

Chapter 2. Banking

1.) Mrs. Goswami deposits Rs. 1000 every month in a recurring deposit account for 3 years at 8% interest per annum. find the matured value.

→ Here, given that

• Mrs. Goswami deposits Rs. 1000 every month in a recurring deposit account for 3 years at the rate of 8% interest per annum.

Then, deposit per month (P) = Rs. 1000

Duration of period = 3 years = 36 months

Interest rate per annum = 8%

$$\text{Then, Total principal} = \frac{36(36+1) \times 1000}{2} = \frac{(36 \times 37 \times 1000)}{2}$$

$$\text{And Interest} = \frac{PRT}{100} = \frac{(36 \times 37 \times 1000 \times 8)}{(2 \times 12 \times 100)} = 12 \times 37 \times 10 = 4440$$

Thus, matured price = P × n * Simple Interest

$$= 1000 \times 36 + 4440$$

$$= 36000 + 4440$$

$$= 40440$$

Thus, the matured value is found to be Rs. 40440.

2.) Sonia had a recurring deposit account in a bank and deposited Rs. 600 per month for 2½ years. If the rate of interest was 10% per annum. find the maturity value of this account.

→ Here, given that

Sonia deposited Rs. 600 per month for 2½ years.

And, the rate of interest was 10% per annum.

$$\begin{aligned}\text{Period of duration} &= 2.5 \text{ years} \\ &= 2.5 \times 12 \text{ months} \\ &= 30 \text{ months}\end{aligned}$$

$$\text{Rate of interest per annum} = 10\%$$

$$\begin{aligned}\text{Then, Simple Interest} &= \frac{P \times (n)(n+1) \times R}{2 \times 100 \times 12} \\ &= \frac{600 \times 30 \times 31}{2 \times 100 \times 12}\end{aligned}$$

$$\boxed{\text{Simple Interest} = 2325 \text{ Rs.}}$$

$$\begin{aligned}\text{Thus, maturity value} &= P \times n + \text{Simple interest} \\ &= 600 \times 30 + 2325 \\ &= 20,325\end{aligned}$$

Thus, the maturity value is found to be 20,325 Rs.

3.) Kiran deposited Rs. 200 per month for 36 months in a bank's recurring deposit account. If the bank pays interest at the rate of 11% per annum, find the amount she gets on maturity?

→ Here, given that

Kiran deposited Rs. 200 per month for 36 months.

The rate of interest per annum is 11%.

Then, The amount deposited (P) = 200 Rs.

Duration of Period (n) = 36 months

Rate of interest (R) = 11% per annum

Then, the total amount deposited in 36 months is

$$200 \times 36 = \text{Rs. } 7200$$

$$\begin{aligned}
 \text{Thus, Simple interest} &= \frac{P \times n \times (n+1) \times R}{2 \times 12 \times 100} \\
 &= \frac{200 \times 36 \times 37 \times 11}{2 \times 12 \times 100} \\
 &= \frac{(200 \times 36 \times 37 \times 11)}{(2 \times 12 \times 100)} \\
 &= 12,21
 \end{aligned}$$

$$\begin{aligned}
 \text{Hence, the maturity value} &= 7200 + 1221 \\
 &= 8421
 \end{aligned}$$

Thus, Kiran will get maturity value as Rs. 8421.

4) Haneef has a cumulative bank account and deposits Rs. 600 per month for a period of 4 years. If he gets Rs. 5880 as interest at the time of maturity, find the rate of interest.

→ Here, given that

- Haneef deposits Rs. 600 per month for a period of 4 years.
- And he got an interest of Rs. 5880 at the time of maturity.

$$\text{Then, Monthly deposit (P)} = \text{Rs. } 600$$

$$\text{Interest} = \text{Rs. } 58,800$$

$$\text{Period of duration (n)} = 4 \text{ years} = 48 \text{ months}$$

$$\begin{aligned}
 \text{Thus, deposit for 1 month} &= \frac{P \times n \times (n+1)}{2} \\
 &= (600 \times 48 \times 49) / 2 \\
 &= \text{Rs. } 70,560
 \end{aligned}$$

Let us consider the rate of interest is $y\%$ per annum.

$$\text{Then, Interest} = P \times r \times t / 100$$

$$58,800 = (70,560 \times r \times 1) / (100 \times 12)$$

$$5880 = 588r$$

$$\therefore r = \frac{5880}{588} = 10 \quad \boxed{r=10}$$

Thus, the rate of interest is found to be 10%.

5.) David opened a recurring deposit account in a bank and deposited Rs. 300 per month for two years. If he received Rs. 7725 at the time of maturity, find the rate of interest per annum.

→ Here, given that

- David deposited Rs. 300 per month for two years.
- And he received Rs. 7725 at the time of maturity.

Here, Deposit during one month (P) = Rs. 300

duration of period = 2 years = 24 months

And maturity value = Rs. 7725

Let us consider 'R' is the rate percent which we have to find.

$$\begin{aligned} \text{Thus, Principal for 1 month} &= P \times n \times (n+1) / 2 \\ &= 300 \times 24 \times 25 / 2 \\ &= 90,000 \end{aligned}$$

$$\begin{aligned} \text{Hence, Interest got} &= PRT / 100 \\ &= (90,000 \times R \times 1) / (100 \times 12) \\ &= 75R \end{aligned}$$

$$\begin{aligned} \text{Thus, } 300 \times 24 + 75R &= 7725 \\ 7200 + 75R &= 7725 \\ 75R &= 7725 - 7200 = 525 \\ R &= 525 / 75 = 7 \end{aligned}$$

$$\boxed{R = 7}$$

Thus, the rate of interest is found to be 7% per annum.

6.) Mr. Gupta opened a recurring deposit account in a bank. He deposited Rs. 2500 per month for two years. At the time of maturity he got Rs. 67,500. Find

i) the total interest earned by Mr. Gupta

ii) The rate of interest per annum.

→ Here, given that

Mr. Gupta deposited Rs. 2500 per month for 2 years.

And he got Rs. 67,500 at the time of maturity.

Thus, Amount deposited per month = Rs. 2500
Period of duration = 2 years = 24 months
Maturity value = Rs. 67500

$$\begin{aligned}\text{Then, Total principal for 1 month} &= P \times n \times (n+1) / 2 \\ &= (2500 \times 24 \times 25) / 2 \\ &= 7,50,000\end{aligned}$$

$$\begin{aligned}\text{Thus, Interest} &= 67,500 - 24 \times 2500 \\ &= 67,500 - 60,000\end{aligned}$$

$$\boxed{\text{Interest} = 7500}$$

$$\text{Period} = 1 \text{ month} = \frac{1}{12} \text{ year}$$

$$\begin{aligned}\text{Then, Rate of interest} &= \frac{(\text{Simple interest} \times 100)}{(7500 \times 100 \times \frac{1}{12})} \\ &= 12\%\end{aligned}$$

Thus, i) The total interest earned by Mr. Gupta is 7500 Rs.

ii) And the rate of interest per annum is 12%.

7.) Shahzakh opened a recurring deposit account in a bank and deposited Rs. 800 per month for $1\frac{1}{2}$ years. If he received Rs. 15,084 at the time of maturity, find the rate of interest per annum.

→ Here, given that

Shahzakh deposited Rs. 800 per month for $1\frac{1}{2}$ years.
And he received Rs. 15,084 at the time of maturity.

Then, Amount deposited per month (P) = Rs. 800

Period of months (n) = $1\frac{1}{2} \times 12 = \frac{3}{2}$ years

$$n = \frac{3}{2} \times 12 \text{ months}$$

$$\boxed{n = 18 \text{ months}}$$

$$\text{Thus, Interest} = \frac{P \times n \times (n+1) \times r}{2 \times 12 \times 100}$$

$$= \frac{800 \times 18 \times 19 \times r}{2 \times 12 \times 100}$$

$$\boxed{\text{Interest} = 114r}$$

But, maturity value = 15,084

$$\text{Hence, } 15084 = 114r + 800 \times 18$$

$$15084 = 114r + 14400$$

$$15084 - 14400 = 114r$$

$$684 = 114r$$

$$r = 684/114 = 6\%$$

$$\boxed{r = 6\%}$$

Thus, the rate of interest per annum is found to be 6%.

8.) Rekha opened a recurring deposited account for 20 months and the rate of interest per annum is 9%. And Rekha received 441 as interest at the time of maturity. Find the rate of interest per annum.

→ Here, given that

- Rekha deposited amount for 20 months with rate of interest per annum 9%.
- Rekha received Rs. 441 at the as interest at the time of maturity.

Then, $n = 20$ months, $r = 9\%$

Let the monthly deposited amount (P) = y

$$\text{Thus, Interest} = P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$$

$$= \frac{y \times 20 \times 21 \times 9}{2 \times 12 \times 100}$$

$$= \frac{y \times 5 \times 7 \times 9}{2 \times 100}$$

$$\text{Interest} = 1.575y \text{ Rs.}$$

But, given that, Rekha got interest at time of maturity } = 441 Rs.

$$\therefore 441 = 1.575y$$

$$\boxed{y = 280 \text{ Rs.}}$$

Thus, the rate of interest per annum is found to be Rs. 280.

9.) Mohan has a recurring deposit account in a bank for 2 years at 6% per annum simple interest. If he gets Rs. 1200 as interest per at the time of maturity, find i) the monthly instalment
ii) the amount of maturity.

→ Here, given that

- Mohan deposited account in a bank for 2 years at 6% per annum simple interest.
- He got Rs. 1200 interest at the time maturity,

Then, $\boxed{\text{Interest} = \text{Rs } 1200}$

Period of duration (n) = 2 years = 24 months

Rate per annum (r) = 6%

Let us consider monthly deposit is Rs. P.

Then, $\text{Interest} = \frac{P \times n \times (n+1) \times r}{2 \times 12 \times 100}$

$$1200 = \frac{P \times 24 \times 25 \times 6}{2 \times 12 \times 100}$$

$$1200 = \frac{6}{4} P$$

$$\therefore P = \frac{1200 \times 4}{6} = 800$$

$$\therefore \boxed{\text{Monthly deposit} = \text{₹ } 800}$$

Then, maturity value = $P \times n + \text{Interest}$
 $= 800 \times 24 + 1200$
 $= 19,200 + 1200$

$$\boxed{\text{maturity value} = 20,400}$$

Thus, i) the monthly installment is found to be Rs. 800
and ii) The amount of maturity is found to be Rs. 20,400.

10.) Mr. R.K. Nair gets Rs. 6,455 at the end of one year at the rate of 14% per annum in a recurring deposit account. find the monthly installment.

→ Here, given that

Mr. R.K. Nair gets Rs. 6,455 at the end of one year at the rate of 14% per annum.

Then, period of duration (n) = 1 year = 12 months

$$\boxed{n=12}$$

Let us consider, the monthly installment is Rs. 'P'

Then, Maturity value = $\frac{P \times n(n+1) \times R}{2 \times 12 \times 100} + (P \times n)$

$$6455 = \frac{12 \times 13 \times 14 \times P}{2 \times 12 \times 100} + (P \times 12)$$

$$6455 = \frac{(13 \times P \times 7)}{100} + (P \times 12)$$

$$6455 = (91P + 1200P) / 100$$

$$645500 = 1291P$$

$$P = 645,500 / 1291$$

$$\boxed{P = ₹500}$$

Thus, the monthly installment found is ₹. 500.

11.) Samita has a recurring deposit account in a bank of Rs. 2000 per month at the rate of 10% per annum. If she gets Rs. 83,100 at the time of maturity. find the total time for which the account was held.

→

Here, given that

- Samita deposited Rs. 2000 per month at the rate of 10% per annum.
- And she got Rs. 83,100 at the time of maturity.

Then, deposit per month (P) = 2000

Rate of interest (r) = 10%

Let us consider the period of duration is (n) months.

$$\text{Then, (principal for one month)} = \frac{2000 \times n \times (n+1)}{2}$$
$$= 1000n(n+1)$$

$$\text{And interest} = \frac{1000n(n+1) \times 10 \times 1}{100 \times 12}$$

$$\text{Interest} = 100n(n+1)/12$$

$$\text{Thus, maturity value} = 2000 \times n + \frac{100n(n+1)}{12}$$

$$83,100 = 2000n + 100n(n+1)/12$$

$$24000n + 100n^2 + 100n = 83100 \times 12$$

$$240n + n^2 + n = 831 \times 12$$

$$n^2 + 241n - 9972 = 0$$

$$n^2 + 277n - 36n - 9972 = 0$$

$$n(n+277) - 36(n+277) = 0$$

$$(n+277)(n-36) = 0$$

$$n+277=0 \quad \text{or} \quad n-36=0$$

$$\boxed{n = -277} \quad \text{or} \quad \boxed{n = 36}$$

Thus, $n = 36$ months = 3 years