EXERCISE 2

1. Shweta deposits ₹ 350 per month in a recurring deposit account for one year at the rate of 8% p.a. Find the amount she will receive at the time of maturity.

Solution:

It is given that

Amount deposited by Shweta = ₹ 350

Rate of interest = 8% p.a.

Period (x) = 1 year = 12 months

We know that

Total principal for one month = 350 × [x (x + 1)]/ 2

Substituting the value of x

= 350 × (12 × 13)/ 2

By further calculation

= 350 × 78

= ₹ 27300

Interest = PRT/ 100

Substituting the values

= (27300 × 8 × 1)/ (100 × 12)

So we get

= ₹ 182

So the amount of maturity = P × x + SI

= 350 × 12 + 182

= 4200 + 182

= ₹ 4382

2. Saloni deposited ₹ 150 per month in a bank for 8 months under the Recurring Deposit Scheme. What will be the maturity value of his deposits, if the rate of interest is 8% per annum?

Solution:

It is given that

Amount deposited by Saloni = ₹ 150

Rate of interest = 8% p.a.

Period (x) = 8 month

We know that

Total principal for one month = 150 × [x (x + 1)]/ 2

Substituting the value of x

= 150 × (8 × 9)/ 2

By further calculation

= ₹ 5400

Interest = PRT/ 100

Substituting the values

= (5400 × 8 × 1)/ (100 × 12)

So we get

= ₹ 36

So the amount of maturity = P × x + SI

= 150 × 8 + 36

= 1200 + 36

= ₹ 1236

3. Mrs. Goswami deposits ₹ 1000 every month in a recurring deposit account for 3 years at 8% interest per

annum. Find the matured value.

Solution:

It is given that

Amount deposited by Mrs. Goswami = ₹ 1000

Rate of interest = 8% p.a.

Period (x) = 3 years = 36 months

We know that

Total principal for one month = $1000 \times [x (x + 1)]/ 2$

Substituting the value of x

= $1000 \times (36 \times 37)/ 2$

By further calculation

= ₹ 666000

Interest = PRT/ 100

Substituting the values

= $(666000 \times 8 \times 1)/ (100 \times 12)$

So we get

= ₹ 4440

So the amount of maturity = $P \times x + SI$

= $1000 \times 36 + 4440$

= 36000 + 4440

= ₹ 40440

4. Kiran deposited ₹ 200 per month for 36 months in a bank's recurring deposit account. If the banks pays

interest at the rate of 11% per annum, find the amount she gets on maturity?

Solution:

It is given that

Amount deposited by Kiran = ₹ 200

Rate of interest = 11% p.a.

Period (x) = 36 months

So the amount deposited in 36 months = 200×36 = ₹ 7200

We know that

Total principal for one month = $200 \times [x (x + 1)]/ 2$

Substituting the value of x

= $200 \times (36 \times 37)/ 2$

By further calculation

= ₹ 133200

Interest = PRT/ 100

Substituting the values

= $(133200 \times 11 \times 1)/ (100 \times 12)$

So we get

= ₹ 1221

So the amount of maturity = $P \times x + SI$

= 7200 + 1221

= ₹ 8421

5. Joseph deposits ₹ 600 per month in a recurring deposit account in a post office for 4 ½ years. Find the
amount payable to him on maturity, if the rate of interest is 9% per annum.
Solution:
It is given that
Amount deposited by Joseph = ₹ 600
Rate of interest = 8% p.a.
Period (n) = 4 ½ years = 54 months
We know that
Total principal for one month = 600 × [x (x + 1)]/ 2
Substituting the value of x
= 600 × (54 × 55)/ 2
By further calculation
= ₹ 891000
Interest = PRT/ 100
Substituting the values
= (891000 × 8 × 1)/ (100 × 12)
So we get
= ₹ 5940
So the amount of maturity = P × x + SI
= 600 × 54 + 5940
= 32400 + 5940
= ₹ 38340
6. Haneef has a cumulative bank account and deposits ₹ 600 per month for a period of 4 years. If he gets ₹
5590 as interest at the time of maturity, find the rate of interest per annum.
Solution:
Interest at the time of maturity = ₹ 5880
Amount deposited by Haneef = ₹ 600
Period (x) = 4 years = 48 months
We know that
Total principal for one month = 600 × [x (x + 1)]/ 2
Substituting the value of x
= 600 × (48 × 49)/ 2
By further calculation

= ₹ 705600
Consider r% p.a. as the rate of interest
Interest = PRT/ 100
Substituting the values
5880 = (705600 × r × 1)/ (100 × 12)
So we get
5880 = 588r
By further calculation
r = 5880/588 = 10
Hence, the rate of interest = 10% p.a.
7. David opened a Recurring Deposit Account in a bank and deposited ₹ 300 per month for two years. If he
received ₹ 7725 at the time of maturity, find the rate of interest per annum.
Solution:

It is given that
Amount deposited per month = ₹ 300
Period (x) = 2 years = 24 months
Amount received at the time of maturity = ₹ 7725
Consider R as the rate percent
We know that
Total principal for one month = 300 × [x (x + 1)]/ 2
Substituting the value of x
= 300 × (24 × 25)/ 2
By further calculation
= ₹ 90000
Interest = PRT/ 100
Substituting the values
= (90000 × R × 1)/ (100 × 12)
So we get
= 75R
So we get
300 × 24 + 75R = 7725
By further calculation
7200 + 75R = 7725
75R = 7725 – 7200 = 525
R = 525/75 = 7
Hence, the rate of interest is 7% p.a.

8. Mr. Gupta opened a recurring deposit account in a bank. He deposited ₹ 2500 per month for two years.
At the time of maturity he got ₹ 67500. Find:
(i) the total interest earned by Mr. Gupta.
(ii) the rate of interest per annum.
Solution:

It is given that
Amount deposited by Mr. Gupta per month = ₹ 2500
Period (x) = 2 years = 24 months
Amount got at the time of maturity = ₹ 67500
We know that
Total principal for one month = 2500 × [x (x + 1)]/ 2
Substituting the value of x
= 2500 × (24 × 25)/ 2
By further calculation
= ₹ 750000
Interest = Maturity value – x × deposit per month
Substituting the values
= 67500 – 24 × 2500
= 67500 – 60000
= ₹ 7500
We know that
Period = 1 month = 1/12 year
So the rate of interest = (SI × 100)/ (P × T)
Substituting the values
= (7500 × 100 × 12)/ (750000 × 1)

= 12%

9. Shahrukh opened a Recurring Deposit Account in a bank and deposited ₹ 800 per month for 1 ½ years.
If he received ₹ 15084 at the time of maturity, find the rate of interest per annum.
Solution:
Amount deposited by Shahrukh per month = ₹ 800
We know that
No. of months (n) = 1 ½ = 3/2 × 12 = 18 months
We know that
Total principal for one month = 800 × [x (x + 1)]/ 2
Substituting the value of x
= 800 × (18 × 19)/ 2
By further calculation
= ₹ 136800
Interest = PRT/ 100
Substituting the values
= (136800 × r × 1)/ (100 × 12)
So we get
= 114r
So the amount of maturity = P × x + SI
15084 = 800 × 18 + 114r
By further calculation
114r = 15084 - 14400

114r = 684
r = 684/114 = 6%
Hence, the rate of interest per annum is 6%.

10. Mohan has a recurring deposit account in a bank for 2 years at 6% p.a. simple interest. If he gets ₹
1200 as interest at the time of maturity, find
(i) the monthly installment.
(ii) the amount of maturity.
Solution:
Interest at the time of maturity = ₹ 1200
Period (x) = 2 years = 24 months
Rate of interest = 6% p.a.
Consider ₹ P p.m. as the monthly deposit
We know that
Interest = P × [x (x + 1)]/ (2 × 12) × r/100
Substituting the value of x
1200 = (P × 24 × 25)/ 24 × 6/100
By further calculation
1200 = 6/4P
By cross multiplication
P = (1200 × 4)/ 6 = 800
Here monthly deposit = ₹ 800
So the amount of maturity = P × x + SI
= 800 × 24 + 1200
= 19200 + 1200
= ₹ 20400

11. Mr. R. K. Nair gets ₹ 6455 at the end of one year at the rate of 14% per annum in a recurring deposit account. Find the monthly installment.

Solution:

Consider ₹ P as the monthly installment

Period (x) = 1 year = 12 months

We know that

Total principal for one month = P × [x (x + 1)]/ 2

Substituting the value of x

= P × (12 × 13)/ 2

By further calculation

= 78P

Interest = PRT/ 100

Substituting the values

= (78P × 14 × 1)/ (100 × 12)

So we get

= 0.91P

So the amount of maturity = P × x + SI

6455 = P × 12 + 0.91P

6455 = 12.91P

By further calculation

P = 6455/12.91 = ₹ 500

12. Samita has a recurring deposit account in a bank of ₹ 2000 per month at the rate of 10% p.a. If she gets ₹ 83100 at the time of maturity, find the total time for which the account was held.

Solution:

Amount deposited in the account per month = ₹ 2000

Rate of interest = 10%

Consider period = n months

We know that

Principal for one month = 2000 × n (n + 1)/ 2 = 1000 n (n + 1)

Interest = [1000n (n + 1) × 10 × 1]/ [100 × 12]

= [100 n (n + 1)]/ 12

So the maturity value = 2000 × n + [100 n (n + 1)]/ 12

Substituting the values

2000n + [100 n (n + 1)]/ 12 = 83100

By further calculation

24000n + 100n$_2$ + 100n = 83100 × 12

Dividing by 100

240n + n$_2$ + n = 831 × 12

n$_2$ + 241n – 9972 = 0

We can write it as

n$_2$ + 277n – 36n – 9972 = 0

n (n + 277) – 36 (n + 277) = 0

(n + 277) (n – 36) = 0

Here n + 277 = 0

So we get

n = - 277 which is not possible

Similarly

n – 36 = 0 where x = 36
So the period = 36 months or 3 years
Hence, the total time for which the account was held is 3 years.

CHAPTER TEST

1. Mr. Dhruv deposits ₹ 600 per month in a recurring deposit account for 5 years at the rate of 10% per
annum (simple interest). Find the amount he will receive at the time of maturity.
Solution:
It is given that
Amount deposited by Mr. Dhruv = ₹ 600
Rate of interest = 10% p.a.
Period (n) = 5 years = 60 months
We know that
Total principal for one month = 600 × n (n + 1)/ 2
Substituting the value of n
= 600 × (60 × 61)/ 2
So we get
= ₹ 1098000
Here Interest = PRT/ 100
Substituting the values
= (1098000 × 10 × 1)/ (100 × 12)
= ₹ 9150
So the amount of maturity = 600 × 60 + 9150
= 36000 + 9150
= ₹ 45150

2. Ankita started paying ₹ 400 per month in a 3 years recurring deposit. After six months her brother
Anshul started paying ₹ 500 per month in a 2 ½ years recurring deposit. The bank paid 10% p.a. simple
interest for both. At maturity who will get more money and by how much?
Solution:
Case 1 – Ankita
Amount deposited per month = ₹ 400
Period (n) = 3 years = 36 months
Rate of interest = 10%
We know that
Total principal for one month = 400 × n (n + 1)/ 2
Substituting the value of n
= 400 × (36 × 37)/ 2
So we get
= ₹ 266400
Here Interest = PRT/ 100
Substituting the values
= (266400 × 10 × 1)/ (100 × 12)
= ₹ 2220
So the amount of maturity = 400 × 36 + 2220

= 14400 + 2220

= ₹ 16620

Case 2 – Anshul

Amount deposited per month = ₹ 500

Period (n) = 2 ½ years = 30 months

Rate of interest = 10%

We know that

Total principal for one month = 500 × n (n + 1)/ 2

Substituting the value of n

= 500 × (30 × 31)/ 2

So we get

= ₹ 232500

Here Interest = PRT/ 100

Substituting the values

= (232500 × 10 × 1)/ (100 × 12)

= ₹ 1937.50

So the amount of maturity = 500 × 30 + 1937.50

= 15000 + 1937.50

= ₹ 16937.50

We know that at maturity Anshul will get more amount

So the difference = 16937.50 – 16620 = ₹ 317.50

3. Shilpa has a 4 year recurring deposit account in Bank of Maharashtra and deposits ₹ 800 per month. If
she gets ₹ 48200 at the time of maturity, find
(i) the rate of simple interest,
(ii) the total interest earned by Shilpa

Solution:

It is given that

Amount deposited per month (P) = ₹ 800

Amount of maturity = ₹ 48200

Period (n) = 4 years = 48 months

Consider R% p.a. as the rate of interest

We know that

Total principal for one month = 800 × n (n + 1)/ 2

Substituting the value of n

= 800 × (48 × 49)/ 2

So we get

= ₹ 940800

Here the total deposit = 800 × 48 = ₹ 38400

Amount of maturity = ₹ 48200

So the interest earned = 48200 – 38400 = ₹ 9800

(i) Rate of interest = (SI × 100)/ (P × T)

Substituting the values

= (9800 × 100 × 12)/ (940800 × 1)

= 12.5%

(ii) Total interest earned by Shilpa = ₹ 9800

4. Mr. Chaturvedi has a recurring deposit account in Grindlay's Bank for 4 ½ years at 11% p.a. (simple
interest). If he gets Rs 101418.75 at the time of maturity, find the monthly installment.

Solution:

Consider ₹ x as the each monthly installment

Rate of interest = 11%

Period (n) = 4 ½ years = 54 months

We know that

Total principal for one month = x × n (n + 1)/ 2

Substituting the value of n

= x × (54 × 55)/ 2

So we get

= 1485x

Here Interest = PRT/ 100

Substituting the values

= (1485x × 11 × 1)/ (100 × 12)

= 13.6125x

So the amount of maturity = 54x + 13.6125x

= 67.6125x

By equating the value

67.6125x = 101418.75

x = 101418.75/67.6125 = ₹ 1500

Hence, the deposit per month is ₹ 1500.

5. Rajiv Bhardwaj has a recurring deposit account in a bank of ₹ 600 per month. If the bank pays simple
interest of 7% p.a. and he gets ₹ 15450 as maturity amount, find the total time for which the account was
held.

Solution:

It is given that

Amount deposited per month (P) = ₹ 600

Rate of interest = 7% p.a.

Amount of maturity = ₹ 15450

Consider n months as the period

We know that

Total principal for one month = 600 × n (n + 1)/ 2

By further calculation

= 600 (n^2 + n)/ 2

= 300 (n^2 + n)

Here Interest = PRT/ 100

Substituting the values

= (300 (n^2 + 1) × 7 × 1)/ (100 × 12)

= 7/4 (n^2 + n)

Amount of maturity = 600n + 7/4 (n^2 + n)

Substituting the values

600n + 7/4 (n^2 + n) = 15450

By further calculation

2400 + 7n^2 + 7n = 61800

7n^2 + 2407n – 61800 = 0

We can write it as

7n^2 – 168n + 2575n – 61800 = 0

7n (n – 24) + 2575 (n – 24) = 0

(n – 4) (7n + 2575) = 0

Here n – 24 = 0 where n = 24

Similarly

7n + 2575 = 0

Where 7n = -2575

n = -2575/7 which is not possible as it is negative

Period (n) = 24 months or 2 years