MATHEMATICS

SpeedLabs
Assisted Practice | Expert Guidance | Personalized Insights
An Innovative Learning Methodology by IITians.

Class – 10th	Topic – Banking

1. **Mr. Kumar deposits Rs.600 per month in a recurring deposited account for 12 months. Find the amount he will receive at the lime of maturity at the rate of 6% per annum.**

Solution:

In this account the amount Rs.600 deposited in 1st month will remain in the bank for 12 month and it will earn interest for 12 months. The amount Rs.600 deposited in the 2nd month will earn interest for 11 months & so on.

$$I = P \times \frac{n(n + 1)}{2 \times 12} \times \frac{r}{100}$$

$$= 600 \times \frac{12 \times 13}{2 \times 12} \times \frac{6}{100}$$

$$= \frac{36 \times 13}{2} = 18 \times 13 = Rs\ 234$$

∴ Total amount on maturity

= Rs. (600 X 12) + Rs.234

= Rs.7200 + Rs.234

= Rs.7434

2. **Jaya wants to receive Rs.41490 at the end of 5 years by depositing a certain sum of money on a monthly basis in a bank paying 6% simple interest p.a. what is the monthly installment?**

Solution:

Let the monthly installment be P

Here, t = 5 years = 60 months r = 6%

Total deposited money in the bank = 60 P

Period of reccurring deposit $N = \frac{n(n + 1)}{24}$

$$= \frac{60(60 + 1)}{24} = \frac{305}{2} \text{ years}$$

$$\text{Interest} = \frac{PNr}{100} = P \times \frac{305}{2} \times \frac{6}{100}$$

The amount due = 60 P + 9.15 P = 69.15 P

$\therefore$ 69.15 P = 41490

$$P = \frac{(41490)}{69.15} = 600$$

$\therefore$ Monthly installment = Rs.600

3. **Mr. Kalra invests Rs.500 every month for 24 months in a bank and collects Rs.12750 at the end of the term. Find the rate of simple interest paid by the bank on this recurring deposit.**

Solution:

Let rate of interest be r %

P = Rs.500, n = 24 months

$$N = \frac{n(n+1)}{24} = \frac{24(24+1)}{24} = 25 \text{ years}$$

Amount deposited with the bank = Rs.500 × 24 = Rs.12000

$$\text{Interest} = \frac{PNr}{100} = \frac{500 \times 25 \times r}{100} = 125 \, r$$

$\therefore$ 12000 + 125 r = 12750

Or, 125 r = 750

$$r = \frac{750}{125} = 6$$

$\therefore$ Rate of interest = 6%

4. **Which is the better investment Rs. 20000 in a saving deposit with a bank for 3 years the interest being compounded half – yearly at the rate of 6% or Rs. 600 per month in a recurring deposit with a bank paying simple interest at 6% p.a. for 3 years?**

Solution:

For saving deposit, p = 20,000

t = 3 years, n = 6 half years

r = 6% p.a. = 3% per half year

$$A = P\left(1 + \frac{r}{100}\right)^n = 20000\left(1 + \frac{3}{100}\right)^6 = 20000(1.03)^6$$

log A = log 20000 + 6 log (1.03)

= 4.3010 + 6 (0.0128)

= 4.3010 + 0.0768 = 4.3778

A = antilog (4.3778)

= 23870

$\therefore$ Maturity value = Rs. 23,870

For recurring deposit,

P = 600, t = 3 years, n = 36 months

$$N = \frac{n(n + 1)}{24} = \frac{36 \times 37}{24} = \frac{111}{2}$$

r = 6%

Amount deposited in the bank = 36 X 600 = 21,600

$$\therefore \text{Interest} = \frac{PNr}{100}$$

$$= 600 \times \frac{111}{2} \times \frac{6}{100}$$

$$= 1998$$

Maturity value = 21600 + 1998

= Rs.23598

The former is better.

5. **Naseem has 5 years Recurring Deposit account in Punjab National Bank and deposit Rs 240 per month. If she receives Rs 17,694 at the time of maturity. Find the rate of interest.**

Solution:

Here if r% be the rate of interest.

$$\text{Maturity value} = \text{Rs}(240 \times 60) + \text{Rs}\left(240 \times \frac{60 \times 61}{2 \times 12} \times \frac{r}{100}\right)$$

$$17,694 = 14,400 + 366\,r$$

$$366\,r = 3,294$$

$$r = 9\%$$

6. **Zafarullah has a recurring deposit. The list price of the television be 12,500 account in a bank for 3 ½ years at 9.5% S.I p.a. If he gets Rs 78,638 at the time of maturity. Find the monthly installment.**

Solution:

$$\text{Maturity value} = \text{Rs}(x \times 42) + \text{Rs}\left(x \times \frac{42 \times 43}{2 \times 12} \times \frac{19}{200}\right)$$

$$\Rightarrow 78,638 = 42x + \frac{5,719x}{800}$$

$$\Rightarrow \frac{39,319}{800}x = 78,638$$

$$\Rightarrow x = 1600$$

Hence, the monthly installment was of Rs.1600.

7. Kiran deposited 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.

Solution:

$$\text{Interest} = \frac{P\, n(n+1) \times R}{2,400}$$

$$= \frac{200 \times 36 \times 37 \times 11}{2,400} = 3 \times 37 \times 11$$

$$= \text{Rs } 1,221$$

Sum deposited = 36 × 200 = Rs 7,200

⇒ Amount = 7,200 + 1,221 = Rs 8,421

8. Each of A and B both opened recurring deposit accounts in a bank. If A deposited Rs 1,200 per month for 3 years and B deposited Rs 1,500 per month for 2 ½ years, find, on maturity, who will get more amount and by how much? The rate of interest paid by the bank is 10% per annum.

Solution:

For A

Installment per month (P) = Rs 1,200

Number of months (n) = 36

Rate of interest (r) = 10% p.a.

$$\therefore \text{S. I.} = P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$$

$$= 1,200 \times \frac{36(36+1)}{2 \times 12} \times \frac{10}{100}$$

$$= 1,200 \times \frac{1332}{24} \times \frac{10}{100} = \text{Rs } 6,660$$

The amount that A will get at the time of maturity

= Rs (1,200 × 36) + Rs 6,660

= Rs 43,200 + Rs 6,660

= Rs 49,860

For B

Installment per month (P) = Rs 1,500

Number of months (n) = 30

Rate of interest (r) = 10% p.a.

$$\therefore \text{S. I.} = P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$$

$$= 1{,}500 \times \frac{30(30+1)}{2 \times 12} \times \frac{10}{100}$$

$$= 1{,}500 \times \frac{930}{24} \times \frac{10}{100} = \text{Rs } 5{,}812.50$$

The amount that B will get at the time of maturity

$$= \text{Rs}(1{,}500 \times 30) + \text{Rs } 5{,}812.50$$

$$= \text{Rs } 45{,}000 + \text{Rs } 5{,}812.50$$

$$= \text{Rs } 50{,}812.50$$

Difference between both amounts = Rs 50,812.50 – Rs 49,860 = Rs 952.50

Then B will get more money than A by Rs 952.50

9. **Ashish deposits a certain sum of money every month is a Recurring Deposit Account for a period of 12 months. If the bank pays interest at the rate of 11% p.a. and Ashish gets Rs 12,715 as the maturity value of this account, what sum of money did money did he pay every month?**

Solution:

Let installment per month (P) = Rs y

Number of months (n) = 12

Rate of interest (r) = 11% p.a.

$$\therefore \text{S. I.} = P \times \frac{n(n+1)}{2 \times 12} \times \frac{r}{100}$$

$$= y \times \frac{12(12+1)}{2 \times 12} \times \frac{11}{100}$$

$$= y \times \frac{156}{24} \times \frac{11}{100}$$

$$= \text{Rs } 0.715 \, y$$

Maturity value = Rs (y × 12) + Rs 0.715 y = Rs 12.715 y

Given maturity value = Rs 12,715

Then Rs 12.715 y = Rs 12,715

$$\Rightarrow y = \frac{12{,}715}{12.715}$$

$$= \text{Rs } 1000$$

10. Mohan deposits Rs.80 per month in a cumulative deposited account for six years. Find the amount payable to him on maturity, if the rate of interest is 6% per annum.

Solution:

The bank keeps first installment for 72 months

The bank keeps 2nd installment for 71months

The bank keeps 3rd installment for 70 months

$\therefore \dfrac{\text{The bank keeps the last installment for 1 month}}{\text{Total time} = 72 + 71 \ldots + 2 + 1}$

$N = \dfrac{n(n+1)}{2}$

$N = \dfrac{72(72+1)}{2}$ months

$N = \dfrac{72 \times 73}{2 \times 12}$ years

$N = 219$ years

$I = \dfrac{PNr}{100} = \dfrac{Rs\ 80 \times 219 \times 6}{Rs\ 100}$

Rs 1051.20

Total amount deposited in 6 years = $6 \times 12 \times$ Rs. 80

= Rs. 5760

Total amount received after maturity = Rs. 5760 + Rs. 1051.20

= Rs. 6811.20