REEL 84 CUT 60 HINDI

Chapter - 3
Compound Interest

Date:.....

Page:.....

Formulae:

1. Compound Amount (CA) $= P\left(1+\frac{R}{100}\right)^T$
2. Compound Interest (CI) $= A - P$
$= P\left(1+\frac{R}{100}\right)^T - P$
$= P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$

— Annualy

3. Compound Amount (CA) $= P\left(1+\frac{R}{2\times100}\right)^{2T}$
4. Compound Interest (CI) $= P\left[\left(1+\frac{R}{2\times100}\right)^{2T} - 1\right]$

— Semi-annualy

5. Compound Amount (CA) $= P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right)$
6. Compound Interest (CI) $= P\left[\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right) - 1\right]$

— Different rate

7. Compount Amount (CA) $= P\left[\left(1+\frac{R}{100}\right)^T \cdot \left(1+\frac{MR}{1200}\right)\right]$
8. Compound Interest (CI) $= P\left[\left(1+\frac{R}{100}\right)^T \cdot \left(1+\frac{MR}{1200}\right) - 1\right]$

— Time in months

clw

Date:

Page:

Exercise - 3.1

3.a. Find the compound interest compounding annually and the simple interest of the sum of Rs 5000 in 1 year at 10% P.a. Are both types of interest? Write your conclusion

Solution:

Principal (P) = Rs 5000

Time (T) = 1 year

Rate (R) = 10%

Now,

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 5000\left[\left(1+\frac{10}{100}\right)^1 - 1\right]$$

$$= 5000\left[\frac{11}{10} - 1\right]$$

$$= 5000 \times \frac{1}{10}$$

$$= Rs\ 500$$

Again,

$$SI = (PTR)/100$$

$$= \frac{5000 \times 1 \times 10}{100}$$

$$= Rs\ 500$$

Yes, both the Compound Interest and simple Interest are same for 1 year.

---

b. Find the amount compounded annually.

i. Principal (P) = Rs 2000, time (T) = 2 yrs, Rate (R) = 5% P.a

ii. Principal (P) = Rs 4800, time (T) = 1 1/2 yrs, Rate (R) = 10% P.a

Solution:

i. Principal (P) = 2000

Time (T) = 2 years

Rate (R) = 5% P.a

Now,

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

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

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

$= 2000 \times (1.05)^2$

= Rs 2205

---

ii. Principal (P) = Rs 4800

Time (T) = $1\frac{1}{2}$ yrs

Rate (R) = 10% P.a

Now,

$CA = P\left(1+\frac{R}{100}\right)^T$

$= 4800\left(1+\frac{10}{100}\right)^{1.5}$

$= 4800 \times (1.1)^{1.5}$

= Rs

---

c. Find the interest compounded annually.

i. Principle (P) = Rs 8,000, Time (T) = 3 yrs, Rate (R) = 5% P.a

ii. Principle (P) = Rs 7500, Time (T) = 2½ yrs, Rate = 20% P.a

Solution.

i. Principal (P) = Rs 8000

Time (T) = 3 yrs

Rate (R) = 5% p.a

Now,

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 8000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$= 8000 \times \frac{1261}{8000}$$

$$= Rs\ 1261$$

---

ii. Principle (P) = Rs 7500

Time (T) = 2 ½ yrs

Rate (R) = 20% p.a

Now, $CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$

$$= 7500\left[\left(1+\frac{20}{5\ 100}\right)^{2.5} - 1\right]$$

$$= 7500 \times$$

$$= Rs$$

---

d. Find the amount compounded half yearly.

i. Principal (P) = Rs 6250, Time (T) = 1 yrs, Rate (R) = 8% p.a

Solution:

$$CA = P\left(1+\frac{R}{200}\right)^{2T}$$

$$= 6250\left(1+\frac{8}{200}\right)^{2\times 1}$$

$$= 6250 \times 1.0816$$

$$= Rs\ 6760$$

Page:

ii. Principal (P) = Rs 16,000 , Time (T) = $2\frac{1}{2}$ yrs , rate (R) = 10% p.a

Solution:

$$CI = P\left(1 + \frac{R}{200}\right)^{2T}$$

$$= 16000\left(1 + \frac{10}{200}\right)^{2 \times \frac{3}{2}}$$

$$= 16000 \times (1.05)^3$$

$$= Rs\ 18522$$

---

e. Find the interest compounded semi-anually.

i. Principal (P) = Rs 12,500 , Time (T) = 1 yrs , rate (R) = 12% p.a

Solution:

$$CI = P\left[\left(1 + \frac{R}{200}\right)^{2T} - 1\right]$$

$$= 12500\left[\left(1 + \frac{12}{200}\right)^{2 \times 1} - 1\right]$$

$$= 12500 \times 0.1236$$

$$= Rs\ 1545$$

ii. Principal (P) = Rs 64,000 , Time (T) = 1 1/2 yrs, Rate (R) = 15% p.a

Solution:

$$CI = P\left[\left(1 + \frac{R}{200}\right)^{2T} - 1\right]$$

$$= 64000\left[\left(1 + \frac{15}{200}\right)^{2 \times \frac{3}{2}} - 1\right]$$

$$= 64000 \times \left[(1.075)^3 - 1\right]$$

$$= Rs\ 15507$$

Creative Section:

4.a. Ram borrowed Rs 4,800 from sita at a rate of 20% p.a. At the end of one year,

i. how much simple interest will Ram have to pay?

ii. How much compound Interest semi-annually will Ram have to pay?

Solution:

Principal (P) = Rs 4800

Rate (R) = 20% P.A

Time (T) = 1 yrs.

Now,

i. $SI = \frac{PTR}{100}$

$= (4800 \times 10 \times 1)/100$

$= Rs\ 48000 \div 100$

So, I = Rs 480

Also,

$$CI = P\left[\left(1 + \frac{R}{200}\right)^{2T} - 1\right]$$

$$= 4800\left[\left(1 + \frac{20}{200}\right)^{2\times1} - 2\right]$$

$= 4800 \times 0.2025$

$= Rs\ 492$

---

b Find the difference between simple Interest and the annual Compound Interest on Rs 12000 for 2 years at 20% per annum.

Solution:

Principal (P) = Rs 12000

Time (T) = 2 years

Rate (R) = 20% P.a

~~CA~~ CI - SI

$= P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PTR}{100}$

$= 12000\left[\left(1+\frac{20}{100}\right)^2 - 1\right] - \frac{12000 \times 2 \times 20}{100}$

$= 12000 \times \left(\frac{36}{25} - 1\right) - 1200 \times 4$

$= 5280 - 4800$

$= Rs\ 480$

∴ The difference between CI and SI is Rs 480.

C. A person borrowed Rs 16,000 from a bank at 12.5% per annum simple interest and lent the whole amount to a shopkeeper at the same rate of Compound Interest. How much will be gain after 3 years?

Solution:

Principal (P) = Rs 16,000

Rate (R) = 12.5%

Time (T) = 3 years

Now,

Gain = CI - SI

$= P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PTR}{100}$

$= 16000\left[\left(1+\frac{12.5}{100}\right)^3 - 1\right] - \frac{16000 \times 12.5 \times 3}{100}$

$= 16000 \times \frac{217}{512} - 6000$

$= Rs\ 781.25$

∴ The gain amount after 3 years is Rs 781.25.

d. A sum of Rs 2,50,000 amounts to Rs 2,62,500 at a certain rate of interest in 5 years. Find the sum of money that amounts to Rs 198375 at the same rate of compound interest in 2 years.

Solution:

Principal (P) = Rs 1,50,000

Amount (A) = Rs 2,62,500

Time (T) = 5 years

We know,

$$R = \frac{I \times 100}{PT}$$

$$= \frac{(A-P) \times 100}{PT}$$

$$= \frac{(262500 - 150,000) \times 100}{150000 \times 5}$$

$$= \frac{112500 \times 100}{1500000 \times 5}$$

$$= 15\%$$

Again,

Rate (R) = 15%

Time (T) = 2 years

Principal (P) = ?

CA = Rs 198375

We know,

$$CA = P\left(1 + \frac{R}{100}\right)^T$$

$$\text{or, } 198375 = P\left(1 + \frac{3}{20}\right)^2$$

$$\text{or, } 198375 = 1.1025\,P$$

$$\therefore P = Rs\ 150000$$

∴ The required sum of money is Rs 150000.

e. Mohan deposited Rs 5,000 at 8% p.a Compound Interest in a bank. find the difference between Compound Amounts of yearly and half yearly in two years.

Solution:

Principal (P) = Rs 5000

Rate (R) = 8%

Time (T) = 2%

~~of~~ $CA_1 - CA_2$

$= P\left(1+\frac{R}{200}\right)^{2T} - P\left(1+\frac{R}{100}\right)^{T}$

$= 5000\left(1+\frac{8}{200}\right)^{4} - 5000\left(1+\frac{8}{100}\right)^{2}$

$= 5000 \times \left(\frac{26}{25}\right)^{4} - 5000\left(\frac{27}{25}\right)^{2}$

$= 5849.2929 - 5832$

$= Rs\ 17.30$

∴ The difference between Compound amount of annualy and semi-anually is Rs 17.30.

---

f. find the difference between Compound interest compounded semi-annually and the interest Compounded anually on Rs 16,000 at 10% p.a in 1½ yrs?

Solution:

Principal (P) = Rs 16,000

Rate (R) = 10%

Time (T) = 3/2 yrs

A.T.Q

$P\left[\left(1+\frac{R}{200}\right)^{2T}-1\right] - P\left[\left(1+\frac{R}{100}\right)^{T}\left(1+\frac{MR}{1200}\right)-1\right]$

$= 16000\left[\left(1+\frac{10}{200}\right)^{\frac{3}{2}\times 2}-1\right] - 16000\left[\left(1+\frac{10}{200}\right)^{\frac{3}{2}\times 2}\left(1+\frac{MR}{1200}\right)-1\right]$

$= 16000 \times \frac{1261}{8000} - 16000 \times \frac{(1.05)^{1.5}}{200}$

$= 2522 - \frac{160 \times 31}{2}$

$= 2522 - 2480$

$=$ Rs 42

∴ The differences between CI annually and CI semi-anually is Rs 42.

---

g. Find the differences between Compound Interest Compounded semi-anually and simple interest on Rs 8,000 at 10% per annum in 3/2 years.

Solution

Principal (P) = Rs 8000

Rate (R) = 10% p.a

Time (T) = $\frac{3}{2}$ yrs.

A.T.Q

CI - SI

$= P\left[\left(1 + \frac{R}{200}\right)^{2T} - 1\right] - \frac{PTR}{100}$

$= 8000\left[\left(1 + \frac{10}{200}\right)^{2 \times 3/2} - 1\right] - \frac{8000 \times 10 \times 1.5}{100}$

$= 8000 \times \frac{1261}{8000} - 1200$

$= 1261 - 1200$

$=$ Rs 61

∴ The difference between Compound Interest and simple interest is Rs 61.

---

h. Sungyana borrowed a sum of Rs 12,500 at 12% p.a simple interest for 1 year 6 months and lent to bishwant at the same ~~time~~ rate of compound interest compounded half-yearly for the same interval of time. How much profit did she make?

Solution:

Principal (P) = Rs 12,500

Rate (R) = 12%

Time (T) = 1.5 years

By question

Compound Interest − Simple Interest

$= P\left[\left(1+\frac{R}{200}\right)^{2T}-1\right] - \frac{PTR}{100}$

$= 12500\left[\left(1+\frac{12}{200}\right)^{2\times1.5}-1\right] - \frac{12500 \times 12 \times 1.5}{100}$

$= 12500 \times \{(1.06)^3-1\} - 2250$

$= 2387.7 - 2250$

= Rs 137.70

∴ The profit made by her is Rs 137.70

---

i Ram borrowed Rs 1,50,000 from sita at the rate of 21% per year. At the end of 9 months, how much compound Interest compounded half yearly should he pay?

Solution:

Principal (P) = Rs 1,50,000

Rate (R) = 21% p.a

Time (T) = 9 months

$= \frac{1}{2}$ year 3 months

We know,

$$CI = P\left[\left(1+\frac{R}{200}\right)^{2T} \times \left[\left(1+\frac{MR}{1200}\right)-1\right]\right]$$

$$= 150000\left[\left(1+\frac{21}{200}\right)^{2\times\frac{1}{2}}\left(1+\frac{3\times 21}{1200_4}\right)-1\right]$$

$$= 150000\left[\frac{221}{200}\times\frac{421}{400}-1\right]$$

$$= 150000\left[\frac{93041}{80000}-1\right]$$

$$= 150000 \times [1.1630 - 1]$$

$$= 150000 \times 0.1630$$

$$= Rs\ 24451.87$$

5.a. Find the amount compounded annually on ~~Rs 1,00,000 for 3 years~~ 25,000 for 2 years if the rate of interest for two years are 10% and 12% respectively?

Solution:

Principal (P) = Rs 25,000

Time (T) = 2 years

Rate$_1$ (R_1) = 10%

Rate$_2$ (R_2) = 12%

we know,

$$CA = P\left[\left(1+\frac{R_1}{100}\right)^{T}\cdot\left(1+\frac{R_2}{100}\right)^{T}\right]$$

$$= 25000\left[\left(1+\frac{10}{100}\right)^{1}\cdot\left(1+\frac{12}{100}\right)^{1}\right]$$

$$= 25000\left[\frac{110}{100}\times\frac{112}{100}\right]$$

$$= 25000 \times \frac{110\times 112}{10000}$$

$= 25000 \times \frac{12320}{10000}$

$= 25 \times 1232$

$= 30,800$

$\therefore$ The amount is Rs 30,800.

---

b. Find the Compound interest Compounded annually on Rs 1,0000 for 3 years if the rate of interest in the first, second and the third years are 4%, 5% and 7% respectively:

Solution:

Principal (P) = Rs 1,00,000

$R_1 = 4\%$

$R_2 = 5\%$

$R_3 = 7\%$

Time (T) = 3 years

Now,

$$CI = P\left[\left(1+\frac{R_1}{100}\right)^T \cdot \left(1+\frac{R_2}{100}\right)^T \cdot \left(1+\frac{R_3}{100}\right)^T - 1\right]$$

$$= 1,00,000\left[\left(1+\frac{4}{100}\right)^1 \cdot \left(1+\frac{5}{100}\right)^1 \cdot \left(1+\frac{7}{100}\right)^1 - 1\right]$$

$$= 1,00,000\ [1.04 \times 1.05 \times 1.07 - 1]$$

$= 1,00,000 \times 0.16844$

$=$ Rs 16,844

$\therefore$ The CI is Rs 16,844.

6.a. The compound interest on the sum of money at 8% per annum for 2 years is more than the simple interest on the same sum at the same interval by Rs 76.80. Find the sum

Solution:

Rate = 8%

Time (T) = 2 years

According to question

$CI - SI = 76.80$

$\text{or, } P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PTR}{100} = 76.80$

$\text{or, } P\left[\left(1+\frac{8}{100}\right)^2 - 1\right] - \frac{P\times 2\times 8}{100} = 76.80$

$\text{or, } P\left(1.1664 - 1\right) - \frac{16P}{100} = 76.80$

$\text{or, } 0.1664P - 0.16P = 76.80$

$\text{or, } \frac{4P}{625} = 76.80$

$\text{or, } P = \frac{76.80\times 625}{4}$

$\therefore P = \text{Rs } 12,000$

$\therefore$ The sum is Rs 12,000

---

b. The simple interest on a sum of money in 2 years is Rs 36 less than compound interest compounded annually. If the rate of interest is 12% p.a find the sum.

Solution

Rate = 12% p.a

Time (T) = 2 years

By question:

$CI - SI = \text{Rs } 36$

$\text{or, } P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PTR}{100} = 36$

$\text{or, } P\left[\left(\frac{112}{100}\right)^2 - 1\right] - \frac{P\times 2\times 12}{100} = 36$

$\text{or, } 0.2544P - 0.24P = 36$

or,

or, $\frac{9}{625} P = 36$

or, $P = \frac{36 \times 625}{9}$

$\therefore P = Rs\ 2500$

$\therefore$ The sum is Rs 2,500.

---

c. If the compound interest on a sum of money compounded semi-annually is one year at 10% per annum is 40 ~~tha~~ more than the compound interest on the same sum compounded anually in the same time at the same interval of time and same rate, find the sum.

Solution:

Rate = 10%

Time (T) = 2 years.

According to question

$$P\left[\left(1+\frac{R}{200}\right)^{2T}-1\right] - P\left[\left(1+\frac{R}{100}\right)-1\right] = 40$$

or $$P\left[\left(1+\frac{10}{200}\right)^{2\times1}-1\right] - P\left[\left(1+\frac{10}{100}\right)-1\right] = 40$$

or $0.1025P - 0.1P = 40$

or, $\frac{1}{400} P = 40$

or, $P = 40 \times 400$

$\therefore P = Rs\ 16000$

$\therefore$ The sum is Rs 16000.

---

d. The differences between the annually and semi-annual Compound interest on a sum of money is Rs482 at the rate of 20% per annum for 2 years. find the sum.

Solution:

Time (T) = 2 years

Rate (R) = 20% p.a

By question:

$$P\left[\left(1+\frac{R}{200}\right)^{2T}-1\right]-P\left[\left(1+\frac{R}{100}\right)^{2T}-1\right]=Rs\ 482$$

or, $$P\left[\left(1+\frac{20}{200}\right)^{2\times2}-1\right]-P\left[\left(1+\frac{20}{100}\right)^{2}-1\right]=482$$

or, $0.4641P - 0.44P = Rs\ 482$

or, $\frac{241}{20000}P = 482$

or, $P = \frac{482\times10000}{241}$

$\therefore P = Rs\ 20,000$

$\therefore$ The sum is Rs 20,000.

---

e. The sum of simple interest and compound interest after 2 years is Rs 202.50 and the rate of interest is 5% per annum. find the

Solution:

Time (T) = 2 years

Rate (R) = 5% p.a

By question:

$$\frac{PTR}{100}+P\left[\left(1+\frac{R}{100}\right)^{T}-1\right]=202.50$$

or, $$\frac{P\times2\times5}{100}+P\left[\left(1+\frac{5}{100}\right)^{2}-1\right]=202.50$$

or, $0.2P + 0.1025P = 202.50$

or, $\frac{81}{400}P = 202.50$

or, $P = (202.50\times400)/81$

$\therefore P = Rs\ 2006$

7a. In how many years will the sum of Rs 8,000 amounts to Rs 13,824 at 20% per annum interest compounded annually?

Solution:

Principal (P) = Rs 8,000

Rate (R) = 20% p.a.

CA = Rs 13,824

we know

$$CA = P\left[1 + \frac{R}{100}\right]^T$$

$$\text{or } 13824 = 8000\left[1 + \frac{20}{5\ 100}\right]^T$$

$$\text{or, } \frac{13824}{8000} = \left(\frac{6}{5}\right)^T$$

$$\text{or, } \frac{216}{125} = \left(\frac{6}{5}\right)^T$$

$$\text{or } \left(\frac{6}{5}\right)^3 = \left(\frac{6}{5}\right)^T$$

$\therefore T = 3$ years

$\therefore$ The required time is 3 years.

---

b. A man took a loan of Rs 40,000. If the rate of compound interest is 5 paise per rupees per year, in how many years will the compound interest be Rs 6305?

Solution:

Principal (P) = Rs 40,000

$$\text{Int } R = \frac{I \times 100}{PT}$$

$$= \frac{5}{100} \times \frac{100}{1 \cdot 1}$$

$$= 5\%$$

H/W

Date:
Page:

A·T·Q

$$P\left[\left(1+\frac{R}{100}\right)^T - 1\right] = 6305$$

$$\text{or, } 40,000\left[\left(1+\frac{5}{100}\right)^T - 1\right] = 6305$$

$$\text{or, } \left(\frac{105}{100}\right)^T = \frac{6305}{40000} + 1$$

$$\text{or, } \left(\frac{21}{20}\right)^T = \frac{1261}{8000} + 1$$

$$\text{or } \left(\frac{21}{20}\right)^T = \left(\frac{21}{20}\right)^3$$

$$\therefore T = 3 \text{ years}$$

8.a. At what percent rate of compound interest per annum will the compound interest on Rs 1,25,000 be Rs 91,000 in 3 years?

Solution:

Principal (P) = Rs 1,25,000

Time (T) = 3 years

By question:

$$P\left[\left(1+\frac{R}{100}\right)^T - 1\right] = 91000$$

$$\text{or } 125,000\left[\left(1+\frac{R}{100}\right)^3 - 1\right] = 91000$$

$$\text{or } \left(1+\frac{R}{100}\right)^3 = \frac{91000}{125000} + 1$$

$$\text{or, } \left(1+\frac{R}{100}\right)^3 = \left(\frac{6}{5}\right)^3$$

$$\text{or } 1+\frac{R}{100} = \frac{6}{5}$$

$$\text{or } R = \left(\frac{6}{5} - 1\right)100$$

$$\therefore R = 20\%$$

b. At what percent rate per annum compound interest will Rs 2500 amount to Rs 2704 in 2 years?

Solution:

Principal (P) = Rs 2500

CA = 2704

Time = 2 years

By question:

$$CA = 2704$$

$$\text{or, } P\left(1+\frac{R}{100}\right)^T = 2704$$

$$\text{or } 2500\left(1+\frac{R}{100}\right)^2 = 2704$$

$$\text{or, } \frac{2704}{2500} = \left(1+\frac{R}{100}\right)^2$$

$$\text{or, } \left(\frac{26}{25}\right)^2 = \left(1+\frac{R}{100}\right)^2$$

$$\text{or } \frac{26}{25} = 1+\frac{R}{100}$$

$$\text{or, } R = \left(\frac{26}{25}-1\right)\cdot 100$$

$$\therefore R = 4\%$$

∴ The rate is 4% p.a.

9.a. If the compound amount of sum of money in 2 years and 3 years are Rs 13,000 and Rs 14,300 respectively. find the rate of interest.

Solution:

Case I

Let P be Principal and R be Rate

CA = Rs 13000

Time(T) = 2 years.

$CA = P\left(1+\frac{R}{100}\right)^T$

or, $13000 = P\left(1+\frac{R}{100}\right)^2$ —(i)

Case II

CA = Rs 14300

So,

$CA = \left(1+\frac{R}{100}\right)^T$

or, $14300 = \left(2+\frac{R}{100}\right)^3$ —(ii)

Now,

Dividing equation (ii) by (i)

$\frac{14300}{13000} = \frac{P(1+R/100)^3}{P(1+R/100)^2}$

or, $\frac{11}{10} = 1 + R/100$

or, $\frac{12}{10} - 1 = \frac{R}{100}$

or, $R = \frac{1}{10} \times 100$

$\therefore R = 10\%$.

$\therefore$ The rate is 10%.

---

b. If a sum of money becomes Rs 6,480 in 3 years and Rs7776 in 4 years interest being compounded annually, find the sum and the rate of interest.

Solution:

Let p be the principal and R be the rate.

Case I

CA = Rs 6480

$$CA = P\left(1+\frac{R}{100}\right)^T$$

$$\text{or, } 6480 = P\left(1+\frac{R}{100}\right)^3 \quad \text{---(i)}$$

Also,

Case II

$$CA = P\left(1+\frac{R}{100}\right)^T$$

$$\text{or } \frac{7776}{6480} = P\left(1+\frac{R}{100}\right)^4 \quad \text{---(ii)}$$

Dividing equation (ii) by (i)

$$\frac{7776}{6480} = \frac{P\left(1+\frac{R}{100}\right)^4}{P\left(1+\frac{R}{100}\right)^3}$$

$$\text{or, } \frac{6}{5} = 1+R/100$$

$$\text{or, } \left(\frac{6}{5}-1\right)\times 100 = R$$

$$\therefore R = 20\%$$

Also,

$$CA = P\left(1+\frac{R}{100}\right)^T$$

$$\text{or } 6480 = P\left(1+\frac{20}{100}\right)^3$$

$$\text{or } 6480 = P \times \frac{216}{125}$$

$$\text{or } P = \frac{6480 \times 125}{216}$$

$$\therefore P = \text{Rs } 3750$$

∴ The principal is Rs 3750 and interest is 20%.

10.a. The compound interest of a sum of money in 1 year and 2 years are Rs 450 and Rs 945 respectively, find the rate of interest compounded yearly and the sum.

Solution:

Case I

Time (T) = 1 year

CI = Rs 450

We know,

$$CI = Rs\ 450$$

$$\text{or, } P\left[\left(1+\frac{R}{100}\right)^T - 1\right] = 450$$

$$\text{or, } P\left[\left(\frac{100+R}{100}\right)^1 - 1\right] = 450 \quad \text{—(i)}$$

Case II

CI = Rs 945

Time (T) = 2 years.

Now

$$CI = Rs\ 945$$

$$\text{or, } P\left[\left(1+\frac{R}{100}\right)^T - 1\right] = 945$$

$$\text{or, } P\left[\left(\frac{100+R}{100}\right)^2 - 1\right] = 945 \quad \text{—(ii)}$$

Now,

Dividing eq (ii) by (i), we get.

$$\text{or, } \frac{P\left[\left(\frac{100+R}{100}\right)^2 - 1\right]}{P\left[\left(\frac{100+R}{100}\right) - 1\right]} = \frac{945}{450}$$

$$\text{or, } \frac{\left(\frac{100+R}{100}+1\right)\left(\frac{100+R}{100}-1\right)}{\left(\frac{100+R}{100}-1\right)} = 2.1$$

$$\text{or, } \frac{100+R}{100} + 1 = 2.1$$

$$\text{or, } R = \{(2.1-1) \times 100\} - 100$$

$$\text{or, } R = 110 - 100$$

$$\therefore R = 10\% \text{ P.a.}$$

Also,

Putting the value of R in equation (i)

$$\text{or, } P\left[\left(\frac{100+10}{100}\right) - 1\right] = 450$$

$$\text{or } P\left(\frac{110-100}{100}\right) = 450$$

$$\text{or } P = \frac{45000}{10}$$

$$\therefore P = \text{Rs } 4500$$

∴ The sum is Rs 4500 and interest is 10%.

---

b. The compound interest of a sum of money in 1 year is Rs 350 and in 2 years is Rs 724.50. Find the rate of interest compounded yearly and the sum.

Solution:

Case I

CI = Rs 350

Time (T) = 1 year

We know,

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$\text{or } 350 = P\left[\left(1+\frac{R}{100}\right)^1 - 1\right] \quad \text{—(i)}$$

Also,

Case II

CI = Rs 724.50

Page:.....

Time (T) = Rs 724.50

we know,

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$\text{or, } 724.50 = P\left[\left(1+\frac{R}{100}\right)^2 - 1 \quad \text{—(ii)}\right.$$

Now,

Dividing equation (ii) by (i)

$$\frac{P\left[\left(1+\frac{R}{100}\right)^2 - 1\right]}{P\left[\left(1+\frac{R}{100}\right)^2 - 1\right]} = \frac{724.50}{350}$$

$$\text{or, } \frac{\left(\frac{200+R}{100}+1\right)\left(\frac{200+R}{100}-1\right)}{\left(\frac{200+R}{100}-1\right)} = 2.07$$

$$\text{or, } \frac{100+R}{100} = 2.07 - 1$$

$$\text{or, } R = (1.07 \times 100) - 100$$

$$\therefore R = 7\%.$$

Also, putting the value of 'R' in equation (i)

$$P\left[\left(1+\frac{7}{100}\right)^2 - 1\right] = 350$$

$$\text{or } P \times \frac{7}{100} = 350$$

$$\text{or } P = \frac{350 \times 100}{7}$$

$$\therefore P = \text{Rs } 5000$$

∴ The principal is Rs 5000 and ~~Time is~~ rate is 7% p.a.

11.a. Ram lend altogether Rs 10,000 to Hari and Laxmi for 2 years. Hari agrees to pay simple interest at 12% p.a and Laxmi agrees to pay compound interest at the rate of 9% p.a. If Laxmi paid Rs 596.70 more than Hari as the interest, find how much did he lend each other.

Solution:

Let the money lent to Laxmi be Rs 'x'

∴ The money lent to ~~Ram~~ Hari = (10000 − x)

A.T.Q

$CI - SI = Rs\ 596.70$

or, $P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PTR}{100} = Rs\ 596.70$

or, $x\left[\left(1+\frac{9}{100}\right)^2 - 1\right] - \frac{(10000-x)\times 2\times 12}{100} = 596.70$

or, $x \times 0.1881 - \frac{(10000-x)\times 6}{25} = 596.70$

or, $\frac{4.7025x - 60000 + 6x}{25} = 596.70$

or, $10.7025x - 60000 = 14917.5$

or, $x = \frac{14917.5 + 60000}{10.7025}$

∴ $x = Rs\ 7000$.

Or,

or, $0.1881x - \frac{(10000-x)\times 6}{25} = 596.70$

or, $0.1881x - \frac{\{60000 - 6x\}}{25} = 596.70$

or, $0.1881x - 2400 + 0.24x = 596.70$

or, $0.1881x + 0.24x = 596.70 + 2400$

∴ $x = Rs\ 7000$

∴ The money lent to Laxmi is Rs 7000 and the money lent to Hari is Rs (10000 − 7000) = 3000.

b. The Compound interest of a certain sum for 2 years is Rs 8,034 and the ~~int~~ Simple interest ~~is~~ of the same sum for the same time at the same rate is Rs 7,800. Find the sum and the rate of interest.

Solution:

Compound Interest for 2 yrs = Rs 8034

Simple ~~Compound~~ Interest for 2 year = $\frac{8034}{2}$ = Rs 7800

Now,

SI of 1 year = $\frac{7800}{2}$ = Rs 3900

CI and SI for 1st year is same.

CI for 2nd year = 8034 − 3900 = Rs 4134

Difference of interest = 4134 − 3900

= Rs 234

Hence, Rs 234 is the interest of Rs 3900 for 1 year.

we know, Rate of Interest = $\frac{SI \times 100}{P \times T}$

= 23400 / (3900 × 1)

= 6%.

Principal = $\frac{SI \times 100}{TR}$

= $\frac{3900 \times 100}{6 \times 1}$

= Rs 65,000

n/w

Date:
Page:

c. A bank has fixed the rate of interest 20% p.a. semi-annually compound interest in account P and 12% p.a. annually compound interest in account Q. If you are going to deposit Rs 50,000 for 2 years in the same bank, in which account will you deposit your money and why? show by calculation.

Solution:

For account P

$$CI = P\left[\left(1+\frac{R}{200}\right)^{2T}-1\right]$$

$$= 50,000\left[\left(1+\frac{10}{200}\right)^{2\times 2}-1\right]$$

$$= 50000 \times 0.2155$$

$$= Rs\ 10775.3125$$

For Account Q

$$CI = P\left[\left(1+\frac{R}{100}\right)^{T}-1\right]$$

$$= 50,000\left[\left(1+\frac{12}{100}\right)^{2}-1\right]$$

$$= 50000 \times 0.2544$$

$$= Rs\ 12720$$

I will deposit money in account Q, because it gives more interest.