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Sahi Prep Hai Toh Life Set Hai

# COMPOUND INTEREST

## Part-2

## Agenda



\*

Logic of Ratio → To solve question  
of S.I & C.I of 1, 3  
yrs 5 years



(40-45) min

++

C.I Table Concept



(35-40) min

Homework → 30 Question

2 years

$$(CI)_2 - (SI)_2 = \frac{PR^2}{100^2}$$

$$\frac{(SI)_2}{(CI)_2} = \frac{200}{200+R}$$

3 years

$$(CI)_3 - (SI)_3 = \frac{PR^2}{100^2} \left[ \frac{R}{100} + 3 \right]$$

## Ratio - Logic

I<sup>st</sup> formula

$$\text{Eg. } (\text{CI})_3 - (\text{SI})_3 = \text{Rs. } 15.25$$

Find P. = =

$$R = \frac{5\%}{\text{annum}} \\ \left( \frac{1}{20} \right)$$

Note:

- (1) Focus on number of terms and Rate of Interest
- (2) But if number of terms and rate of interest are different for CI and SI, we will give priority to CI.

eg

$$(CI)_3 - (SI)_3 = \boxed{15.25Rs}$$

$$R = 5\% \text{ annum} \\ \underline{\underline{=}}$$

Sol<sup>n</sup>

$$n = 3$$

$$R = \frac{4}{20}$$

$$\text{Let } P = (20)^3 \\ = 8000$$

SI	CI
400	400
400	420
400	441
<hr/>	<hr/>
1200	1261

Gap	P
G <sub>1</sub>	8000
15.25	<hr/> <u><u>2000Rs</u></u>

Eg.  $(CI)_3 - (SI)_3 = \text{Rs. } 15.25$

$R = 5\% / \text{annum}$

Find P

2000M

eg  $(CI)_3 - (SI)_3 = ??$   $R = 12\frac{1}{2}\%$

$n = 3 \quad R = 1/8$

$(8)^3 - \underline{\underline{512}}$

eg  $(CI)_4 - (SI)_4 = ??$   $P = 20\%$

$n = 4 \quad R = \frac{1}{5}$

$P = 5^4$   
 $= 625$

$$n = 5$$

$R = 10\%$  annum

$$P \rightarrow 10^5 \Rightarrow \underline{\underline{00000}}$$

Eg.

n = 4

R = 20%/annum

P = ??

$$20\% \left( \frac{1}{5} \right)$$

n = 4

$$5^4 \Rightarrow \underline{\underline{625}}$$

Eg.  $n = 3$        $R = 16\frac{2}{3}\% / \text{annum}$   
 $P = ??$

$$n = 3 \quad \frac{1}{6}$$

$$6^3 \Rightarrow \underline{\underline{216}} \quad \checkmark$$

Eg.

n = 5  
P = ??

R = 25%/annum

$\frac{1}{4}$

$$4^5 = \underline{\underline{1024}}$$

$\checkmark$

Eg.

$$n = 3$$

$$P = ??$$

$$R = 12\frac{1}{2} \% / \text{annum}$$

$$\cancel{18}$$

let  $P = 8^3 = 512$

eg

$$n = 4$$

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

let  $P = 9^4 \Rightarrow \underline{\underline{6561}}$

$$n = 3 \quad R = \frac{1}{6}$$

let  $P = 6^3 \Rightarrow 216$

Eg1.

$$(CI)_3 - (SI)_3 = \text{Rs.} 171$$

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

$P = ??$

SI	CI
36	36
36	42
36	49
<hr/> <u>108</u>	<hr/> <u>127</u>

Gap

$$\frac{19}{x^9 - 171}$$

$P$

$$\frac{216}{(1+9)^9 - 1}$$

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

$$\frac{P R^2}{100^2} \left[ \frac{R}{100} + 3 \right] = 171$$

$$P \cdot \frac{1}{6} \cdot \frac{1}{6} \left[ \frac{1}{6} + 3 \right] = 171$$

$$P \cdot \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{19}{6} = 171$$

$$P = \underline{\underline{1944}}$$

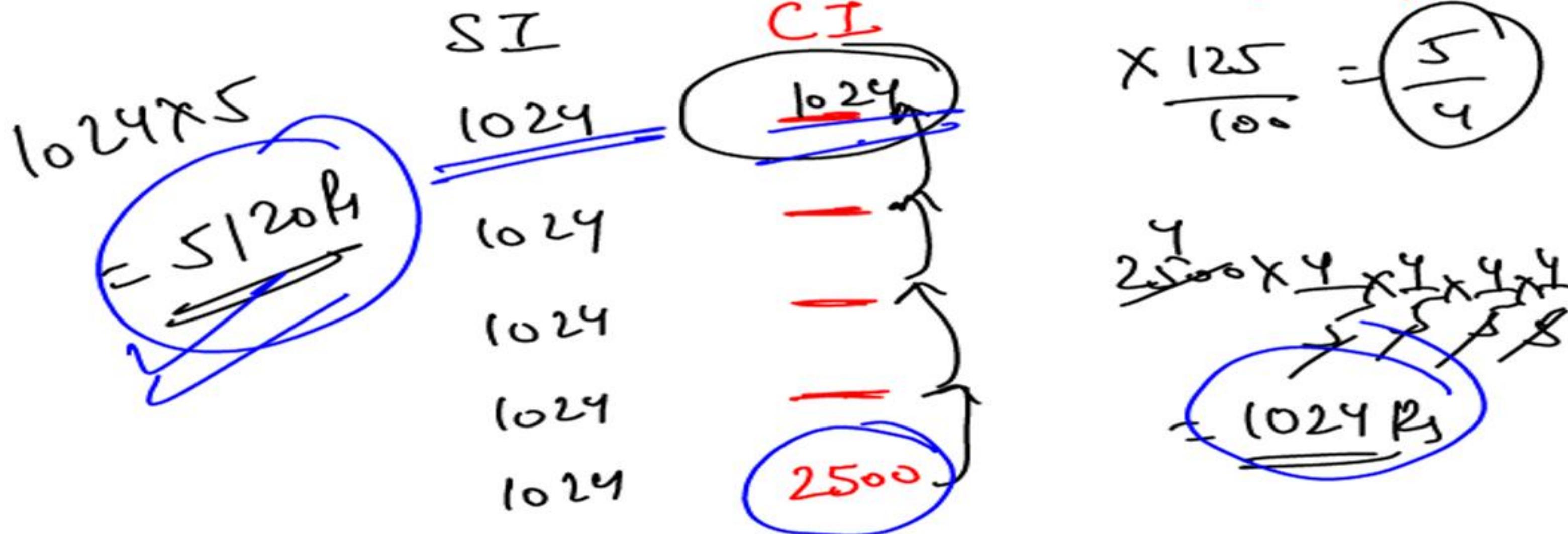
Ans.

Rs.1944

$$(CI)_5^R \rightarrow \underline{\underline{2500 \text{ Rs}}}$$

Eg2. If compound interest earned in the 5th year is Rs.2500. Find the simple interest earned in 5 years, if the rate of interest is 25% per annum.

$$R = 25\%$$



Ans.

**Rs.5120**

~~Ques~~ Note:

- (1) If rate of interest is different for SI & CI, then  
always give priority to CI (Rate of interest).
- (2) If number of terms are different, then  
always give priority to CI (Number of terms).

eg

 $(CI)_3$ 

$$\underline{R = 20\%}$$

 $(SI)_4$ 

$$\underline{R = 25\%}$$

$$n=3 \quad R=15\% \text{ let} \quad P = 5^3 = \underline{\underline{125}}$$

Priority  
order

**CI** <  
Annually

**CI** <  
Semi-Annually

**CI** <  
Quarterly

SI    4 years

R = 4% p.a.

CI    3 years

R = 5% p.a.

Sol<sup>n</sup>

$n = 3$ .    R = 1/20

let P = 80000 Rs

SI

320

320

320

320

1280

CI

400

420

441

1261

Eg3. The simple interest on a sum at 4% p.a. for 4 years. is Rs. 57/- more when the same sum is lent at 5% p.a. at C.I. for 3 years. Find the sum.

- (a) Rs. 22000
- (b) Rs. 24000
- (c) Rs. 25000
- (d) Rs. 20000

Gap

19 Rs

→ 57 Rs

P

8000

24000 Rs

**Ans. (b)**

V. Amp

## COMPOUND INTEREST TABLE CONCEPT

$$P = \textcircled{10000}$$

$$R = \underline{\underline{20\%}} \text{ annum}$$

$$T = \underline{\underline{3 \text{ years}}}$$

Compound Interest = ??

$$1^{\text{st}} \rightarrow \underline{2000} = 2000 \quad \text{--- 9}$$

$$2^{\text{nd}} \rightarrow \underline{2000 + 400} = 2400$$

$$3^{\text{rd}} \rightarrow \underline{2000 + 400 + 400 + 80} = 2880$$

7280 Rs

$$P = \underline{2560}$$

$$R = \underline{25\%} \text{ per annum} \quad T = 4 \text{ years}$$

$$1^{\text{st}} \text{ year} \rightarrow 640$$

$$2^{\text{nd}} \text{ year} \rightarrow 640 + 160$$

$$3^{\text{rd}} \text{ year} \rightarrow 640 + 160 + 160 + 40$$

$$4^{\text{th}} \text{ year} \rightarrow 640 + 160 + 160 + 40 + 160 + 40 + 40 + 10$$

$$P = \underline{\underline{20000}}$$

$R = \underline{\underline{30\%}}$  for 1<sup>st</sup> year

$R = \underline{\underline{10\%}}$  for 2<sup>nd</sup> year

$R = \underline{\underline{20\%}}$  for 3<sup>rd</sup> year

$$1^{\text{st}} \rightarrow \underline{\underline{6000}}$$

$$\rightarrow \underline{\underline{6000}}$$

$$2^{\text{nd}} \rightarrow \underline{\underline{2000 + 600}} \rightarrow \underline{\underline{2600}}$$

$$3^{\text{rd}} \rightarrow \underline{\underline{4000 + 1200 + 400 + 120}} \rightarrow \underline{\underline{5720}}$$

**Q1.**  $P = \underline{54,000}$

$$1^{\text{st}} \rightarrow \underline{5400}$$

$R = 10\% \text{ for } 1^{\text{st}} \text{ year } \left( \frac{1}{10} \right)$

$11\frac{1}{9}\% \text{ for } 2^{\text{nd}} \text{ year } \left( \frac{1}{9} \right)$

$16\frac{2}{3}\% \text{ for } 3^{\text{rd}} \text{ year } \left( \frac{1}{6} \right)$

$$2^{\text{nd}} \rightarrow \underline{6000 + 600}$$

**Find** (i) Compound Interest earned in 3 years  
 (ii) Compound Interest earned in 3<sup>rd</sup> year

$$3^{\text{rd}} \rightarrow \underline{9000 + 900 + 1000 + 100}$$

$$(i) \rightarrow \underline{5400 + 6600 + 11000} \\ = \underline{\underline{23000}}$$

$$(ii) \underline{\underline{11000}}$$

eg

$$P = \underline{\underline{40000}}$$

$$R = \underline{\underline{20\% \text{ annum}}}$$

$$T = 1 \frac{1}{2} \text{ years}$$

$$1^{\text{st}} \text{ year} \rightarrow \underline{\underline{8000}} \rightarrow 8000$$

$$2^{\text{nd}} \text{ year} \rightarrow \underline{\underline{8000 + 1600}} \rightarrow 4800$$

$$\text{Total} \rightarrow 12800$$

**Ans. (i) 23,000 (ii) 11,000**

$(CI) - (CI) = ?$

every 4 months      every 6 months

Q2. Find difference between Compound Interest received in 1 year at 15% p.a. on Rs. 50,000, when interest is compounded in every 4 months and every 6 months respectively?

$$\begin{array}{l} \text{I}^{\text{st}} \\ \text{---} \\ \text{6 months} \quad P = 50000 \\ n = 2 \quad R = \underline{\underline{7.5\%}} \end{array}$$

$$1^{\text{st}} \rightarrow \underline{\underline{3750}}$$

$$2^{\text{nd}} \rightarrow 3750 + 281.25$$

$$\Rightarrow \boxed{7781.25}$$

$$\begin{aligned} & 7.5\% \text{ of } 3750 \\ & 3 \times \frac{75}{100} \times 3750 \\ & = \frac{1125}{4} \end{aligned}$$

Compounded every 4 months

$$n = 3$$

$$R = 5\% \text{ annum}$$

$$P = \underline{\underline{5000}}$$

$$1^{\text{st}} \rightarrow \underline{\underline{2500}}$$

$$2^{\text{nd}} \rightarrow \underline{\underline{2500 + 125}}$$

Diff.  $\rightarrow$

$$\circlearrowleft 100B$$

$$3^{\text{rd}} \rightarrow 2500 + 125 + 125 + 6.25$$
$$\rightarrow \boxed{7881.25 \text{ Rs}}$$

Ans. Rs. 7781.25

II<sup>nd</sup>  $\rightarrow$

Successive % change

$$P = 50000$$

Compound every quarterly

$$n=3 \quad R=\underline{5}$$

$$5+5+\frac{5 \cdot 5}{100} = 10.25\%$$

$$(10.25 + 5 + \frac{10.25 \times 5}{100})$$

=

$$\underline{\underline{15.7625\%}}$$

Compounded every 6 months

$$n=2 \quad R=\underline{7.5\%}$$

$$7.5+7.5+\frac{7.5 \times 7.5}{100}$$

$$\underline{\underline{15.5625\%}}$$

$$0.2\% \text{ of } 50000 \\ = \underline{\underline{100\text{Rs}}}$$

Q3. Find Compound Interest on  
Rs.20,000 at 2% p.a. for  $1\frac{1}{2}$  years  
when interest is compounded half  
yearly?

$$P = \underline{20000}$$

$$R = 2\% \text{ per annum}$$

$$T = \underline{1\frac{1}{2} \text{ years}}$$

$$n = 3$$

$$\underline{R = 1\%}$$

$$1^{\text{st}} \text{ term} \rightarrow \underline{200}$$

$$2^{\text{nd}} \text{ term} \rightarrow 200 + 2$$

$$3^{\text{rd}} \text{ term} \rightarrow 200 + 2 + 2 + 0.02$$

$$= \underline{\underline{606.02}} \text{ Rs}$$



**Ans. Rs.606.02**

$$P = 64000 \quad n = 3$$

$$R = 2.5\% \left( \frac{1}{40} \right)$$

Q4. Find Compound Interest on  
Rs. 64,000 at 5% p.a. for 1½ years  
when interest is compounded  
half yearly?

$$1^{\text{st}} \rightarrow 1600$$

$$2^{\text{nd}} \rightarrow 1600 + 40$$

$$3^{\text{rd}} \rightarrow 1600 + 40 + 40 + 1$$

$$= \underline{\underline{4921 R_1}}$$



**Ans. 4921**

$$P = 25000 \quad R = 8\% \text{ per annum}$$

$$R = 2\% \text{ per month}$$

$$\frac{3 \text{ months}}{2} + 1\frac{1}{2} \text{ months}$$

~~$$12 \text{ months}$$~~

$$3 \text{ months}$$

$$1^{\text{st}} \text{ term} \rightarrow 500$$

$$2^{\text{nd}} \text{ term} \rightarrow 500 \times \frac{1}{10}$$

~~$$510$$~~

$$3^{\text{rd}} \text{ term} \rightarrow 500 + 10 + 10 + 0.2$$

~~$$260.1$$~~

Q5. Find Compound Interest on Rs.25,000 at 8% p.a. for  $7\frac{1}{2}$  months when interest is compounded quarterly?



**Ans. 1270.1**

Q6. Find annual effective rate of interest when 12% p.a. is compounded half yearly?

R = 12%, annum compounded half yearly

$$R = 6\% \quad n = 2$$

$$6 + 6 + \frac{6 \cdot 6}{100}$$

$$= 12.36\%$$

**Ans. 12.36%**

Q7. Find the ratio between CI and SI, when interest is compounded at 42.84% p.a. for 3 years?

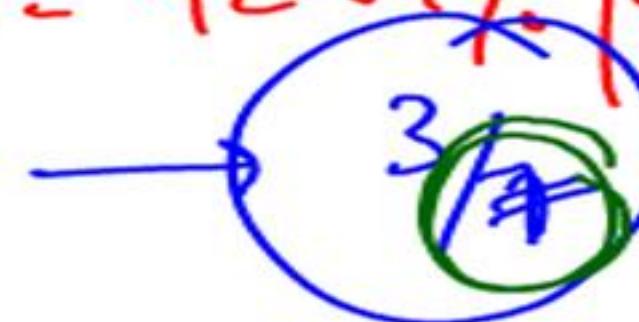
$$\frac{(CI)_3}{(SI)_3} = ??$$



$$SI = \frac{49}{49} = \frac{49}{49} = 147$$

$$CI = \frac{49}{100+3} = \frac{49}{103} = 219$$

If  $R = 42.84\%$  annum



$$\frac{49 \cdot 73}{73} = 49$$

$$\frac{3 \cdot 73}{73} = 3$$

Ans. 73 : 49

\* Compound Interest increases  
by 8% every year

Q8. What will be the difference between Compound interest on sum of Rs. 5000 for 1½ years when the interest are compounded annually and half yearly respectively?

- (a) 2.04
- (b) 2.05
- (c) 3.00
- (d) Data insufficient

B/c rate of interest is  
not given

**Ans. (d)**

# PRACTICE QUESTIONS

1. A sum of money on compound interest amount to Rs. 10648 in 3 years and Rs. 9680 in 2 years. The rate of interest per annum is:





2. (b)

**3.** A certain sum of money yields Rs. 1261 as compound interest for 3 years at 5% per annum. The sum is :

- (a) Rs. 9000      (b) Rs. 1200  
(c) Rs. 6000      (d) Rs. 8000

3. (d)

4. A dealer buys a house and a car for Rs. 6,00,000 and for Rs. 8,00,000. If price of house appreciates at the rate of 10% per annum and that of car depreciates at the rate of 20% per annum, then how much profit or loss he will get after two years ?
- (a) Rs. 162000 profit
  - (b) Rs. 184000 Profit
  - (c) Rs. 162000 Loss
  - (d) Rs. 184000 Loss



5. Gagan lent Rs. 18000 on a condition such that the rate of compound interest per annum be 10% for first year, 20% for next two years and 25% for next three years. How much compound interest he will get at the end of 6 years?

- (a) 35000
- (b) 37687.5
- (c) 36000
- (d) 38500.6



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5. (b)

6. A sum of money at compound interest double itself in 10 years. It will become eight times of itself in-
- (a) 30 years
  - (b) 40 years
  - (c) 36 years
  - (d) 42 years



7. An amount of money becomes Rs. 2400 in 5 years and to Rs. 5000 in 10 years on compound interest. Find the sum
- (a) 1200
  - (b) 1152
  - (c) 1180
  - (d) 1272



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7. (b)

8. A sum of money becomes Rs. 3780 in 8 years and Rs. 4536 in 16 years at the rate of compound interest. What is the sum and after 24 years, the amount will be–
- (a) Rs. 3150, 5440
  - (b) Rs. 3250, 5440
  - (c) Rs. 3150, 5443.2
  - (d) Rs. 3150, 5453.20



9. Compound interest on a certain sum at 5% per annum for 2nd year is Rs. 262.5. Find sum.



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9. (d)

10. A sum of money is invested at 5% per annum compounded interest for 3 years. Difference of compound interest of 3<sup>rd</sup> and 2<sup>nd</sup> year is Rs. 26.25. Find sum.

- (a) 5000
- (b) 8000
- (c) 10000
- (d) 10145



11. The compound interest and the simple interest for two years on a certain sum at a certain rate of interest are 1845 and Rs. 1800 respectively. Find principal and the rate percent.

- (a) 18000, 5%
- (b) 18000, 4%
- (c) 17500, 5%
- (d) 17500, 4%

11.(a)

**12. Find the difference between the compound interest and the simple interest on 32000 at 10% p.a. for 4 years.**

- (a) Rs. 2051.20      (b) Rs. 2050.50
- (c) Rs. 2050.50      (d) Rs. 2501.20



13. A person lent out a certain sum on simple interest and the same sum on compound interest at a certain rate of interest per annum. He noticed that the ratio between the difference of compound interest and simple interest of 3 years and 2 years is 25 : 8. The rate of interest per annum is :

- (a) 10%
- (b) 11%
- (c) 12%
- (d) 12½%

13. (d)

14. A sum of money becomes Rs. 4500 after two years and Rs. 6750 after 4 years compounded annually. The sum is
- (a) Rs. 4000
  - (b) Rs. 2500
  - (c) Rs. 3000
  - (d) Rs. 3050



15. A father deposited Rs. 22360 in the account of his two sons Gagan and Mohan. At the time of deposit, the age of two sons were 14 years, and 17 years respectively. He put a condition to the bank officer that his both children must get equal amount when they will be 30 years old and the rate of compound interest be  $16\frac{2}{3}\%$  per annum.

Find the amount deposited in their account.

- (a) Rs. 8640, Rs. 12720
- (b) Rs. 8460, Rs. 13720
- (c) Rs. 8640, Rs. 13720
- (d) Rs. 8640, Rs. 12270



16. A certain sum is lent for 3 years at  $16\frac{2}{3}\%$  p.a. compound interest. If the C.I. for the 3<sup>rd</sup> year is Rs. 24.50/- then what will be the simple interest of 5 years?
- (a) Rs. 90
  - (b) Rs. 60
  - (c) Rs. 45
  - (d) Rs. 120

16.(a)

17. A sum of money is lent for 2 years at the rate of interest of 20% compounded annually. If the interest is calculated half yearly then he gain 482 Rs. more. Find the sum.

- (a) 20,000
- (b) 40,000
- (c) 16,000
- (d) 18,000

17.(a)

**18. The compound interest on a certain sum for 2 years is 6000 and for 4 years is 14000. Find the principal.**

- A. 24000
- B. 10000
- C. 12000
- D. 18000



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19. What will be the difference between Compound interest on sum of Rs. 5000 for  $1\frac{1}{2}$  years when the interest are compounded annually and half yearly respectively?

- (a) 2.04
- (b) 2.05
- (c) 3.00
- (d) Insufficient Data



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19. (d)

20. What is the present worth of a house which would be worth Rs. 50000 after 3 years, if it depreciates at the rate of 10%?
- (a) Rs. 35765.74
  - (b) Rs. 67560.74
  - (c) Rs. 67655.74
  - (d) Rs. 68587.10

20. (D)

21. Ram purchased a flat at Rs. 1 lakh and Prem purchased a plot of land worth Rs. 1.1 lakh. The respective annual rates at which the prices of the flat and the plot increased were 10% and 5%. After two years, they exchanged their belongings and one paid the other the difference. Then,
- (a) Ram paid Rs. 275 to Prem
  - (b) Ram paid Rs. 475 to Prem
  - (c) Ram paid Rs. 375 to Prem
  - (d) Prem paid Rs. 475 to Ram

21. (a)

**22. The rate of inflation was 1000%. Then, what will be the cost of an article, which cost 6 units of currency now, 2 years from now?**

- (a) 666
- (b) 660
- (c) 720
- (d) 726



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22. (d)

23. Some amount was lent at 10% p.a simple Interest. After 1 years, Rs. 4400 is repaid and the rest of the amounts repaid at 20% p.a. if the 2nd years interest is  $11/7$  of the first year's interest, find the amount of money that was lent out initially?

- (a) Rs. 12000
- (b) Rs. 13000
- (c) Rs. 14000
- (d) Rs. 15000

23. (c)

24. A man borrows Rs. 9000 at 10 compound interest per annum. After the end of each year he returns Rs. 3000. At the end of third year how much money should he returns to settle all his debt ?

- |             |             |
|-------------|-------------|
| A. Rs. 5050 | B. Rs. 5049 |
| C. Rs. 5048 | D. Rs. 5051 |

24. (b)

25. In the beginning of the year 2004, a person invests some amount in a bank. In the beginning of 2007, the accumulated interest is Rs. 10,000 and in the beginning of 2010, the accumulated interest becomes Rs. 25,000. The interest rate is compounded annually and the annual interest rate is fixed. The principal amount is :

- (a) Rs. 16,000
- (b) Rs. 18,000
- (c) Rs. 20,000
- (d) None of the above



26. A person earned an interest of 'S' when he invested a principal at simple interest for 3 years. He earned an interest of 'C' when he invested the same principal at compound interest for 2 years. The rate of interest was same in both the cases. If the ratio  $S:C = 15:11$ , then which of the following can be the rate of interest?

- |         |         |
|---------|---------|
| (a) 5%  | (b) 10% |
| (c) 15% | (d) 20% |

26. (d)

27. A person invests a sum into a compound interest account at the rate of 10% p.a. At the end of the first, second and third years, he withdraws 5000, 2500 and 4510 rupees to completely empty the account. How much did he invest initially?

- |               |               |
|---------------|---------------|
| (a) Rs. 9000  | (b) Rs. 9900  |
| (c) Rs. 10000 | (d) Rs. 11000 |



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28. Ashok bought a scooter on the condition that he would pay Rs. 6000 instantly and Rs. 840 after one year and Rs. 2646 after two years. If the payment is at 5% compound interest, then what was the cost price of scooter.

- A. Rs. 9,200
- B. Rs. 9,000
- C. Rs. 10,000
- D. Rs. 10,700



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28. (a)

29. Rs. 6000 was invested for N years at 6% p.a. compound interest. How much more money should be invested at 12% p.a. compound interest for N years, for the overall interest to be 10% p.a. for N years ?
- A. Rs. 12000
  - B. Rs. 11000
  - C. Rs. 8000
  - D. Cannot be determined without knowing

29. (D)

30. Compound interest given on an amount of Rs 5000 which is calculated at 8% semiannually for a period of 3 years. The borrower pays Rs 1000 at the end of each year. What amount will he have to pay at the end of the third year to repay the entire amount?

- A. Rs. 4705.1
- B. Rs. 4170.5
- C. Rs. 4075.1
- D. Rs. 4570.1

30. (C)



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Practise  
topic-wise quizzes

Keep attending  
live classes



eg  $P = 60000$   $R = 25\%$  annum  $T = \underline{\underline{2\frac{1}{2} \text{ years}}}$

1<sup>st</sup>  $\rightarrow$  15000



2<sup>nd</sup>  $\rightarrow$  15000 + 3750 R



3<sup>rd</sup>  $\rightarrow$  15000 + 3750 + 3750 + 937.5

= 23437.5

45468.75/-

$\rightarrow$

11718.75

eg

$$P = \underline{80000} \quad R = \underline{40\% \text{ annum}} \quad T = \underline{10 \text{ months}}$$

Compounded quarterly

$S = P(1 + \frac{R}{n})^{nt}$

Term  $\rightarrow$  3 months -  $R = 10\%$

$$\begin{aligned}1^{\text{st}} \text{ term} &\rightarrow 8000, \rightarrow 8000 \\2^{\text{nd}} &\rightarrow 8000 + 800 \\3^{\text{rd}} &\rightarrow 8000 + 800 + 800 + 80 \\4^{\text{th}} &\rightarrow 8000 + 800 + 800 + 80 + 80 + 8 \\&\rightarrow 30029.33 \text{ Rs} \\&\rightarrow \frac{10648}{3} \rightarrow 3549.33\end{aligned}$$