SIMPLE INTEREST

① If the SI on a certain sum of money for 3 years at the rate of 12.5% is Rs 3500 less than its principal. find the sum and SI.

$12.5\% = \frac{1}{8}$ ← SI (1 year), P

P	SI
8 unit	3 unit (for 3 year)

$SI = \frac{P \times R \times T}{100}$

5 unit ⟶ 3500 Rs

1 unit ⟶ 700 Rs.

Principal = 8 × 700 = 5600 Rs

SI = 3 × 700 = 2100 Rs. Ans:

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② If the SI on a certain sum of money @ $6\frac{2}{3}\%$ per annum for 4 years is Rs 4400 less than its principal. find the SI and principal.

$6\frac{2}{3}\% = \frac{1}{15}$ ← SI 1 yr, P

P	SI
15 unit	4 unit

11 unit ⟶ 4400 Rs

1 unit ⟶ 400 Rs

Principal = 15 × 400 = 6000 Rs.

SI = 4 × 400 = 1600 Rs.

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③ The rate of SI for 1st 3 years is 6%, for next 4 years it is 7%. And the period beyond 7 years it is 7.5% per annum. If a man invest Rs 18800 for 11 years, find the SI earned by him?

6% × 3 yr	= 18%
7% × 4 yr	= 28%
7.5% × 4 yr	= 30%
Rate for 11 yr	= 76%

$SI = 18800 \times \frac{76}{100}$

= 14288 Rs Ans

(4) The rate of SI on a certain sum of money is 4% per annum for 1st two years, 6% per annum for next 4 years, and 8% per annum for the period beyond 6 years. If the simple interest earned by a sum is Rs 1120 in 9 years, find the sum.

$4\% \times 2yr = 8\%$

$6\% \times 4yr = 24\%$

$8\% \times 3yr = 24\%$

Rate for 9 years $= 56\%$

$$P \times \frac{56}{100} = 1120$$

$$P = 2000 \text{ Rs.}$$ Ans

(5) A bicycle can be purchased on cash payment of Rs 1500. But the same cycle can also be purchased on the cash down payment of Rs. 350 and rest can be paid in three equal annual installment of Rs 400 for next three years. find the rate of simple interest ?

1500 − 350 = 1150

1150 − 400) I

750 − 400) II

350 − 400) III

2250

$400 \times 3 = 1200$

SI $= 1200 - 1150 = 50$ Rs

$$\frac{1150 \times r \times 1}{100 \times 12} + \frac{750 \times r \times 1}{100 \times 12} + \frac{350 \times r \times 1}{100 \times 12} = 50$$

$$\frac{r}{1200}[1150 + 750 + 350] = 50$$

$$\frac{r}{1200} \times 2250 = 50$$

$$r = 26\frac{2}{3}\%$$ Ans.

(6) The cash price of a pen is 60 Rs. But it can also be purchased on a cash down payment of Rs 20 and 6 monthly equal installment @ the rate of Rs 8 per month. find the rate percent.

$\frac{60}{20}$ $\frac{40}{}$ $8 \times 6 = 48$

40	-8
32	-8
24	-8
16	-8
8	-8
0	
120	

↓ Principal of 6 installments.

$\frac{120 \times r \times 1}{100 \times 12} = 8$

$r = 80\%$

Calculate the Principal of every month.

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(7) The cash price of a pen is Rs 10. But it can also be purchased on 11 monthly equal installment of Rs 1 each. find the rate of simple interest?

10 9 8 7 6 5 4 3 2 1 0

$\frac{55 \times r \times 1}{100 \times 12} = 1$

$r = 21\frac{9}{11}\%$

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(8) A man borrowed a sum of Rs 7000 from bank at SI After 3 years he paid Rs 3000 to the bank and @ the end of 5 years he paid Rs 5450 and clear all this dues. find the rate percent?

7000	3000
7000	+5450
7000	8450
4000	-7000
4000	1450 = SI
29000	

$\frac{29000 \times r \times 1}{100} = 1450$

$r = 5\%$

(9) A man borrowed a sum of Rs 6000 from bank at SI. After 4 years he paid Rs 2500. and at the end of 5 th year he paid Rs 4550 and clear all his dues. find the rate of simple interest ?

[244]

6000
6000
6000
6000
3500
27500

2500
4550
7050
−6000
SI = 1050

$\frac{6000 \times r \times 1}{100} = 1050$

$r = 3\frac{9}{11}\%$

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(10) A man lent out two equal sums in two parts at the rate 8% and 7% per annum on SI. If the former is recovered 6 months earlier than the later, & he received equal amount of Rs 2560 each from both the parts. find the principal.

I	II
P	P
8%	7%
$(t-\frac{1}{2})$ year	t year

दोनों से equal amt. receive हो रही है। So, SI same होगा

$\frac{P \times 8 (t-\frac{1}{2})}{100} = \frac{P \times 7 \times t}{100}$

$8t - 4 = 7t$

$t = 4$

$\Rightarrow P + \frac{P \times 7 \times 4}{100} = 2560$

$\frac{128P}{100} = 2560$

$\Rightarrow P = 2000$ Rs

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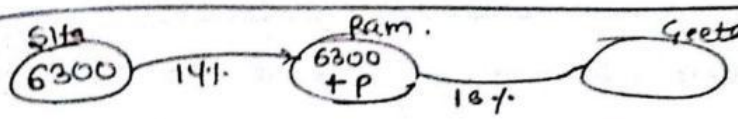
(11) Ram borrow a sum of Rs 6300 from sita at the rate of 14% per annum for 3 years. He added some more money in it and lent it to Geeta at 16% per annum for 3 years. In this process he earn a total profit of Rs 618. find how much amount does he added ?



$$\frac{(6300+P)\times 16\times 3}{100} - \frac{6300\times 14\times 3}{100} = 618 \Rightarrow P = 500 \text{ Rs.}$$

OR Ram saves 618 in 3 years.

So, in 1 year $= \frac{618}{3} = 206$ Rs

saving $= 16\% - 14\% = 2\%$ of 6300

$6300 \times \frac{2}{100} = 126$ Rs

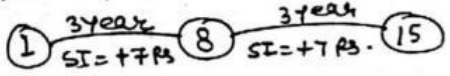
diff of saving

$206 - 126 = 80$ Rs. This diff is becoz of amt P invested by Ram.

$\frac{P\times 16\times 1}{100} = 80 \Rightarrow \boxed{P = 500}$ Rs

Ans

(12) If a certain sum of money becomes 8 times of itself in 3 years. In how much time it will be 64 times of itself.



7 Rs — SI = 3 years

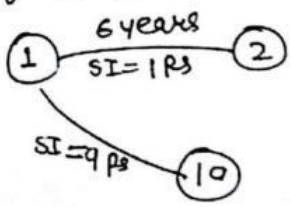
63 Rs — SI $= \frac{3}{7}\times 63 = 27$ years. Ans

* P = 1 Rs

SI = 63 Rs

Amt = 64 Rs, so 64 times. in 27 years.

(13) A certain sum of money become double of itself in 6 years on SI. In what time it will be 10 times of itself.



1 Rs — SI = 6 years

9 Rs — SI = $6\times 9 = 54$ years.

(14) A certain sum @ certain rate percent per annum simple interest becomes Rs 2100 in two years and Rs 2250 in 5 years. find Principal & rate percent.

2 year — 2100]

5 year — 2250] $\frac{150}{3} = 50$ (SI for 1 year)

2250 = 2000 (P) + 250 (SI for 5 year)

$\frac{2000\times r\times 1}{100} = 50$

$\boxed{r = \frac{5}{2}\%}$

(15) if a certain sum of money invested for a certain time it amounts to Rs 350 @ 5% per annum, and it amounts to Rs 250 @ 3% per annum. find the time and principal?

P —— t —— 5% = 350 < P, 5% SI
P —— t —— 3% = 250 < P, 3% SI
] $\frac{100}{2\%} = 50$

100 (P) 150 (SI)

$$\frac{100 \times 1 \times t}{100} = 50$$

$$t = 50 \text{ years}$$

(16) if a certain sum of money amounts 10,000 in 5 years and Rs 10,800 in 7 years at a certain rate of interest. find rate percent.

5 years —— 10,000 — P + SI (5 years)
7 years —— 10,800 — P + SI (7 years)
] diff of SI of 2 years = 800

$$\frac{800}{2} = 400 = \text{SI for 1 year.}$$

$$P = 10,800 - 7(400) = 8000$$

$$\frac{8000 \times r \times 1}{100} = 400$$

$r = 5\%$

(12) A man deposit a total amt of 65,000 in 3 banks A, B and C at the rate of simple interest 12%, 16% and 18% respectively. and earn a total SI of Rs 10,180 in one year. If the amount invested in bank A was $71\frac{2}{7}\%$ of amount invest in bank C. find the amt invested in Bank B.

(13) A man Invested a certain sum of Rs 80,000 in 3 banks A, B and C @ 15%, 16% and 27%. Amt. invested in bank A is 20% of the amt. invested in C. find the amount invested in bank B if he earn a interest of Rs 36,400 SI in two years.

$C = 5x$

$A = x$

$B =$

$$\frac{x \times 15 \times 2}{100} + \frac{(80,000 - 6x) \times 16 \times 2}{100} + \frac{5x \times 27 \times 2}{100} = 36400$$

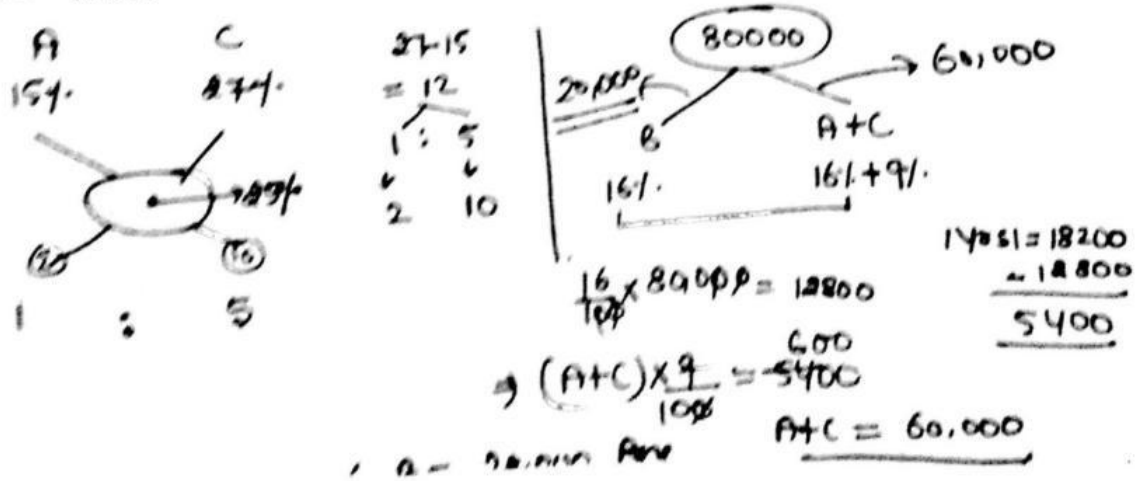
$x = 10,000$

$C = 5 \times 10,000 = 50,000$

$A = x = 10,000$

$B = 80000 - 60000 = 20,000$ Ans

(14)



Soln-17 $A = 71\frac{3}{7}\%\ C$

$$\frac{A}{C} = \frac{500}{700} = \frac{5x}{7x}$$

$A = 5x$
$C = 7x$
$B = 65000 - 12x$

$$\frac{5x \times 12}{100} + \frac{(65000-12x)\times 16}{100} + \frac{7x \times 18}{100} = 10180$$

$$\Rightarrow \frac{2}{100}\left(5x \times 6 + (65000-12x)\times 8 + 7x \times 9\right) = \frac{5090}{10180}$$

$$30x + 520000 - 96x + 63x = 509000$$

$$3x = 11000$$

$$x = \frac{11000}{3}$$

$$\therefore B = 65000 - {}^{4}\cancel{12}\times \frac{11000}{\cancel{3}}$$

$$= 21000 \quad \underline{\text{Ans.}}$$

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(19) Rs 26,000 is invested in two parts in such a way that the SI from 1st part @ 10% per annum for 5 years is equal the simple interest on 2nd part @ 9% per annum for 6 years. find both the parts.

(20) Rs 12,600 is invested in 3 parts in such a way that SI on 1st part @ 2% per annum for 3 years is equal to SI on 2nd part @ 3% per annum for 4 years is equal to SI on 3rd part @ 4% per annum for 5 years are equal. find the SI on each part.

(21) Rs 18,750 is invested by a man in the bank account of his two sons whose ages are 12 years and 14 years in such a way that they will get equal amount at an age of 18 years @ 5% per annum? find the share of younger child.

Solutions

(19) $\frac{A \times 5 \times 5}{100} = \frac{B \times 9 \times 3}{100}$

$25A = 27B$

$\frac{A}{B} = \frac{27}{25}$

52 unit —— 26,000

1 unit —— 500 Rs

$A = 27 \times 500 = 13,500$ Rs

$B = 25 \times 500 = 12500$ Rs

Ans

(20) 12,600

$\frac{A \times 2 \times 3}{100} = \frac{B \times 3 \times 4}{100} = \frac{C \times 4 \times 5}{100}$

$3A = 6B = 10C = 30$ (let LCM of 3, 6, 10)

A : B : C

10 : 5 : 3

18 unit —— 12,600 Rs

1 unit —— 700 Rs.

$A = 7000$, $B = 3500$, $C = 2100$.

SI on 1st part $= \frac{7000 \times 2 \times 3}{100} = 420$ Rs. = 2nd & 3rd part.

(21) 12 year 14 year

Y = younger

E = Elder

$Y + \frac{Y \times 5 \times 6}{100} = E + \frac{E \times 5 \times 4}{100}$

P SI P SI

$\frac{130Y}{100} = \frac{120E}{100}$

$\frac{Y}{E} = \frac{12}{13}$

25 unit —— 18750

1 unit —— 750

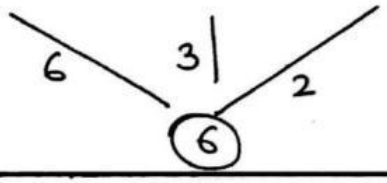
younger = 12×750

= 9000 Rs.

(22) A person invest money in 3 diff scheme for 6 year, 10 year, 12 years @ 10%, 12% and 15% SI respectively At the completion of each scheme he gets the same interest, find the ratio of this investment

$$\frac{P_1 \times 10 \times 6}{100} = \frac{P_2 \times 12 \times 10}{100} = \frac{P_3 \times 15 \times 12}{100}$$

$$1 \cdot P_1 = 2 P_2 = 3 P_3$$



6 : 3 : 2 Ans

(23) If Rs 64 amount to Rs 83.20 in 2 years. what will Rs 86 amounts to in 4 years @ the same rate percent per annum.

$$\begin{array}{r} 83.20 \\ -64.00 \\ \hline \end{array}$$

SI = 19.20 Rs

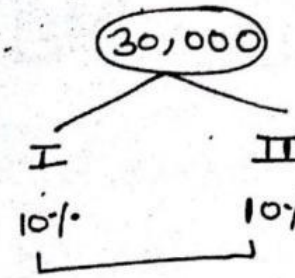
$$\frac{64 \times r \times 2}{100} = 19.20$$

$r = 15\%$

$$\Rightarrow \frac{86 \times 15 \times 4}{100 \times 5} = \frac{258}{5} = 51.6 \text{ Rs}$$

Amount = 86 + 51.6 = 137.6 Rs Ans

(24) A man borrowed a total amt of Rs 30,000, A part of it on SI @ 12% per annum & remaining on SI @ 10% p.a. if at the end of 2nd year, he paid in all Rs 36,480 to settle the loan amt. what was the amt. borrowed at 12% per annum.



SI for 1 year $= \frac{6480}{2}$

$= 3240$

$\frac{10}{100} \times 30,000$

$= 3000$

$3240 - 3000 = 240$

$II \times \frac{2}{100} = 240$

$II = 12,000$ Rs. Ans

(25) A moneylender founds that due to a ~~fraud~~ decrease in the rate from 13% to $12\frac{1}{2}$%, his yearly income reduced by Rs 104. what is his capital ?

$P \times \frac{1}{2}\% = 104$

$P \times \frac{1}{200} = 104$

$P = 20800$ Rs. Ans

Annual Income/payment/Installment $= \frac{\text{देय ऋण} \quad \text{Due Debt} \times 100}{100t + \frac{r \times t \times (t-1)}{2}}$

(26) What annual payment will discharge a debt of Rs 944 in 4 annual equal installments at the rate of 12% p.a on SI.

$$\frac{944 \times 100}{400 + \frac{12 \times 4 \times 3}{2}} = \frac{944 \times 100}{400 + 72}$$

$$\Rightarrow \frac{944 \times 100}{472} \Rightarrow 200 \text{ Rs} \quad \underline{\text{Ans.}}$$

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(27) What annual installment will discharge a debt of Rs 2210 due in 4 years @ 7% SI.

$$\frac{2210 \times 100}{400 + \frac{7 \times 4 \times 3}{2}} = \frac{2210 \times 100}{442} = 500 \text{ Rs}$$

Ans

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(28) The annual payment of Rs 700 in 5 yr @ 10% p.a SI will discharge a debt of what amount.

$$700 = \frac{D \times 100}{500 + \frac{10 \times 5 \times 4}{2}}$$

$$700 = \frac{D \times 100}{600} \qquad D = 4200 \text{ Rs} \quad \underline{\text{Ans}}$$

(OR)

700	280
700	210
700	140
700	70
700	0
3500	700

$\frac{700 \times 1 \times 10}{100} = 70$ Rs ↓ 1 yr SI

3500 + 700 = 4200 Rs. Ans

True Discount

Principal → present worth
SI → True discount
Amount → Due Debt.

(29) Find the present worth and true discount recurring 5% p.a SI of Rs 10,000 due in 5 years.

Present worth = P

$\text{True Discount} = \text{SI} = \frac{P \times 5 \times 5}{100} = \frac{25}{100} P$

$\text{Due Debt} = P + \frac{25P}{100} = 10{,}000$

$\frac{125P}{100} = 10{,}000$

$P = 8000 \text{ Rs}$

Present worth = 8000

True discount = $10{,}000 - 8000 = 2000$ Rs.

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(30) find the present worth of Rs 9950 due $3\frac{1}{4}$ years hence @ $7\frac{1}{2}\%$ p.a SI. Also find the true discount.

Let Present worth = 100

$T.D = \frac{100 \times 15 \times 13}{100 \times 2 \times 4} = \frac{195}{8}$ unit

$\text{Due Debt} = 100 + \frac{195}{8} = \frac{995}{8}$ unit ——— 9950

1 unit ——— 80 Rs

$\therefore$ Present worth = $100 \times 80 = 8000$ Rs

True discount = $\frac{195}{8} \times 80^{10} = 1950$ Rs. Ans

(31) find the diff b/w True discount and SI on Rs 2400 due after 5 years @ 4 % per annum.

Present worth = 100 Rs (let)

$$T.D = \frac{100 \times 4 \times 5}{100} = 20 \text{ unit}$$

Due Debt = 100+20 = 120 unit → 2400

1 unit → 20 Rs

T.D = 20 × 20 = 400 Rs

Present worth = 100 × 20 = 2000 Rs.

$$SI = \frac{2400 \times 4 \times 5}{100} = 480$$

SI − TD = 480 − 400 = 80 Rs Ans.