, $r = 12\%$ p.a., Time, $t = 1\frac{3}{4}$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (22,500 \times 12 \times 1)/100 \\ &= ₹ 2,700\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 22,500 + 2,700 \\ &= ₹ 25,200\end{aligned}$$

Therefore, new principal is ₹ 25,200.

Now, for the second year, $t = \frac{3}{4}$ year, $p = ₹ 25,200$

$$\begin{aligned}\text{S.I.} &= (P \times r \times t)/100 \\ &= (25,200 \times 12 \times 3)/(100 \times 4) \\ &= ₹ 2,268\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 25,200 + 2,268 \\ &= ₹ 27,468\end{aligned}$$

We know that,

$$\begin{aligned}\text{C.I.} &= \text{Interest in first year} + \text{interest in second year} \\ &= ₹ (2,700 + 2,268) \\ &= ₹ 4,968\end{aligned}$$

(i) ₹ 16,000 at 15% p.a. in $2\frac{2}{3}$ years.

Solution:-

From the question it is given that,

Principal, $P = ₹ 16,000$, Rate, $r = 15\%$ p.a., Time, $t = 2\frac{2}{3}$ years

For the first year, $t = 1$ year

$$\begin{aligned}\text{We know that, S.I.} &= (P \times r \times t)/100 \\ &= (16,000 \times 15 \times 1)/100 \\ &= ₹ 2,400\end{aligned}$$

$$\begin{aligned}\text{Then, } A &= P + \text{S.I.} \\ &= 16,000 + 2,400 \\ &= ₹ 18,400\end{aligned}$$

Therefore, new principal is ₹ 18,400.

Now, for the second year, $t = 1$ year, $p = ₹ 18,400$

$$\begin{aligned} \text{S.I.} &= (P \times r \times t)/100 \\ &= (18,400 \times 15 \times 1)/100 \\ &= ₹ 2,760 \end{aligned}$$

Then, $A = P + \text{S.I.}$

$$\begin{aligned} &= 18,400 + 2,760 \\ &= ₹ 21,160 \end{aligned}$$

Therefore, new principal is ₹ 21,160.

Now, for the third year, $t = 1/3$ year, $p = ₹ 21,160$.

$$\begin{aligned} \text{S.I.} &= (P \times r \times t)/100 \\ &= (21,160 \times 15 \times 2)/(100 \times 3) \\ &= ₹ 2116 \end{aligned}$$

Then, $A = P + \text{S.I.}$

$$\begin{aligned} &= 21,160 + 2116 \\ &= ₹ 23,276 \end{aligned}$$

We know that,

$$\begin{aligned} \text{C.I.} &= \text{Interest in first year} + \text{interest in second year} + \text{interest in third year} \\ &= ₹ (2,400 + 2760 + 2116) \\ &= ₹ 7,276 \end{aligned}$$

2. A sum of ₹ 65,000 is invested for 3 years at 8% p.a. compound interest.

(i) Find the sum due at the end of the first year.

(ii) Find the sum due at the end of the second year.

(iii) Find the compound interest earned in the first two years.

(iv) Find the compound interest earned in the last year.

Solution:-

From the question it is given that,

Principal, $P = ₹ 65,000$, Rate, $r = 8\%$ p.a., Time, $t = 3$ years

(i)

$$\begin{aligned} C_1 &= (P \times r \times t)/100 \\ &= (65,000 \times 8 \times 1)/100 \\ &= ₹ 5,200 \end{aligned}$$

Then, $P_1 = 5200 + 65000$

$$= ₹ 70,200$$

(ii)

$$C_2 = (P \times r \times t)/100$$

$$= (70,200 \times 8 \times 1)/100$$
$$= ₹ 5,616$$

$$\text{Then, } P_2 = 70,200 + 5,616$$
$$= ₹ 75,816$$

(iii)

$$C_1 + C_2 = 5,200 + 5,616$$
$$= ₹ 10,816$$

(iv)

$$C_3 = (P \times r \times t)/100$$
$$= (75,816 \times 8 \times 1)/100$$
$$= ₹ 6,065.28$$

3. Alisha invested ₹ 75,000 for 4 years at 8% p.a. compound interest,

(i) Find the amount at the end of the second year.

(ii) Find the amount at the end of third year.

(iii) Find the interest earned in the third year.

(iv) Calculate the interest for the fourth year.

Solution:-

From the question it is given that,

Alisha invested ₹ 75,000 for 4 years at 8% p.a.

Principal, $P = ₹ 75,000$, Rate, $r = 8\%$ p.a., Time, $t = 4$ years

(i)

$$C_1 = (P \times r \times t)/100$$
$$= (75,000 \times 8 \times 1)/100$$
$$= ₹ 6,000$$

$$\text{Then, } P_1 = 75,000 + 6,000$$
$$= ₹ 81,000$$

$$C_2 = (P \times r \times t)/100$$
$$= (81,000 \times 8 \times 1)/100$$
$$= ₹ 6,480$$

$$\text{Then, } P_2 = 81,000 + 6,480$$
$$= ₹ 87,480$$

(ii)

$$C_3 = (P \times r \times t)/100$$
$$= (87,480 \times 8 \times 1)/100$$
$$= ₹ 6,998.4$$

$$\begin{aligned}\text{Then, } P_3 &= 6,998.4 + 87,480 \\ &= ₹ 94478.4\end{aligned}$$

(iii)

$$\begin{aligned}C_3 &= (P \times r \times t)/100 \\ &= (87,480 \times 8 \times 1)/100 \\ &= ₹ 6,998.4\end{aligned}$$

(iv)

$$\begin{aligned}C_4 &= (P \times r \times t)/100 \\ &= (9,4478.4 \times 8 \times 1)/100 \\ &= ₹ 7,558.272\end{aligned}$$

4. Aryan borrowed a sum of ₹ 36,000 for 1½ years at 10% p.a. compound interest

(i) Find the total interest paid by him.

(ii) Find the amount he needs to return to clear the debt.

Solution:-

From the question it is given that,

Aryan borrowed a sum of ₹ 36,000 for 1½ years at 10% p.a

Principal, $P = ₹ 36,000$, Rate, $r = 10\%$ p.a., Time, $t = 1\frac{1}{2}$ years

(i)

$$\begin{aligned}C_1 &= (P \times r \times t)/100 \\ &= (36,000 \times 10 \times 1)/100 \\ &= ₹ 3,600\end{aligned}$$

$$\begin{aligned}\text{Then, } P_1 &= 36,000 + 3,600 \\ &= ₹ 39,600\end{aligned}$$

(ii)

$$\begin{aligned}C_2 &= (P \times r \times t)/100 \\ &= (39,600 \times 10 \times 1)/100 \\ &= ₹ 3,960\end{aligned}$$

$$\begin{aligned}\text{Then, } P_2 &= 39,600 + 3,960 \\ &= ₹ 43,560\end{aligned}$$

5. Ameesha loaned ₹ 24,000 to a friend for 2½ at 10% p.a. compound interest.

(i) Calculate the interest earned by Ameesha.

(ii) calculate the amount by her at the end of time period.

Solution:-

From the question it is given that,

Ameesha loaned ₹ 24,000 to a friend for 2½ at 10% p.a.

Principal, $P = ₹ 24,000$, Rate, $r = 10\%$ p.a., Time, $t = 1\frac{1}{2}$ years

(i)

$$\begin{aligned}C_1 &= (P \times r \times t)/100 \\ &= (24,000 \times 10 \times 1)/100 \\ &= ₹ 2,400\end{aligned}$$

$$\begin{aligned}\text{Then, } P_1 &= 24,000 + 2,400 \\ &= ₹ 26,400\end{aligned}$$

$$\begin{aligned}C_2 &= (P \times r \times t)/100 \\ &= (26,400 \times 10 \times 1)/100 \\ &= ₹ 2,640\end{aligned}$$

$$\begin{aligned}\text{Then, } P_2 &= 26,400 + 2,640 \\ &= ₹ 29,040\end{aligned}$$

$$\begin{aligned}C_3 &= (P \times r \times t)/100 \\ &= (29,040 \times 10 \times 1)/100 \\ &= ₹ 2,904\end{aligned}$$

$$\begin{aligned}\text{Then, } P_3 &= 29,040 + 2,904 \\ &= ₹ 31,944\end{aligned}$$

(ii)

From above,

$$\begin{aligned}\text{The total interest} &= 2,400 + 2,640 + 2,904 \\ &= ₹ 7,944\end{aligned}$$

6. Harjot deposited ₹ 27,500 in a deposit scheme paying 12% p.a. compound interest. If the duration of the deposit is 3 years, calculate:

(i) The amount received by him at the end of three years.

(ii) The compound interest received by him.

(iii) The amount received by him had he chosen the duration of the deposit to be 2 years.

Solution:-

From the question it is given that,

Harjot deposited ₹ 27,500 in a deposit scheme paying 12% p.a.

Time, $t = 3$ years

(i)

$$\begin{aligned}C_1 &= (P \times r \times t)/100 \\ &= (27,500 \times 12 \times 1)/100 \\ &= ₹ 3,300\end{aligned}$$

$$\text{Then, } P_1 = 27,500 + 3,300$$

$$= ₹ 30,800$$

$$\begin{aligned}C_2 &= (P \times r \times t)/100 \\ &= (30,800 \times 12 \times 1)/100 \\ &= ₹ 3,696\end{aligned}$$

$$\begin{aligned}\text{Then, } P_2 &= 30,800 + 3,696 \\ &= ₹ 34,496\end{aligned}$$

$$\begin{aligned}C_3 &= (P \times r \times t)/100 \\ &= (34,496 \times 12 \times 1)/100 \\ &= ₹ 4139.52\end{aligned}$$

$$\begin{aligned}\text{Then, } P_3 &= 4,139.52 + 34,496 \\ &= ₹ 38,636\end{aligned}$$

(ii)

$$\begin{aligned}\text{Then, the compound interest received by him} &= ₹ 3,300 + ₹ 3,696 + ₹ 4,139.52 \\ &= ₹ 11,135.52\end{aligned}$$

(iii) The amount received by him had he chosen the duration of the deposit to be 2 years, $P_2 = 34,496$

7. Natasha gave ₹ 60,000 to Nimisha for 3 years at 15% p.a. compound interest. Calculate to the nearest rupee:

(i) The amount Natasha receives at the end of 3 years.

(ii) The compound interest paid by Nimisha

(iii) The amount saved by Nimisha had he cleared the debt in 2 years.

Solution:-

From the question it is given that,
Natasha gave ₹ 60,000 to Nimisha for 3 years at 15% p.a.

(i)

$$\begin{aligned}C_1 &= (P \times r \times t)/100 \\ &= (60,000 \times 15 \times 1)/100 \\ &= ₹ 9,000\end{aligned}$$

$$\begin{aligned}\text{Then, } P_1 &= 60,000 + 9,000 \\ &= ₹ 69,000\end{aligned}$$

$$\begin{aligned}C_2 &= (P \times r \times t)/100 \\ &= (69,000 \times 15 \times 1)/100 \\ &= ₹ 10,350\end{aligned}$$

$$\begin{aligned}\text{Then, } P_2 &= 69,000 + 10,350 \\ &= ₹ 79,350\end{aligned}$$

$$C_3 = (P \times r \times t)/100$$

$$= (79,350 \times 15 \times 1)/100$$

$$= ₹ 1190.25$$

$$\text{Then, } P_3 = 79,350 + 1,190.25$$

$$= ₹ 91,252.5$$

(ii) The compound interest paid by Nimisha,

$$C_{\text{total}} = C_1 + C_2 + C_3$$

$$= 9,000 + 10,350 + 1,190.25$$

$$= ₹ 20,541$$

8. Gayatri invested ₹ 25,000 for 3 years and 6 months in a bank which paid 10% p.a. compound interest. Calculate the amount, to the nearest Ts.10, that she received at the end of the period.

Solution:-

From the question it is given that,

Gayatri invested ₹ 25,000 for 3 years and 6 months in a bank which paid 10% p.a.

$$C_1 = (P \times r \times t)/100$$

$$= (25,000 \times 10 \times 1)/100$$

$$= ₹ 2,500$$

$$\text{Then, } P_1 = 25,000 + 2,500$$

$$= ₹ 27,500$$

$$C_2 = (P \times r \times t)/100$$

$$= (27,500 \times 10 \times 1)/100$$

$$= ₹ 2,750$$

$$\text{Then, } P_2 = 27,500 + 2,750$$

$$= ₹ 30,250$$

$$C_3 = (P \times r \times t)/100$$

$$= (30,250 \times 10 \times 1)/100$$

$$= ₹ 3,025$$

$$\text{Then, } P_3 = 30,250 + 3,025$$

$$= ₹ 33,275$$

$$C_4 = (P \times r \times t)/100$$

$$= (33,275 \times 10 \times 1)/100$$

$$= ₹ 1,663.75$$

$$\text{Then, } P_4 = 33,275 + 1,663.75$$

$$= ₹ 34,940$$

9. Prerna borrowed ₹ 16,000 from a friend at 15% p.a. Compound interest. Find the amount, to the nearest rupees, that she needs to return at the end of 2.4 years to clear the debt.

Solution:-

From the question it is given that,
Prerna borrowed ₹ 16,000 from a friend at 15% p.a.

$$\begin{aligned}C_1 &= (P \times r \times t)/100 \\ &= (16,000 \times 15 \times 1)/100 \\ &= ₹ 2,400\end{aligned}$$

$$\begin{aligned}\text{Then, } P_1 &= 16,000 + 2,400 \\ &= ₹ 18,400\end{aligned}$$

$$\begin{aligned}C_2 &= (P \times r \times t)/100 \\ &= (18,400 \times 15 \times 1)/100 \\ &= ₹ 2,760\end{aligned}$$

$$\begin{aligned}\text{Then, } P_2 &= 18,400 + 2,760 \\ &= ₹ 21,160\end{aligned}$$

$$\begin{aligned}C_3 &= (P \times r \times t)/100 \\ &= (21,160 \times 15 \times 1)/100 \\ &= ₹ 7,935\end{aligned}$$

$$\begin{aligned}\text{Then, } P_3 &= 21,160 + 7,935 \\ &= ₹ 29,095\end{aligned}$$

10. Shekhar had a fixed deposit of ₹ 24,000 for 3 years. If he received interest at 10% p.a. compounded annually, find the amount received by him at the time of maturity.

Solution:-

From the question it is given that,
Shekhar had a fixed deposit of ₹ 24,000 for 3 years.

Where, $P = ₹ 24,000$, $t = 3$ years, $r = 10\%$ p.a.

$$\begin{aligned}\text{Amount} &= P(1 + r/100)^t \\ \text{Amount} &= 24,000 (1 + (10/100))^3 \\ &= ₹ 31,944\end{aligned}$$

Hence, shekhar received ₹ 31,944 at the time of maturity.

11. Neha loaned ₹ 27,500 to a friend for $1\frac{3}{4}$ years at 8% p.a. compound interest. Find the interest earned by her.

Solution:-

From the question it is given that,

Neha loaned ₹ 27,500 to a friend for $1\frac{3}{4}$ years at 8% p.a.
Where, $P = ₹ 27,500$, $t = 1\frac{3}{4}$ years = 1.75 years, $r = 8\%$ p.a.
Amount = $P(1 + r/100)^t$
Amount = $27,000 (1 + (10/100))^{1.75}$
= ₹ 3,982

Hence, shekhar received ₹ 31,944 at the time of maturity.

12. Prashant borrowed ₹ 35,000 at 12% p.a. compounded semi-annually. Find the amount he needs to pay back at the end of $1\frac{1}{2}$ years.

Solution:-

From the question it is given that,
Prashant borrowed ₹ 35,000 at 12% p.a.
Where, $p = ₹ 35,000$, $t = 1\frac{1}{2}$ years = 1.5 years, $r = 12\%$ p.a.
Amount = $P(1 + r/100)^{2t}$
Amount = $35,000 (1 + (12/200))^3$
= ₹ 41,685.56

Hence, Prashant has to pay back ₹ 41,685.56 at the end of $1\frac{1}{2}$ years.

13. Amita wanted to start a business for which she needed ₹ 40,000. She borrowed this from Dolly at 10% p.a. compounded semi-annually. Find the extra amount that she needs to pay at the end of two years to clear her debt.

Solution:-

From the question it is given that,
Amita needed = ₹ 40,000
Where, $p = ₹ 40,000$, $t = 1\frac{1}{2}$ years = 2 years, $r = 10\%$ p.a.
Amount = $P(1 + r/100)^{2t}$
Amount = $40,000 (1 + (10/200))^4$
= ₹ 48,620.25

Hence, Amita has to pay ₹ 48,620.25 at the end of two years to clear her debt.

14. Pradeep gave ₹ 16,000 to a friend for 1.5 years at 15% p.a. compounded semi-annually. Find the interest earned by him at the end of 1.5 years.

Solution:-

From the question it is given that,
Pradeep gave ₹ 16,000 to a friend for 1.5 years at 15% p.a.
Where, $p = ₹ 16,000$, $t = 1.5$ years, $r = 15\%$ p.a.
Amount = $P(1 + r/100)^{2t}$

$$\begin{aligned}\text{Amount} &= 16,000 (1 + (15/200))^3 \\ &= ₹ 19,876.75\end{aligned}$$

$$\begin{aligned}\text{Then, } C &= 19,876 - 16,000 \\ &= ₹ 3,876.75\end{aligned}$$

Therefore, the interest earned by Pradeep at the end of 1.5 years is ₹ 3,876.75.

15. Mr. Mohan invested ₹ 12,500 at 16% p.a. compounded annually. If the duration of the deposit was 1.5 years, find the amount Mr. Mohan received at the end of 1.5 years.

Solution:-

From the question it is given that,

Mr. Mohan invested ₹ 12,500 at 16% p.a.

Where, $p = ₹ 12,500$, $t = 1.5$ years, $r = 16\%$ p.a.

$$\text{Amount} = P(1 + r/100)^t$$

$$\begin{aligned}\text{Amount} &= 12,500 (1 + (16/100))^{1.5} \\ &= ₹ 15,660\end{aligned}$$

Therefore, Mr. Mohan received ₹ 15,660 at the end of 1.5 years