PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 2 : Banking (Recurring Deposit Account)

STEP-BY-STEP SOLUTIONS & MARKING SCHEME · Maximum Marks: 40

Formulae used (P = monthly instalment, n = number of months, r = rate % per annum):

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

Maturity value (M.V.) = $P \times n + I$ | Equivalent principal for one month = $P \times \frac{n(n+1)}{2}$

SECTION A (20 Marks)

Question 1 [8 × 1 = 8]

Part	Ans.	Working
(i)	**(b)** ₹ 650	$I = 1{,}000 \times \frac{12 \times 13}{24} \times \frac{10}{100} =$ ₹ 650.
(ii)	**(a)** ₹ 18,000	Equivalent principal $= P \times \frac{n(n+1)}{2} = 500 \times \frac{8 \times 9}{2} =$ ₹ 18,000.
(iii)	**(c)** ₹ 2,484	$I = 400 \times \frac{6 \times 7}{24} \times \frac{12}{100} = 84$; sum deposited = 400 × 6 = 2,400; M.V. = 2,400 + 84 = ₹ 2,484.
(iv)	**(a)**	$I = 100 \times \frac{12 \times 13}{24} \times \frac{8}{100} =$ ₹ 52, so (A) is true. The first instalment earns interest for 12 months, the second for 11 months, …, the last for only 1 month, so (R) is false.
(v)	**(d)** ₹ 912	Sum deposited = 800 × 18 = 14,400; interest = 15,312 − 14,400 = ₹ 912.
(vi)	**(b)** 6%	$390 = 1{,}000 \times \frac{12 \times 13}{24} \times \frac{r}{100} = 65r \Rightarrow r = 6\%$.
(vii)	**(b)**	$I = P \times \frac{n(n+1)}{24} \times \frac{r}{100}$ is directly proportional to P, so doubling P doubles the interest.
(viii)	**(d)**	$I = 200 \times \frac{6 \times 7}{24} \times \frac{10}{100} =$ ₹ 35, so (A) is true. (R) is also true, but it only describes the scheme and does not explain the amount of interest.

Question 2 [4 + 4 + 4 = 12]

(i)

(a) n = 2 × 12 = 24; sum deposited = 750 × 24 = **₹ 18,000** [1]

(b) $I = 750 \times \frac{24 \times 25}{2 \times 12} \times \frac{8}{100} = 750 \times 25 \times 0.08 =$ **₹ 1,500** [2]

(c) M.V. = 18,000 + 1,500 = **₹ 19,500** [1]

(ii)

For P = ₹ 100, n = 15, r = 12%:

(a) $I = 100 \times \frac{15 \times 16}{24} \times \frac{12}{100} =$ ₹ 120; sum deposited = 100 × 15 = 1,500; M.V. = 1,500 + 120 = **₹ 1,620** [2]

(b) When M.V. is ₹ 1,620, instalment = ₹ 100. When M.V. is ₹ 24,300, instalment = $\frac{100}{1{,}620} \times 24{,}300$ = **₹ 1,500** [1]

(c) Sum deposited = 1,500 × 15 = ₹ 22,500; interest = 24,300 − 22,500 = **₹ 1,800** [1]

(iii)

(a) Sum deposited = 2,000 × 36 = **₹ 72,000** [1]

(b) Interest = 80,880 − 72,000 = **₹ 8,880** [1]

(c) $8{,}880 = 2{,}000 \times \frac{36 \times 37}{2 \times 12} \times \frac{r}{100} = 1{,}110\ r \Rightarrow r = \frac{8{,}880}{1{,}110}$ = **8%** [2]

SECTION B (20 Marks) — any two questions

Question 3 [3 + 3 + 4 = 10]

(i)

n = 2 × 12 + 3 = 27 months [1]

$I = 600 \times \frac{27 \times 28}{2 \times 12} \times \frac{10}{100} = 600 \times 31.5 \times 0.1$ = ₹ 1,890 [1]

Sum deposited = 600 × 27 = ₹ 16,200; M.V. = 16,200 + 1,890 = **₹ 18,090** [1]

(ii)

Anu: n = 24; $I = 900 \times \frac{24 \times 25}{24} \times \frac{12}{100} = 900 \times 25 \times 0.12$ = ₹ 2,700; deposits = 900 × 24 = ₹ 21,600.

M.V. = 21,600 + 2,700 = **₹ 24,300** [1]

Binu: n = 36; $I = 600 \times \frac{36 \times 37}{24} \times \frac{12}{100} = 600 \times 55.5 \times 0.12$ = ₹ 3,996; deposits = 600 × 36 = ₹ 21,600.

M.V. = 21,600 + 3,996 = **₹ 25,596** [1]

Binu receives more, by 25,596 − 24,300 = **₹ 1,296** [1]

(iii)

P = 800, r = 10%. $I = 800 \times \frac{n(n+1)}{24} \times \frac{10}{100} = \frac{10}{3} n(n+1)$; sum deposited = 800n.

Sum deposited + Interest = M.V. $\Rightarrow 800n + \frac{10}{3} n(n+1) = 15{,}540$ [1]

Multiplying by 3: $2{,}400n + 10n^2 + 10n = 46{,}620 \Rightarrow$ **$n^2 + 241n - 4{,}662 = 0$** [1]

$n^2 + 259n - 18n - 4{,}662 = 0 \Rightarrow n(n + 259) - 18(n + 259) = 0 \Rightarrow (n + 259)(n - 18) = 0$ [1]

n = −259 (rejected, as n cannot be negative) or n = 18. Period = 18 months = **1 year 6 months** [1]

Question 4 [3 + 3 + 4 = 10]

(i)

$n = 12;\ I = P \times \frac{12 \times 13}{24} \times \frac{12}{100} = 0.78P = 1{,}950 \Rightarrow P =$ **₹ 2,500** [2]

(b) M.V. = 2,500 × 12 + 1,950 = 30,000 + 1,950 = **₹ 31,950** [1]

(ii)

Let the monthly instalment be P. n = 24, r = 10%.

$M.V. = 24P + P \times \frac{24 \times 25}{24} \times \frac{10}{100} = 24P + 2.5P = 26.5P$ [1]

$26.5P \geq 50{,}000 \Rightarrow P \geq 1{,}886.79$ (approx.) [1]

Least multiple of ₹ 5 not less than this = **₹ 1,890** (check: 1,890 × 26.5 = 50,085 ≥ 50,000, while 1,885 × 26.5 = 49,952.50 < 50,000) [1]

(iii)

(a) $I = 1{,}600 \times \frac{24 \times 25}{24} \times \frac{9}{100} = 1{,}600 \times 25 \times 0.09 =$ **₹ 3,600** [2]

(b) M.V. = 1,600 × 24 + 3,600 = 38,400 + 3,600 = **₹ 42,000** [1]

(c) Price of TV = 40,000 + 5% of 40,000 = ₹ 42,000. Balance left = 42,000 − 42,000 = **₹ 0** (the maturity value exactly pays for the TV) [1]

Question 5 [3 + 3 + 4 = 10]

(i)

Sum deposited = 1,800 × 24 = ₹ 43,200; interest = 47,250 − 43,200 = ₹ 4,050 [1]

$4{,}050 = 1{,}800 \times \frac{24 \times 25}{24} \times \frac{r}{100} = 450\,r \Rightarrow r = \frac{4{,}050}{450} =$ **9%** [2]

(ii)

$1{,}260 = 600 \times \frac{n(n+1)}{24} \times \frac{12}{100} = 3n(n+1) \Rightarrow n(n+1) = 420 \Rightarrow n^2 + n - 420 = 0$ [1]

$(n + 21)(n - 20) = 0 \Rightarrow n = -21$ (rejected) or $n = 20$ [1]

Period = 20 months = **1 year 8 months** [1]

(iii)

Let the monthly instalment be P. n = 24, r = 10%.

$M.V. = 24P + P \times \frac{24 \times 25}{24} \times \frac{10}{100} = 24P + 2.5P = 26.5P = 68{,}900 \Rightarrow P =$ **₹ 2,600** [2]

(b) Sum deposited = 2,600 × 24 = **₹ 62,400** [1]

(c) Interest = 68,900 − 62,400 = **₹ 6,500** [1]

Question 6 [3 + 3 + 4 = 10]

(i)

(a) Equivalent principal $= 2{,}500 \times \frac{30 \times 31}{2} =$ **₹ 11,62,500** [1]

(b) $I = 11{,}62{,}500 \times \frac{1}{12} \times \frac{8}{100} =$ **₹ 7,750** [1]

(c) M.V. = 2,500 × 30 + 7,750 = 75,000 + 7,750 = **₹ 82,750** [1]

(ii)

Let the instalments be ₹ x (at 8%) and ₹ y (at 12%). For n = 12, $\frac{n(n+1)}{24} = 6.5$.

$x + y = 2{,}000$ …(1) [1]

Interest: $6.5 \times 0.08x + 6.5 \times 0.12y = 1{,}248 \Rightarrow 0.52x + 0.78y = 1{,}248 \Rightarrow 2x + 3y = 4{,}800$ …(2) [1]

From (1), $x = 2{,}000 - y$; in (2): $4{,}000 - 2y + 3y = 4{,}800 \Rightarrow y = 800$, $x = 1{,}200$. Instalments: **₹ 1,200 (at 8%)** and **₹ 800 (at 12%)** (check: 624 + 624 = 1,248 ✓) [1]

(iii)

$n = 4 \times 12 = 48$; $\frac{n(n+1)}{24} = \frac{48 \times 49}{24} = 98$. Let the instalment be P.

(a) Extra interest for 2% $= P \times 98 \times \frac{2}{100} = 1.96P = 2{,}940 \Rightarrow P =$ **₹ 1,500** [2]

(b) $I = 1{,}500 \times 98 \times \frac{7}{100} =$ **₹ 10,290** [1]

(c) M.V. = 1,500 × 48 + 10,290 = 72,000 + 10,290 = **₹ 82,290** [1]

— End of Solutions —