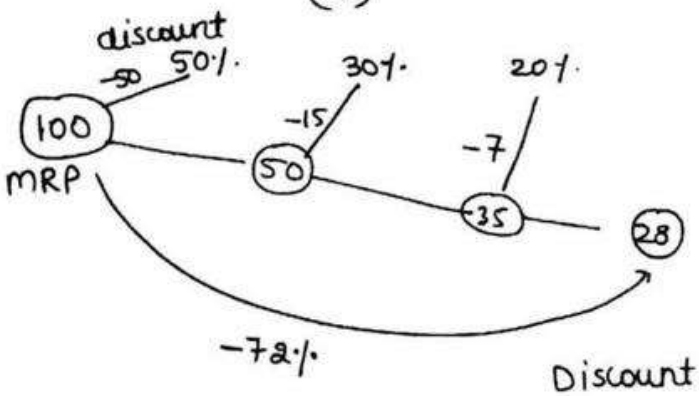
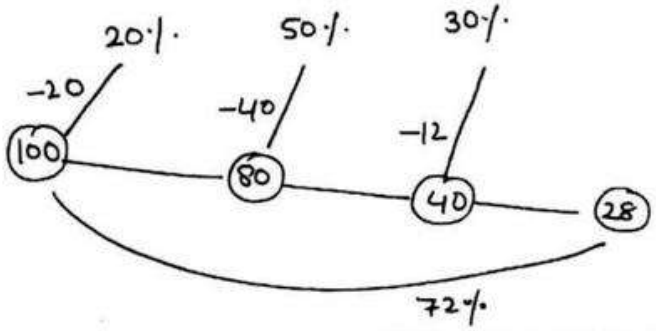
COMPOUND INTEREST

(#) Successive increase / successive decrease
↓ (CI) ↓ successive discount



Discount = 72%

(#)



(#) Two discounts = x%, y%

successive discount = $x+y-\frac{xy}{100}$

(*) 20% 50% 30%

$\Rightarrow 20+50-\frac{20\times50}{100} = 60\%, 30\%$

$\Rightarrow 60+30-\frac{60\times30}{100} \Rightarrow 72\%$

(*) 10%, 20%, . find equivalent discount

$C\frac{1}{10}$ $C\frac{1}{5}$

$\begin{matrix} 10 & 9 \\ 5 & 4 \\ \hline 50 & 36 \end{matrix}$

-14

$\frac{14}{50}\times100 = 28\%$ Ans

(*) 4 successive discounts are $12\frac{1}{2}\%$, $9\frac{1}{11}\%$, $11\frac{1}{9}\%$, 10%.

Equivalent discount = $C\frac{1}{8}$ $C\frac{1}{11}$ $C\frac{1}{9}$ $C\frac{1}{10}$

8 7
11 10
9 8
10 9
11 7
4

$\frac{4}{11} \times 100 = 36\frac{4}{11}\%$

(*) $57\frac{1}{7}\%$, $66\frac{2}{3}\%$. find equivalent discount.

$C\frac{4}{7}$ $C\frac{2}{3}$

7 3
3 1
7 1
6

$\frac{6}{7} \times 100 = 85\frac{5}{7}\%$

---

(1) Two successive increase are $12\frac{1}{2}\%$, $12\frac{1}{2}\%$, find equivalent increase.

$C\frac{1}{8}$ $C\frac{1}{8}$

8 9
8 9
64 81
P A
17
CI

$\frac{17}{64} \times 100$.

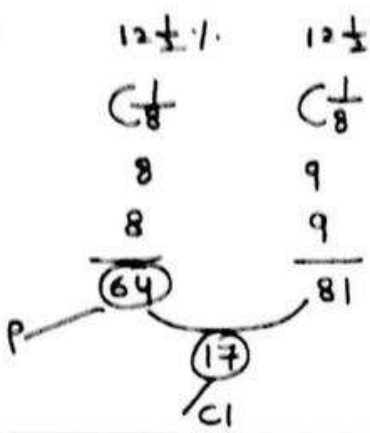
---

(2) P = ?

Time = 2yr

r = $12\frac{1}{2}\%$

CI = 6.80 Rs



17 unit ——— 6.80

1 ——— $\frac{6.80}{17} = 0.4$

P = 64 × 0.4 = 25.6 Rs.

---

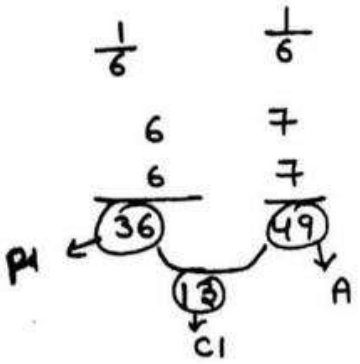
(3) P = ?

r = $16\frac{2}{3}$%

T = 2 yr

CI = ?

Amount = 1470 Rs.



49 unit ⟶ 1470

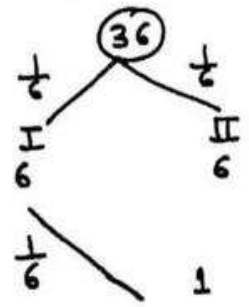
1 ⟶ 30

Principal = 30 × 36 = 1080 Rs

CI = 13 × 30 = 390 Rs.

OR r = $\frac{1}{6}$, Time = 2 year,

let P = 6^2 = 36



SI = 12 unit.] diff 1 unit

CI = 13 unit.]

P + CI = 36 + 13 = 49

49 ——— 1470

1 ——— 30.

Principal = 36 × 30 = 1080 Rs

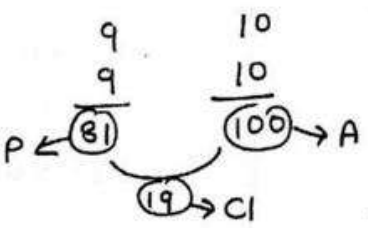
CI = 13 × 30 = 390 Rs

diff b/w CI & SI ⇒ 30 Rs.

④ A = ? , P = ? , $r = 11\frac{1}{9}\%$, T = 2 years.

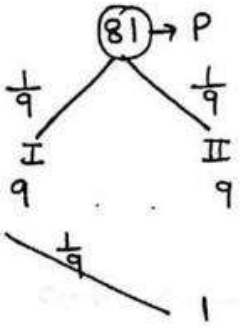
CI of 2nd year = 70 Rs.

$11\frac{1}{9}\% = \frac{1}{9}$)



अगर P, A, CI के अलावा कुछ और पूछा है तो ये method फेल.

OR



SI = 18

CI = 19

CI − SI = 1

2nd year CI = 10

10 unit —— 70

1 —— 7.

P = 81 × 7 = 567 Rs

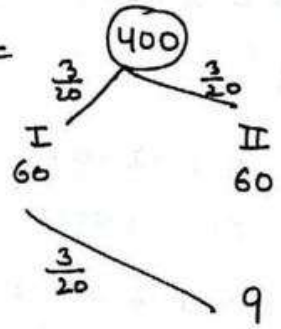
A = 100 × 7 = 700 Rs.

---

⑤ P = ? , r = 15% , t = 2 years , CI − SI = 2.70 Rs , CI = ?

$r = 15\% = \frac{3}{20}$

let $P = (20)^2 =$



CI = 129

SI = 120

CI − SI = 9

9 unit → 2.70 Rs

1 → $\frac{2.70}{9} = 0.30$

P = 400 × 0.30 = 120 Rs

CI = 129 × 0.3

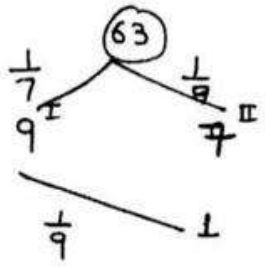
= 38.70 Rs.

(6) P = ? , t = 2 year , CI − SI = 40 Rs

R for 1st year = $14\frac{2}{7}$ % , for 2nd year = $11\frac{1}{9}$ %

r = $\frac{1}{7}$, $\frac{1}{9}$

Let P = 7×9 = 63.



SI = 16

CI = 17

CI − SI = 1

1 unit ⟶ 40

P = 63×40 = 2520 Rs. Ans.

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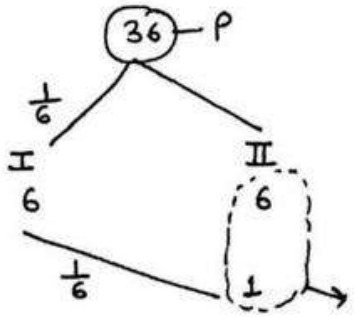
(7) P = 18000 Rs , R = $16\frac{2}{3}$ % , T = 1 year 73 days , CI = ?

R = $16\frac{2}{3}$ % = $\frac{1}{6}$



This is for 365 days

CI for 1 year = 6

CI for 1 year 73 days = 6 + 1.4 = 7.4

$\frac{7}{\cancel{365}\ 5} \times \cancel{73} = 1.4$

36 —— 18000

1 unit —— $\frac{18000}{36} = 500$

∴ CI = 7.4 × 500 = 3700 Rs.

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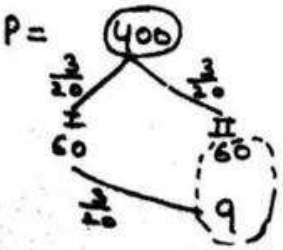
(8) P = ? , r = 15% , T = 1 year 6 month , CI = 9.45 Rs.

r = 15% = $\frac{3}{20}$



CI for 1 year = 60

CI of 6 months = $\frac{69}{2} = 34.5$

CI for 1 yr 6 month = 60 + 34.5 = 94.5

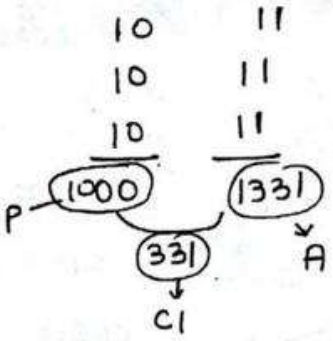
94.5 unit —— 9.45

1 unit —— $\frac{9.45}{94.5} = \frac{1}{10}$

Principal = 400 × $\frac{1}{10}$ = 40 Rs Ans

(9) P = ? , T = 3 yr , R = 10% , CI = 6620 Rs.

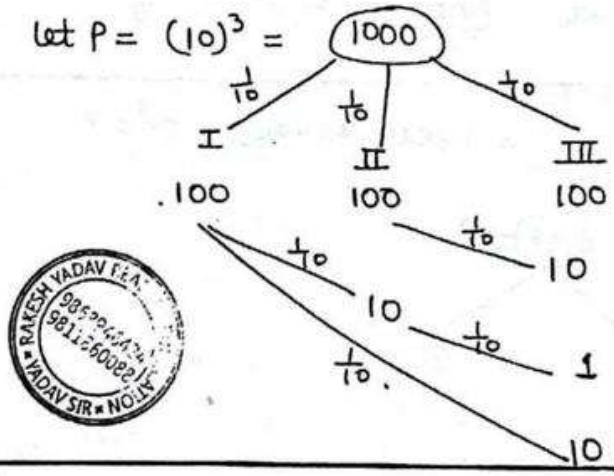
$R = \frac{1}{10}$)



331 —— 6620
1 —— 20
P = 1000 × 20 = 20,000 Rs.

OR $r = \frac{1}{10}$, $t = 3yr$

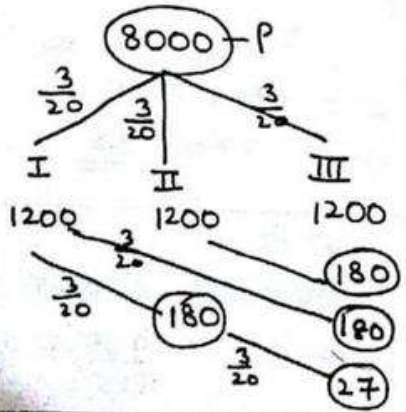
Let $P = (10)^3 = 1000$



SI = 300
CI = 331

(10) P = ? , T = 3yr , R = 15% , CI − SI = 1701 Rs.

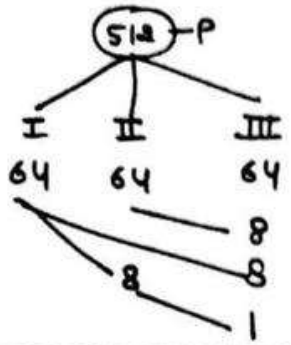
$R = 15\% = \frac{3}{20}$



SI = 3600
CI = 4167
CI − SI = 567
567 unit —— 1701 Rs
1 unit —— $\frac{1701}{567} = 3$
∴ Principal = 8000 × 3 = 24000 Rs Ans

(11) P = ?
T = 3yr
$R = 12\frac{1}{2}\%$
CI − SI = 12.50 Rs.

$r = 12\frac{1}{2}\% = \frac{1}{8}$



CI − SI = 25

25 unit — 12.50

1 unit — $\frac{1}{2}$

$P = 512 \times \frac{1}{2} = 256$ Rs Ans.

$r = \frac{1}{8}$ → [illegible]

CI − SI = 3×8 + 1 = 25.

(12) P = ? $r = 16\frac{2}{3}\%$

T = 3Yr CI − SI = 5.70 Rs.

$r = \frac{1}{6}$, let $P = 6^3 = 216$

CI − SI = 3×6 + 1 = 19

19 unit — 5.70

1 unit — 0.3

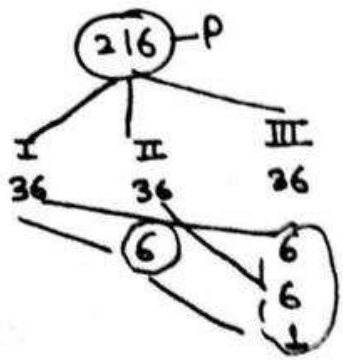
∴ P = 216 × 0.3

= 648 Rs. Ans

(13) P = ?, T = 3Yr, $r = 16\frac{2}{3}\%$

3rd yr CI − 2nd year CI = 420 Rs.

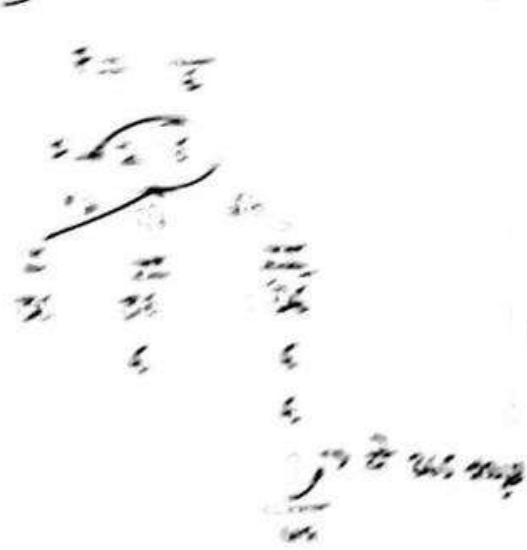
$R = \frac{1}{6}$



13 − 6 = 7 → 420

1 unit → 60

P = 216 × 60 = 12960 Rs.



Calculate CI when rate is compounded half years.

$T = (1\text{yr } 6\text{month}) \times 2 = 3$ half yearly

$R = \frac{20\%}{2} = 10\% = \frac{1}{10}$

10 11
10 11
10 11
1000 1331
331

1000 unit $\longrightarrow$ 20,000
1 unit $\longrightarrow$ 20

CI = 331 $\Rightarrow$ 331 × 20
$\Rightarrow$ 6620 Rs Ans

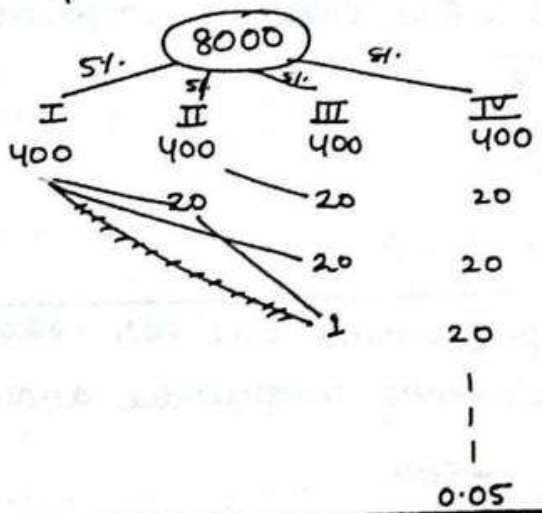
---

(17) P = 8000 Rs
$r = 20\%$
$T = 1\text{yr}$

find CI-SI if rate is compounded quarterly.

$T = 1 \times 4 = 4$ Quarter years.

$r = \frac{20\%}{4} = 5\%$ per Quarter year.



CI-SI = 124.05 Rs.

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(18) if a certain sum of money of Rs 225 amounts to Rs 256 in two years. find the rate of compound interest ?

$\sqrt{225}$ $\sqrt{256}$ — 1 साल के लिए square करेंगे.

15 ⌒ 16

1

$\frac{1}{15} \times 100 = 6\frac{2}{3}\%$ Ans

---

(19) if a certain sum of money of Rs 102400 amounts to Rs 145800 in 3 years. find the rate of compound interest.

~~102400~~ ~~145800~~

$\sqrt[3]{512}$ $\sqrt[3]{729}$

8 ⌒ 9

1

$\frac{1}{8} \times 100 = 12\frac{1}{2}\%$

3 साल में 512 से 729 हुआ है। 1 साल के लिए cube करेंगे।

---

(20) if a certain sum of money becomes 8 times of itself in 3 years. find rate of compound interest.

$\sqrt[3]{1}$ $\sqrt[3]{8}$

1 ⌒ 2

1

$\frac{1}{1} \times 100 = 100\%$

---

(21) A what rate % per annum will rs. 2304 amounts to Rs 2500 in two years compounded annually.

~~2304~~ ~~2500~~

~~1152~~ : ~~1250~~

$\sqrt[2]{576}$: $\sqrt[2]{625}$

24 ⌒ 25

1

$\frac{1}{24} \times 100 = 4\frac{1}{6}\%$

(22) At what rate per annum will rupees 32000 yield (231) a compound interest of 5044 Rs in 9 months interest being compounded quarterly.

32000 : 37044

$\sqrt[3]{8000}$ $\sqrt[3]{9261}$

20 21

1

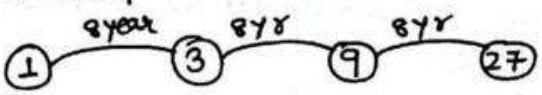
$\frac{1}{20} \times 100 = 5\%$ per quarterly

$5\% \times 4 = 20\%$ per annum.

9 month
× 4 quarterly
36 months
= 3 quarterly years.

CLASS 31

(23) if a certain sum of money becomes equal ~~to~~ 3 times of itself in 8 years. In How much time it will be 243 times of itself



$3^1 \rightarrow$ 8 year

$243 = 3^5 \rightarrow$ $8 \times 5 = 40$ year.

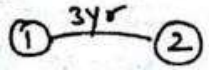
1 : 3

1 : $\sqrt[8]{3}$

$\sqrt[8]{3} - 1$

$R = \frac{\sqrt[8]{3} - 1}{1} \times 100\ \%$

(24) if a certain sum of become double of itself in 3years. In How much time it will be 64 times of itself



$2^1 \rightarrow$ 3 year

$64 \rightarrow 2^6 \rightarrow$ $6 \times 3 = 18$ yr

Rate:

1 2

1 : $\sqrt[3]{2}$

$\sqrt[3]{2} - 1$

$r = \sqrt[3]{2} - 1 \times 100$

(25) if a certain sum of money amounts to Rs 4500 in 5 years and Rs 6750 in 10 years. find principal.

$\frac{6750}{4500} = \frac{3}{2}$ (4500 का $\frac{3}{2}$ times)

$P \times \frac{3}{2} = \overset{1500}{\cancel{4500}} = 3000$ Ans.

---

(26) if a certain sum of money amounts to Rs 650 in two years and Rs 676 in 4 years. find principal.

$\frac{676}{650} = \frac{26}{25}$ times of 650.

$P \times \frac{\cancel{26}}{25} = \overset{25}{\cancel{650}}$ $\quad P = 625$ Rs Ans.

---

(27) if a certain sum of money amounts to Rs 66300 in 10 yrs and Rs 99450 in 20 yrs.

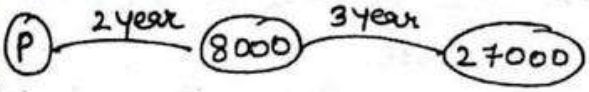
$\frac{\cancel{99450}}{\cancel{66300}} = \frac{3315}{2210}$

$P \times \frac{\cancel{3315}}{2210} = \overset{20}{\cancel{66300}}$

$P = 44200$ Rs Ans.

---

(28) if a certain sum of money becomes Rs 8000 in 2 years and Rs 27000 in 5 years. find the principal.



बिना rate निकाले solve नहीं होगा.

$\sqrt[3]{8000}$ $\quad \sqrt[3]{27000}$

2 $\quad$ 3

1

$\frac{1}{2} \times 100$

$R = 50\%$

P = ?

r = 50% = $\frac{1}{2}$

t = 2 yr

A = 8000

2	3
2	3
4	9
P	A

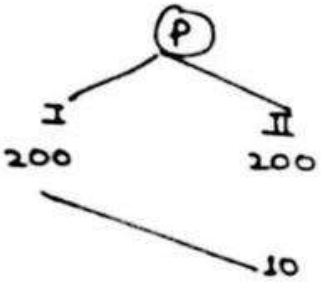
9 unit — 8000

1 unit — $\frac{8000}{9}$

P = 4 unit — $\frac{8000}{9} \times 4$

$= \frac{32000}{9} = 3555.55$ Rs.

(29) The simple interest and compound interest on a certain sum of money is 400 & 410 Rs respectively. find Principal and rate of interest ? (time = 2 years)



$\frac{10}{200} \times 100 = 5\%$

$P \times \frac{5}{100} = 200$

$P = 4000$

(30) If the diff b/w CI and SI on a certain sum of money of Rs 5000 for 2 years is Rs 72. find rate of interest ?

$R = \sqrt{\frac{72}{5000}} \times 100$

$= \frac{6}{50} \times 100 = 12\%$

Time = 2 year

CI − SI = D

Principal = P

$R = \sqrt{\frac{D}{P}} \times 100$

(31) At what rate percent the diff of CI and SI on a certain sum of money of Rs 30720 in 3 years is 1500.

$r\% = \frac{1}{x} \times 100$

$\frac{3x+1}{x^3} = \frac{D}{P} = \frac{1500}{30720} = \frac{25}{512}$

$x^3 = 512$, $\therefore x = 8$

$r\% = \frac{1}{8} \times 100 = 12\frac{1}{2}\%$ (2nd method next page me explained h)

Time = 3 year

CI − SI = D

Principal = P

$\frac{D}{P} = \left(\frac{r}{100}\right)^2 \left(\frac{300+r}{100}\right)$

Time = 3year

$r\% = \frac{1}{x} \times 100$

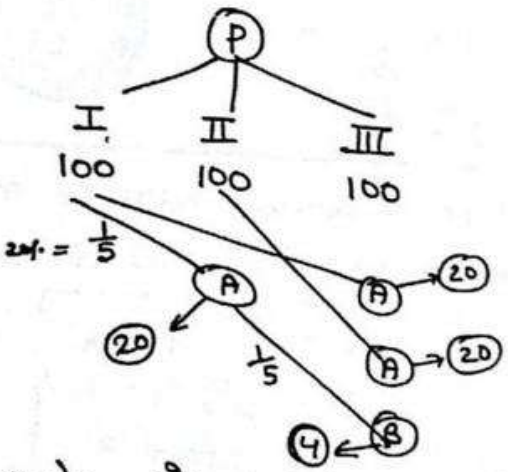
$\frac{3x+1}{x^3} = \frac{D}{P}$ → calculate value of x from this relation and put in $r\% = \frac{1}{x} \times 100$ to find rate.

(32) Ratio of 3 year of CI and SI of one year on a certain sum of money is 3.64 : 1 . find rate percent.

3.64 : 1

(364) : (100)

3 yr CI, 1 yr SI



diff b/w CI-SI = 64.

3A + B = 64.

(Put from options)

or Try value putting.

A = 20

60 + 4 = 64 (satisfy)

(3A, B)

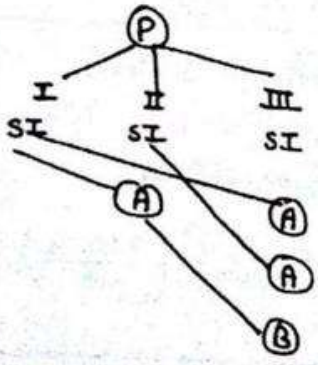
r = 20%.

A = r

$B = \frac{r^2}{100}$

20% A को 100 पे calculate किया है, Hence. A is rate of intrest.

(33) The ratio of diff b/w CI and SI for 3 years to the diff of CI and SI for 2 years is 19 : 6. find rate of intrest.



3A + B : A

(diff of CI & SI of 3 years : diff of CI & SI for 2 years.)

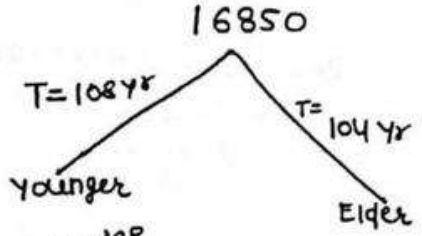
3A + B : A

19 : 6

$\frac{1}{6} \times 100 = 16\frac{2}{3}\%$ Ans

(34) A man want to invest 16850 in bank account of his two sons whose ages are 12 years and 16 years in such a way so that they will get equal amount at an age of 120 years at the rate of $33\frac{1}{3}\%$ per annum. find the share of younger son.

$$A = P\left(1+\frac{r}{100}\right)^T$$



C → Part of younger

B → Part of Elder

$$C\left(1+\frac{1}{3}\right)^{108} = B\left(1+\frac{1}{3}\right)^{104}$$

$$\Rightarrow C\left(\frac{4}{3}\right)^{108} = B\left(\frac{4}{3}\right)^{104}$$

$$\Rightarrow \frac{\left(\frac{4}{3}\right)^{108}}{\left(\frac{4}{3}\right)^{104}} = \frac{B}{C}$$

$$\therefore \frac{B}{C} = \left(\frac{4}{3}\right)^4 = \frac{256}{81}$$

$256+81 = 337$

337 —— 16850

1 unit —— 50

younger son = C = 81 × 50

= 4050

Elder = B = 256 × 50

= 12800

(OR)

Age diff	Younger	Elder
1 year -	3	4
2 year -	9	16
3 year -	$(3)^3$	$(4)^3$
4 year -	$(3)^4$	$(4)^4$

$r = 33\frac{1}{3}\% = \frac{1}{3}$ ← Younger

Elder = 3+1 = 4

(35) A man purchase a motorbike for a certain price and promise to pay the ~~installment~~ price in 3 equal annual installments of 10,800 at the rate of 20% per annum. find the cost price of motor bike.

	Price	installment
1st yr	$5 \times 36 = 180$	6×36
2nd yr	$25 \times 6 = 150$	36×6
3rd yr.	$125 = 125$	216
	455	

$20\% = \frac{+1}{5}$)

But all installments are equal. so equal them.

216 unit —— 10,800

1 unit —— $\frac{10,800}{216} = 50$

455 unit → $50 \times 455 = 22750$ Rs Ans.

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(36) A man borrowed a sum of Rs 25220 from a bank. and promise to pay the amount in 3 annual equal installment at the rate of 5% per annum. find the value of each installment.

Price	Installment
20×441 (8820)	$21 \times (441)$
400×21 (8400)	$441 \times (21)$ ← To equal installments
$8000 - (8000)$	9261
25220	

$5\% = \frac{1}{20}$)

25220 unit —— 25220

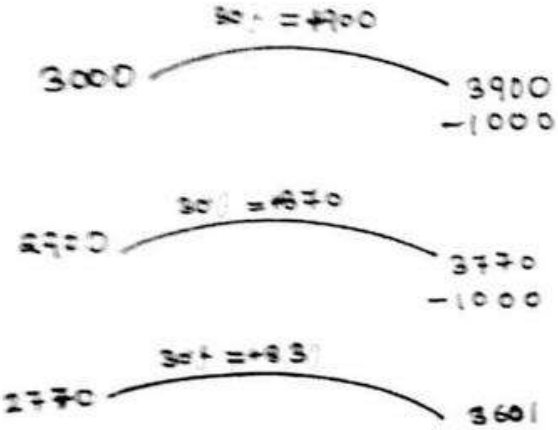
1 unit —— 1 Rs

installment = 9261 unit

9261 unit = 9261×1

= 9261 Rs Ans.

(37) A man borrowed a sum of Rs 3000 from bank at 30% per annum. He pays back Rs 1000 at the end of each year. Calculate how much amount he will pay at the end of 3rd year to clear all his dues.



He has to pay 3601 Rs at the end of 3rd year to clear the loan.

(38) P = 4000
R = 6%
T = 2 years
CI − SI = ?

$CI - SI = \left(\frac{3 \times 2}{100}\right)\% = 0.06\%$

$\Rightarrow 4000 \times 6\% \Rightarrow \frac{4000 \times 6}{100} = 240$ Rs.

SI = x%, y%

$CI = \left(x + y + \frac{xy}{100}\right)\%$

$CI - SI = \left(\frac{xy}{100}\right)\%$

(39) P = 4000
R = 5%
T = 3 years
CI − SI = ?

$CI - SI = \frac{3 \times 2}{100}\% = 0.06\%$

$4000 \times \frac{6}{100} = 240$ Rs.

(40) rate for 3 months = $2\frac{1}{2} \times 3 = 2\%$

(40) P = ?

T = 1Yr 6 month

r = 6%

CI = 4590 Rs

$CI = \left(x + y + \frac{xy}{100}\right)$

$= 6 + 3 + \frac{6 \times 3}{100} = 9.18$

r for 6 month $= \frac{6}{12} \times 6 = 3\%$

$P \times 9.18\% = 4590$

$P \times \frac{918}{100 \times 100} = 4590$

P = 50,000

Ans

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(41) P = ? , r = 5% , T = 1Yr 73 days , CI = 302.50 Rs.

$CI = \left(x + y + \frac{xy}{100}\right)\%$

$\left(5 + 1 + \frac{5 \times 1}{100}\right)\%$

$= 6.05\%$

rate for 73 days $= \frac{5}{365} \times 73 = 1\%$

$P \times 6.05\% = 302.50$

$P \times \frac{605}{100 \times 100} = \frac{30250}{100}$

P = 5000 Rs

Ans

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(42) P = 8000, T = 3Yr

R = I → 1%
II → 2%
III → 3%

CI − SI = ?

1% , 2% , 3%

$1 + 2 + \frac{1 \times 2}{100}$

3.02% , 3%

$3.02 + 3 + \frac{3.02 \times 3}{100}$

$6.02 + 0.0906$

$= 6.1106\%$

$8000 \times \frac{0.1106}{100}$

8.848 Rs.

SI = 1% + 2% + 3%

= 6%

CI − SI = 6.1106 − 6

0.1106 %

(43) P = ? , T = 3 yrs , R = I → 5% , II → 4% , III → 3% , CI = 12476 Rs.

5% 4% 3%

9.02 , 3%

$9.02 + 3 + \frac{9.02 \times 3}{100}$

12.02 + 0.276 = 12.476%

$P \times \frac{12.476}{100} = 12476$

$P \times \frac{12476}{100 \times 1000} = 12476$

P = 10,0000 Ans

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(##) Time 3 years.

Rate	CI	CI − SI
a%	$3a + \frac{3a^2}{} + \frac{a^3}{}$	$0 + \frac{3a^2}{} + \frac{a^3}{}$
4%	12.4864 %	0.4864 %
1%	3.0301 %	0.301 %
2%	6.1208 %	
5%	15.7625 %	
10%	33.1000 %	
	(33.1 %)	

(44) P = ?
r = 4%
Time = 1 yr 6 month
CI − SI = 204 Rs & CI is calculated half yearly.
(SI: Half yearly, CI: Annually.)

if calculated annually = $4+2+\frac{4\times2}{100}$
= 6.08%
(rate for 6 months = $2\frac{4}{12}\times\frac{6}{2}$ = 2%)

if calculated half yearly ⇒ T = 3 years, r = $\frac{4}{2}$ = 2%
rate of 3 years = 6.1208%

⇒ 6.1208% − 6.08 = 0.0408%

P × 0.0408% = 204

$P \times \frac{408}{10000\times100} = 204$

P = 500000 Rs Ans

(45) P = 4000
r = 6%
Time = 1 year 6 month
CI − CI = ?
(Half yearly, Annual.)

If calculated annually, CI = $6+3+\frac{6\times3}{100}$ = 9.18%

if calculated half yearly, → Time = 3 years, rate = 3%
CI = 9.2727%

9.2727 − 9.18 = 0.0927% of P.

$4000 \times \frac{0.0927}{100}$ = 3.708 Rs. Ans