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COMPOUND INTEREST

In case of compound interest, the interest will be added to the initial principal after every compounding period. Hence, compound interest keeps on increasing after every compounding period.

Differences between Simple Interest and Compound Interest

SI	CI
Principal remains fixed for the whole period	Principal keeps on increasing
Interest is not added to the principal.	Interest remains fixed.
Amount follows simple interest.	Interest for next year is calculated over the original principal.
Interest is added to the principal after every compounding period. Interest keeps on increasing.	Amount follows geometric progression. Interest for next year is calculated over the last year's amount.

In Case of SI

For example, if the rate of interest = 10% and the principal = Rs.1000, then:

Interest for 1st year = 10% of Rs.1000 = Rs.100

Interest for 2nd year = 10% of Rs.1000 = Rs.100

Interest for 3rd year = 10% of Rs.1000 = Rs.100

It can be seen that interest generated every year = Rs.100

	Principal	Rate	Interest
1 st year	1000	10%	100
2 nd year	1000	10%	100
3 rd year	1000	10%	100

In Case of CI

Principal of 1st year (initially) = P

Principal of 2nd year = P + interest of 1st year

Principal of 3rd year = P + interest of 1st year + interest of 2nd year

For example, if the rate of interest = 10% and the principal = Rs.1000, then

Interest for 1st year = 10% of Rs.1000 = Rs.100

	Principal	Rate	Interest
1 st year	1000	10%	100
2 nd year	1000+100=1100	10%	110
3 rd year	1000+100+100=1210	10%	121

Expression for Simple Interest and Compound Interest

$$SI = \frac{\text{Principal} \times \text{Rate of Interest} \times \text{Time}}{100}$$

$$CI = \text{Principal} \times \left[1 + \frac{R}{100} \right]^N - \text{Principal}$$

Principal = Sum invested or lent

R = Rate of interest per annum

N = Number of years

It should be noted that the unit of rate of interest and time should be same. So, if rate of interest is 'per year', then time should also be in 'year'.

In case of CI, if the compounding is not done annually, then formula changes like the following:

1. Half yearly compounding: It means that interest is given after every 6 months. In this case, after every 6 months, interest will be added to the principal.

Rate	Compounding period	Time (6 months)	No. of compounding period
R%	Half yearly	R/2	2 (12/6)

$$CI = \text{Principal} \times \left[1 + \frac{R/2}{100} \right]^N - \text{Principal}$$

2. Quarterly compounding: It means that interest is given after every three months. In this case, after every three months, interest will be added to the principal.

Rate	Compounding period	Time (6 months)	No. of compounding period
R%	Quarterly	R/4	4(12/3)

$$CI = \text{Principal} \times \left[1 + \frac{R/4}{100} \right]^{4N} - \text{Principal}$$

Remember

1. If the rate of interest = R% per annum for both CI and SI, then the difference between CI and SI for 2 yr will be equal to (R% of R)% of principal = $\frac{R^2}{100}$ % of principal.

In the above case, R = 10%, so the difference between CI and SI for 2 yr is 1%.

2. If a sum doubles itself in n years at SI, then rate of interest = $\frac{100}{n}$.

3. At SI, if a sum of money amount to n times in t years, then rate of interest = $\frac{(n-1)}{t} 100\%$.

Comparison between CI and SI

Assume two different sums are getting double at their respective rates of SI and CI in 5 yr. Following table gives us the mechanism of getting money n times in the above situation:

	5 yr	10 yr	15 yr	20 yr
SI	2	3	4	5
CI	2	4	8	16

It happens because in case of SI, the amount follows arithmetic progression, and in case of CI, the amount follows geometric progression.

MASTER SSC TYPES TYPE

A sum of Rs. 2000 is given on at the rate of 10% compound interest, compounded annually for 2 years. Find the Compound Interest?

Solution:

$$10\% = \frac{1}{10} \rightarrow \frac{11}{10} \rightarrow \left(\frac{11}{10}\right)^3 \rightarrow \frac{1331}{1000} \rightarrow \frac{331}{1000} \rightarrow \frac{331 \rightarrow ?}{1000 \rightarrow 2000} \rightarrow 331 \times 2 = \mathbf{662 \text{ ans}}$$

Alternate

$$10\% \rightarrow 1/10$$

Assume P = **1000** (10×10×10)

1000	$\xrightarrow{1/10}$	100			
	$\xrightarrow{1/10}$	100	10		
	$\xrightarrow{1/10}$	100	20	1	
		300 (SI)	30	1	331 (CI)

Compare now

As given in question

$$1000 \rightarrow 2000$$

$$1 \rightarrow 2$$

$$331 \rightarrow 662$$

TYPE

A sum of Rs. 2000 is given on at the rate of 10% compound interest, compounded annually for 2 years. Find the total amount received at the end of 2 years?

Solution:

$$10\% = \frac{1}{10} \rightarrow \frac{11}{10} \rightarrow \left(\frac{11}{10}\right)^3 \rightarrow \frac{1331}{1000} \rightarrow \frac{1331 \rightarrow ?}{1000 \rightarrow 2000} \rightarrow 1331 \times 2 = \mathbf{2662 \text{ ans}}$$

TYPE

A certain sum amounts to Rs. 2662 in 2 years at the rate of 10% compound interest, compounded annually. Find the sum?

Solution:

$$10\% = \frac{1}{10} \rightarrow \frac{11}{10} \rightarrow \left(\frac{11}{10}\right)^3 \rightarrow \frac{1331}{1000} \rightarrow \frac{1331 \rightarrow 2662}{1000 \rightarrow ?} \rightarrow 1000 \times 2 = \mathbf{2000 \text{ ans}}$$

TYPE

If a sum of Rs. 2000 amounts to Rs. 2662 in 2 years at the rate of compound interest, compounded annually. Then find the rate of interest per annum?

Solution:

$$\frac{2662}{2000} \rightarrow \frac{1331}{1000} \rightarrow \sqrt[3]{\frac{1331}{1000}} \rightarrow \frac{11}{10} \rightarrow \frac{1}{10} \rightarrow 10\%$$

TYPE

If a sum of Rs. 2000 amounts to Rs. 2662 in certain years at the rate of 10% per annum compounded annually. Find the number of years?

Solution:

$$10\% = \frac{1}{10} \rightarrow \frac{11}{10} \text{ equivalent to } \frac{2662}{2000} \rightarrow \frac{1331}{1000}$$

so $\frac{11}{10}$ become $\frac{1331}{1000}$ in 3 years

TYPE

A certain amount of money at r% compounded annually after two and three years becomes Rs. 1440 and Rs. 1728 respectively. R% is

Solution:

$$P \rightarrow 1440 \rightarrow 1728$$

difference
1728-1440
=288

$$\frac{1440}{288} \rightarrow \frac{1}{5} \rightarrow 20\%$$

TYPE

A certain amount of money earns Rs. 540 as simple interest in 3 years. If it earns a compound interest of Rs.376.20 at the same rate of interest in 2 years, find the amount (in Rupees).

Solution:

$$\frac{540}{3} \rightarrow 180 \text{ (SI 1 yr)}$$

$$\text{SI} = 360 \text{ (2 yr)}$$

$$\text{CI} = 376.2 \text{ (2 yr)}$$

$$\text{Difference} = \text{CI} - \text{SI} = 376.2 - 260 = 16.2$$

16.2 is interest on SI of 1st year. So,

$$\frac{16.2}{180} \rightarrow \frac{9}{100} \rightarrow 9\%$$

TYPE

A principal of Rs. 10000 after 2 years compounded annually, the rate of interest being 10% per annum during the first year and 12 % per annum during the second year (in rupees) will amount to

Solution:

$$1 \xrightarrow{10\% \rightarrow 1.10} 1.1 \xrightarrow{12\% \rightarrow 1.12} 1.1 \times 1.12 \rightarrow 1.232$$

If 1→10000

Then 1.232 → 12320

$$10\% \rightarrow \frac{1}{10} \rightarrow \frac{11}{10} \text{ also } 12\% \rightarrow \frac{12}{100} \rightarrow \frac{3}{25} \rightarrow \frac{28}{25}$$

$$\text{Net} = \frac{11}{10} \times \frac{28}{25} = \frac{308}{250} \rightarrow \frac{308 \times 4}{250 \times 4} \rightarrow \frac{1232}{1000} \rightarrow 12320$$

TYPE

A sum borrowed under compound interest doubles itself in 10 years. When will it become fourfold of itself at the same rate of interest?

Solution:

$$P \xrightarrow{10 \text{ yrs}} 2P \xrightarrow{10 \text{ yrs}} 4P$$

$$10 + 10 = 20 \text{ yrs}$$

Solution:

$$P \xrightarrow{2 \text{ yrs}} 4500 \xrightarrow[= \frac{3}{2} \text{ times}]{2 \text{ yrs}} 6750$$

$$P \times \frac{3}{2} = 4500 \rightarrow P = 4500 \times \frac{2}{3} = 3000$$

TYPE

Find the difference between the compound interest and the simple interest on 32,000 at 10% p.a. for 4 years.

Solution:

$$CI \rightarrow 10\% \rightarrow \frac{1}{10} \rightarrow \frac{11}{10} \rightarrow \left(\frac{11}{10}\right)^4 \rightarrow \frac{14641}{10000} \rightarrow \frac{4641(CI)}{10000}$$

$$SI \rightarrow 10\% \rightarrow \frac{1}{10} \rightarrow \frac{4}{10} \rightarrow \frac{4000(SI)}{10000}$$

$$\text{Difference} = CI - SI = 4641 - 4000 = 641$$

$$10000 \rightarrow 32000$$

$$1 \rightarrow 32/10$$

$$641 \rightarrow \frac{32}{10} \times 641 = 2051.2$$

Solution:

Rate % = 10%, time = 2 years

Effective Rate% of CI for 4 years = 46.41%

Effective Rate % of SI for 4 years = 40%

According to the question,

$$\text{Required difference} = 32000 \times (46.41 - 40)/100 = \text{Rs. } 2051.20$$

TYPE

If the difference between the compound and simple interests on a certain sum of money for 3 years at 5% per annum is Rs. 15.25, then the sum is:

Solution:

8000	$\frac{1}{20}$	400		
	$\frac{1}{20}$	400	20	
	$\frac{1}{20}$	400	40	1
		1200	60	1
		(SI)		(CI)

$$\text{Difference} = 61 \text{ units}$$

$$61 \text{ units} = \text{Rs. } 15.25$$

$$8000 \text{ units} = (15.25 \times 8000)/61 = \text{Rs. } 2000$$

$$\text{Hence, required sum} = \text{Rs. } 2000$$

Pervious year questions

1. A builder borrows Rs. 2550 to be paid back with compound interest at the rate of 4% of per annum by the end of 2 years in two equal yearly **installments**. How much will each installment be?
(a) Rs.1352 (b) Rs.1377
(c) Rs.1275 (d) Rs.1283

2. A certain amount of money at r% compounded annually after two and three years becomes Rs. 1440 and Rs. 1728 respectively 1440 and Rs. 1728 respectively. R% is
(a) 5 (b)10
(c)15 (d)20
3. A certain amount of money earns Rs. 540 as simple interest in 3 years. If it earns a compound interest of Rs.376.20 at the same rate of interest in 2 years, find the amount (in Rupees).
(a) 1600 (b)1800
(c) 2100 (d)2000
4. A certain sum amounts to Rs. 5832 in 2 years at 8%, per annum compound interest, the sum is:
(a) Rs. 5000 (b) Rs. 5200
(c) Rs. 5280 (d) Rs. 5400
5. A certain sum of money amounts to Rs. 2420 in 2 years and Rs. 2662 in 3 years at same rate of compound interest, compounded annually the rate of interest per annum is:
(a) Rs. 6% (b) Rs. 8%
(c) Rs. 9% (d) Rs. 10%
6. A certain sum will amount to Rs. 12,100 in 2 years at 10% per annum of compound interest, interest being compounded annually. The sum is :
(a) Rs.12000 (b) Rs. 6000
(c) Rs. 8000 (d) Rs. 10000
7. A certain sum, invested at 4% per annum compound interest compounded half yearly amounts is Rs. 7803 at the end of one year. The sum is:
(a) Rs. 9000 (b) Rs. 8400
(c) Rs. 7500 (d) Rs 8000
8. A certain sum, invested at 4% per annum compound interest compounded half yearly, amounts is Rs. 7803 at the end of one year. The sum is:
(a) Rs. 7000 (b) Rs. 7200
(c) Rs. 7500 (d) Rs. 7700
9. A loan of Rs. 12300 at 5% per annum compound interest, is to be repaid in two equal annual **installments** at the end of every year. Find the amount of each installment.
(a) Rs. 6651 (b) Rs. 6615
(c) Rs. 6516 (d) Rs. 6156
10. A man borrows Rs. 21000 at 10% compound interest. How much he has to pay annually at the end of each year, to settle his loan in two years?
(a) Rs. 12000 (b) Rs. 12100
(c) Rs. 12200 (d) Rs. 12300
11. A man buys a scooter on making a cash down payment of Rs. 16223 and promises to pay two more yearly **installments** of equivalent amount in next two years. If the rate of interest is 4% per annum. Compounded yearly, the cash value of the scooter, is:
(a) Rs. 40000 (b) Rs. 46824
(c) Rs. 46000 (d) Rs. 50000

12. A man invests Rs. 2000 at 5% compound interest. At the end of 3 years he will have :
- (a) Rs.2316.25 (b) Rs. Rs. 2305
(c) Rs. 2205 (d) Rs. 2315.25
13. A money-lender borrows money at 4% per annum and pays the interest at the end of the year. He lends it at 6% per annum compound interest compounded half yearly and receives the interest at the end of the year. In this way, he gains Rs. 104.50 a year. This amount of money he borrows is:
- (a) Rs. 6000 (b) Rs. 5500
(c) Rs. 5000 (d) Rs. 4500
14. A person deposited a sum of Rs. 6000 in a bank at 5% per annum simple interest. Another person deposited Rs. 5000 at 8% per annum compound interest. After two years, the difference of their interest will be:.
- (a) Rs. 230 (b) Rs. 232
(c) Rs. 832 (d) Rs. 600
15. A principal of Rs. 10000 after 2 years compounded annually, the rate of interest being 10% per annum during the first year and 12 % per annum during the second year (in rupees) will amount to
- (a) Rs.12000 (b) Rs.12320
(c) 12500 (d)21000
16. A sum becomes Rs. 1352 in 2 years at 4% per annum compound interest. The sum is:
- (a) Rs. 1225 (b) Rs. 1270
(c) Rs. 1245 (d) Rs. 1250
17. A sum becomes Rs. 2916 in 2 years at 8% per annum compound interest. The simple interest at 9% per annum for 3 years on the same amount will be
- (a) Rs. 600 (b) Rs.675
(c) Rs.650 (d) Rs. 625
18. A sum becomes Rs. 4500 after two years and Rs. 6750 after four years at the same compound interest. The sum is:
- (a) Rs. 4000 (b) Rs. 2500
(c) Rs. 3000 (d) Rs, 3050
19. A sum borrowed under compound interest doubles itself in 10 years. When will it become fourfold of itself at the same rate of interest?
- (a) 15 yrs. (b) 20yrs.
(c) 24 yrs. (d) 40 yrs.
20. A sum of money amounts to Rs. 4840 in 2 years and to Rs. 5324 in 3 years at compound interest. The rate of interests per annum is:
- (a) 10% (b) 9%
(c) 11% (d) 8%
21. A sum of money at compound interest amounts to thrice itself in 3 years. In how many years will it be 9 times itself
- (a) 9 years (b) 27 years
(c) 6 years (d)3 years
22. A sum of money at compound interest doubles itself in 15 years. It will become eight times of itself in..
- (a) 45 years (b) 48 years
(c) 54 years (d) 60 years
23. A sum of money becomes double in 3 years at compound interest compounded annually. At the same rate. In how many years will it become four times of itself?
- (a) 4 year (b) 6 year
(c) 6.4 year (d) 7.5 year
24. A sum of money becomes eight times in 3 years, if the rate is compounded annually. In how much time will the same amount at the same compound rate become sixteen times?
- (a) 6 years (b)4 years
(c)8 years (d) 5 years
25. A sum of money becomes eight-times of itself in 3 years at compound interest. The rate of interest per annum is:
- (a)100% (b) 80%
(c) 20% (d) 10%
26. A sum of money doubles itself in 4 years compound interest. It will amount to 8 times itself at the same rate of interest in:
- (a) 18 years (b) 12 years
(c) 16 years (d) 24 years
27. A sum of money invested at compound interest amounts in 3 years to Rs. 2400 and in 4 years to Rs. 2520. The interest rate per annum is:
- (a) 5 % (b) 6%
(c) 10% (d) 12%
28. A sum of money invested at compound interest amounts to Rs. 650 at the end of first year and Rs. 676 at the end of second year. The sum of money is:
- (a) Rs. 600 (b) Rs. 540
(c) Rs. 625 (d) Rs. 560
29. A sum of money invested at compound interest doubles itself in 6 years. At the same rate of interest, it will amount to eight times of itself in:
- (a) 12 years (b) 12 years
(c) 18 years (d) 10 years
30. A sum of money is paid is paid back in two annual **installments** of Rs. 17,640 each, allowing 5% compound interest compounded annually. The sum borrowed was
- (a) Rs.32800 (b) Rs.32400
(c) Rs. 32000 (d) Rs. 32200
31. A sum of money on compound interest amounts to Rs. 10648 in 3 years and Rs. 9680 in 2 years. The rate of interest per annum is:
- (a) 5% (b) 10%
(c) 15% (d) 20%
32. A sum of money placed at compound interest double itself at 2 years. The year it will take to amount 4 times itself is.
- (a) 3 (b) 4
(c) 8 (d)6
33. A sum of money placed at compound interest double itself in 4 years. In how many years will it amount to four times itself?
- (a)12 years (b) 13 years

- (c) 8 years (d) 16 years
34. A sum of money placed at compound interest doubles itself in 15 years. In how many years, it would amount to eight times of itself at the same rate of interest ?
 (a) 30 years (b) 45 years
 (c) 21 years (d) 60 years
35. A sum of money placed at compound interest doubles itself in 5 years. It will amount to eight times itself at the same rate of interest in
 (a) 15 years (b) 10 years
 (c) 12 years (d) 20 years
36. A sum of Rs. 12000 deposited at compound interest becomes double after 5 years. How much will it be after 20 years?
 (a) Rs.144000 (b) Rs. 120000
 (c) Rs.150000 (d) Rs.192000
37. A sum of Rs. 13360 was borrowed at 35/4% per annum compound interest and paid in two years in two equal annual **installments**. What was the amount of each **installments**?
 (a) Rs. 5679 (b) Rs. 7569
 (c) Rs. 7009 (d) Rs. 7500
38. A sum of Rs. 210 was taken as a loan. This is to be paid back in two equal **installments**. If the rate of interest be 10% compounded annually, then the value of each installment is
 (a) Rs.127 (b) Rs. 121
 (c) Rs. 210 (d) Rs.225
39. A sum of Rs. 3200 invested at 10% p.a. compounded quarterly amounts to Rs. 3,362. Compute the time period.
 (a) 1/2 years (b) 1 year
 (c) 2 year (d) 3/4 years
40. A sum of Rs. 6000 is deposited for 3 years at 5% per annum compound interest compounded annually. The difference of interests for 3 and 2 years will be:
 (a) Rs. 75 (b) Rs. 30.75
 (c) Rs. 330.75 (d) Rs. 375.00
41. A sum of Rs. 8000 will amount to Rs. 8820 in 2 years if the interest is calculated every year. The rate of compound interest is
 (a) 6% (b) 7%
 (c) 3% (d) 5%
42. An amount of money at compound interest grows up to Rs. 3840 in 5 years. Find the rate of interest.
 (a) 2.5% (b) 2%
 (c) 3.5% (d) 2.05%
43. An amount of money appreciates to Rs. 7,000 after 4 years and to Rs. 10000 after 8 years at a certain compound interest compounded annually. The initial amount of money was
 (a) Rs. 4700 (b) Rs. 4900
 (c) Rs.4100 (d) Rs. 4300
44. An amount of Rs. 6000 lent at 5% per annum compound interest for 2 years will become
 (a) Rs.600 (b) Rs.6600
 (c) Rs.6610 (d) Rs.6615
45. At a certain rate per annum, the simple interest on a sum of money for one year is Rs. 260 and the compound interest on the same sum for two years is Rs. 540.80. the rate of interest per annum is:
 (a) 4% (b) 6%
 (c) 8% (d) 10%
46. At what percent per annum will Rs. 3000 amounts to Rs. 3993 in 3 years if the interest compounded annually?
 (a) 9% (b) 10%
 (c) 11% (d) 13%
47. At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?
 (a) 6.5% (b) 4.5%
 (c) 6% (d) 7.5%
48. At what rate of percent of compound interest on Rs. 10000 amounts to become Rs. 13310 in 3 years is:
 (a) 13% (b) 11%
 (c) 10% (d) 12%
49. At what rate per annum will Rs. 32000 yield a compound interest of Rs. 5044 in 9 months interest being compounded quarterly?
 (a) 20% (b) 32%
 (c) 50% (d) 80%
50. At what rate per cent per annum will Rs. 2304 amount to Rs. 2500 in 2 years at compound interest?
 (a) 9/2% (b) 21/5 %
 (c) 25/6% (d) 13/3%
51. At what rate percent per annum of compound interest will a sum of money become four times of itself in two years?
 (a) 100% (b) 75%
 (c) 50% (d) 20%
52. At what rate percent per annum will a sum of Rs. 1000 amounts to Rs. 1102.50 in 2 years at compound interest?
 (a) 5% (b) 5.5%
 (c) 6% (d) 6.5%
53. Compound interest on a sum of money for 2 years at 4 per cent per annum is Rs. 2448. Simple interest on the same sum of money at the same rate of interest for 2 years will be:
 (a) Rs. 2500 (b) Rs. 2400
 (c) Rs. 2360 (d) Rs. 2250
54. Find the difference between the compound interest and the simple interest on 32,000 at 10% p.a. for 4 years.
 (a) Rs.2051.20 (b) Rs. 2050.50
 (c) Rs. 2025.20 (d) Rs. 2501.20
55. Find the rate percent per annum if Rs. 2,000 amounts to Rs. 2315.25 in a year and , interest being compounded half yearly.
 (a) 10% (b) 11.5%
 (c) 5% (d) 20%

56. If the amount is 2.25 times of the sum after 2 years at compound interest (compounded annually), the rate of interest per annum is:
 (a) 25% (b) 30%
 (c) 45% (d) 50%
57. If the amount is $27/8$ times the sum after 3 years at compound interest compounded annually, then the rate of interest per annum is:
 (a) 25% (b) 50%
 (c) $50/3\%$ (d) $100/3\%$
58. If the compound interest on a certain sum for 2 years at 3% per annum is Rs. 101.50, then the simple interest on the same sum at the same rate and for the same time will be:
 (a) Rs. 90.00 (b) Rs. 95.50
 (c) Rs. 100.00 (d) Rs. 98.25
59. If the compound interest on a certain sum for two years at 12% per annum is Rs. 2,544, the simple interest on it at the same rate for 2 year will be
 (a) Rs. 2400 (b) Rs. 2500
 (c) Rs. 2480 (d) Rs. 2440
60. If the compound interest on a sum for 2 years at $25/2\%$ per annum is Rs. 510 the simple interest on the same sum at the same rate for the same period of time is:
 (a) Rs. 400 (b) Rs. 480
 (c) Rs. 450 (d) Rs. 460
61. If the compound interest on a sum for 2 years at $25/2$ p.a. is Rs. 510 the simple interest on the same sum of the same rate for the same period of time is
 (a) Rs. 400 (b) Rs. 450
 (c) Rs. 460 (d) Rs. 480
62. If the compound interest on a sum of money for 3 years at the rate of 5% per annum is Rs. 252.20, the simple interest on the same sum at the same rate and for the same time is:
 (a) Rs. 220 (b) Rs. 240
 (c) Rs. 245 (d) Rs. 250
63. If the compound interest on certain sum for 2 years at 4% p.a. is Rs. 102, the simple interest at the same rate of interest for two years would be:
 (a) Rs. 200 (b) Rs. 50
 (c) Rs. 150 (d) Rs. 100
64. If the difference between S.I and C.I for 2 years on a sum of money lent at 5% is Rs. 6, then the sum is:
 (a) Rs. 2200 (b) Rs. 2400
 (c) Rs. 2600 (d) Rs. 2000
65. If the difference between the compound and simple interests on a certain sum of money for 3 years at 5% per annum is Rs. 15.25, then the sum is:
 (a) Rs. 2000 (b) Rs. 1000
 (c) Rs. 1500 (d) Rs. 2500
66. If the difference between the compound interest and simple interest on a sum of 5% rate of interest per annum for three years is Rs. 36.60, then sum is:
 (a) Rs. 8000 (b) Rs. 8400
 (c) Rs. 4400 (d) Rs. 4800
67. If the difference between the compound interest, compounded every six months, and the simple interest on a certain sum of money at 12% of rate per annum for one year is Rs. 36, the sum is:
 (a) Rs. 10000 (b) Rs. 12000
 (c) Rs. 15000 (d) Rs. 9000
68. If the difference between the simple and compound interests on a sum of money for 2 years at 4% per annum is Rs. 800, the sum is:
 (a) Rs. 50000 (b) Rs. 500000
 (c) Rs. 100000 (d) Rs. 10000
69. If the rate of interest be 4% per annum for first year, 5% per annum for second year and 6% per annum for third year, then the compound interest of Rs. 10000 for 3 years will be:
 (a) Rs. 1600 (b) Rs. 1625.80
 (c) Rs. 1575.20 (d) Rs. 2000
70. In how many years will a sum of Rs. 800 at 10% per annum compound interest, compounded semi-annually becomes Rs. 926.10?
 (a) $3/2$ years (b) $5/3$ years
 (c) $7/3$ years (d) $5/2$ years
71. In how many years will Rs. 2,000, amounts to Rs. 2420 at 10% per annum compound interest?
 (a) 3 years (b) $5/2$ years
 (c) 2 years (d) $3/2$ years
72. In what time will Rs. 1000 amounts to Rs. 1331 at 20% per annum, compounded half yearly?
 (a) $3/2$ years (b) 2 years
 (c) 1 year (d) $5/2$ years
73. In what time will Rs. 1000 becomes Rs. 1331 at 10% per annum compounded annually?
 (a) 3 years (b) $5/2$ years
 (c) 2 years (d) $7/2$ years
74. In what time will Rs. 64,000 amount to Rs. 68921 at 5% per annum interest being compounded half yearly?
 (a) $3/2$ years (b) 2 years
 (c) 3 years (d) $5/2$ years
75. Kamal took Rs. 6800 as a loan which along with interest is to be repaid in two equal annual installment. If the rate of interests is $25/2\%$, compounded annually, then the value of each installment is:
 (a) Rs. 8100 (b) Rs. 4150
 (c) Rs. 4050 (d) Rs. 4000
76. On a certain principal the compound interest compounded annually for the second year at 10% per annum is Rs 132. The principal is
 (a) Rs. 1250 (b) Rs. 1200
 (c) Rs. 1000 (d) Rs. 1320
77. On a certain sum of money the compound interest for 2 years is Rs. 282.15 and the simple interest for the same period of time is Rs. 270. The rate of interest per annum is:
 (a) 6.07% (b) 10%
 (c) 9% (d) 12.15%

78. On a certain sum of money, the difference between the compound interest for a year, payable half yearly. And the simple interest for a year is Rs. 56. If the rate of interest in both cases is 16%, then the sum is:
 (a) Rs.1080 (b) Rs.7805
 (c) Rs. 8750 (d) Rs.5780
79. On a certain sum of money, the difference between the compound interest for a year, payable half yearly, and the simple interest for a year is Rs. 180. If the rate of interest in both the cases is 10%, then the sum is:
 (a) Rs.60000 (b) Rs.72000
 (c) Rs. 62000 (d) Rs. 54000
80. On what sum does the difference between the compound interest and the simple interest for 3 years at 10% is Rs. 31?
 (a) Rs.1500 (b) Rs.1200
 (c) Rs. 1100 (d) Rs.1000
81. On what sum of money will the different between S.I and C.I for 2 years at 5% per annum be equal to Rs.25
 (a) Rs.10000 (b) Rs. 10500
 (c) Rs. 9500 (d) Rs. 9000
82. On what sum of money will the difference between simple interest and compound interest for 2 years at 5% per annum be equal to Rs 63
 (a)23200 (b)29200
 (c) 25200 (d)31200
83. Sita deposited Rs. 5000 at 10% simple interest for 2 years. How much more money will Sita have in her account at the end of two years. If it is compounded semiannually.
 (a)Rs. 50 (b) Rs. 40
 (c) Rs. 77.50 (d) Rs. 85.50
84. The amount on Rs. 25000 in 2 years at annually compound interest. If the rates for the successive years be 4% and 5% per annum respectively is:
 (a) Rs.26800 (b) Rs.27300
 (c) Rs.28500 (d) Rs.30000
85. The compound interest on 12000 for 9 months at 20% per annum, interest being compounded quarterly is:
 (a) Rs.1891.30 (b) Rs.2089.70
 (c) Rs.2130 (d) Rs.1750
86. The compound interest on a certain sum for two successive years are Rs. 225 and Rs. 238.50. The rate of interest per annum is :
 (a) 15/2% (b)5%
 (c)10% (d)60%
87. The compound interest on a certain sum of money at 5% per annum for 2 years is Rs. 246. The simple interest on the same sum for 3 years at 6% per annum is:
 (a) Rs. 435 (b) Rs. 450
 (c) Rs. 430 (d) Rs. 432
88. The compound interest on a certain sum of money at a certain rate for 2 years is Rs. 40.80 and the simple interest on the same sum is Rs. 40 at the same rate and for the same time. The rate of interest is:
 (a) 2% per annum (b) 3% per annum
 (c) 4% annum (d) 5% per annum
89. The compound interest on a certain sum of money at a certain rate per annum for two years is Rs. 2,050 and the simple interest on the same amount of money at the same rate for 3 years is Rs. 3000. Then the sum of money is :
 (a) Rs.20000 (b) Rs. 18000
 (c) Rs. 21000 (d) Rs. 25000
90. The compound interest on a certain sum of money for 2 year at 5% is Rs. 328, then the sum is :
 (a) Rs. 3000 (b) Rs. 3600
 (c) Rs.3200 (d) Rs. 3400
91. The compound interest on a certain sum of money for 2 years at 10% per annum is Rs. 420. The simple interest on the same sum at the same rate and for the same time will be:
 (a) Rs. 350 (b) Rs.375
 (c) Rs.380 (d) Rs.400
92. The compound interest on a certain sum of money for 2 years at 5% per annum is Rs. 410. The simple interest on the same time is
 (a) Rs. 400 (b) Rs. 300
 (c) Rs. 350 (d) Rs.405
93. The compound interest on a certain sum of money invested for 2 years at 5% per annum is Rs. 328. The simple interest on the sum, at the same rate and for the same period will be:
 (a) Rs. 320 (b) Rs. 308
 (c) Rs. 300 (d) Rs. 287
94. The compound interest on a sum of money for 2 years is Rs. 615 and the simple interest for the same period is Rs. 600. Find the principal.
 (a) Rs.6500 (b) Rs.6000
 (c) Rs. 8000 (d) Rs. 9500
95. The compound interest on Rs. 10000 in 2 years at 4% per annum, the interest being compound half-yearly is:
 (a)Rs.636.80 (b) Rs. 824.32
 (c) Rs. 912.86 (d) Rs. 825.82
96. The compound interest on Rs. 16000 for 9 months at 20% per annum, interest being compounded quarterly is:
 (a) Rs. 2520 (b) Rs. 2524
 (c) Rs. 2522 (d) Rs. 2518
97. The compound interest on Rs. 2000 in 2 years if the rate of interest is 4% per annum for the first year and 3% per annum for the second year, will be:
 (a) Rs. 142.40 (b) Rs. 140.40
 (c) Rs. 141.40 (d) Rs. 143.40
98. The compound interest on Rs. 30000 at 7% per annum for a certain time is Rs. 4347. The time is:
 (a) 3 years (b) 4 years
 (c) 2 years (d)2.5 years
99. The compound interest on Rs. 5,000 for 3 years at 10% p.a. will amount to.

- (a) Rs.1654 (b) Rs.1655
(c) Rs. 1600 (d) Rs. 1565
- 100.** The compound interest on Rs. 6000 at 10% per annum for $3\frac{1}{2}$ years, when the interest being compounded annually is:
(a) Rs. 910 (b) Rs. 870
(c) Rs. 930 (d) Rs. 900
- 101.** The compound interest on Rs. 8000 at 15% per annum for 2 years 4 months, compounded annually is?
(a) Rs. 2800 (b) Rs. 3091
(c) Rs. 3109 (d) Rs. 3100
- 102.** The difference between compound and simple interest on a certain sum for 3 years at 5% per annum is Rs. 122. The sum is:
(a) Rs. 16000 (b) Rs. 15000
(c) Rs. 12000 (d) Rs. 10000
- 103.** The difference between compound interest and simple interest on a sum for 2 years at 8% is Rs. 768. The sum is:
(a) Rs. 100000 (b) Rs. 110000
(c) Rs. 120000 (d) Rs. 170000
- 104.** The difference between compound interest and simple interest on a certain sum of money at 10% per annum for 2 years is Rs. 40. The sum is:
(a) Rs. 4000 (b) Rs. 3600
(c) Rs. 4200 (d) Rs. 3200
- 105.** The difference between compound interest and simple interest on Rs. 2500 for 2 years at 4% per annum is :
(a) Rs. 40 (b) Rs. 45
(c) Rs. 14 (d) Rs. 4
- 106.** The difference between simple and compound interest compounded annually on a sum of money for 2 years at 10% per annum is Rs. 65. The sum is:
(a) Rs. 65650 (b) Rs. 65065
(c) Rs. 6565 (d) Rs. 6500
- 107.** The difference between simple and compound interest compounded annually on a certain sum of money for 2 years at 4% per annum is Rs. 1. The sum in Rs. Is:
(a) 650 (b) 630
(c) 625 (d) 640
- 108.** The difference between simple and compound interest on a certain sum of money for 2 years at 4% annum is Rs. 10. The sum of money is:
(a)Rs. 6000 (b) Rs. 6250
(c) Rs. 5600 (d) Rs. 6500
- 109.** The difference between simple and compound interest on a sum of money at 4% per annum for 2 years is Rs. 8. The sum is:
(a) Rs. 400 (b) Rs. 800
(c) Rs. 4000 (d) Rs. 5000
- 110.** The difference between simple interest and compound interest of a certain sum of money at 20% per annum for 2 years is Rs. 48. Then the sum is:
(a) Rs.1000 (b) Rs.1200
(c) Rs. 1500 (d) Rs.2000
- 111.** The difference between the compound and the simple interest of a sum for 2 years at 10% per annum, when the interest is compounded annually, is Rs. 28. If the yearly interest were compounded half yearly, the difference in the two interest will be:
(a) Rs. 44 (b) Rs. 28.35
(c) Rs. 43.41 (d) Rs. 43.29
- 112.** The difference between the compound interest and simple interest on Rs. 10000 for 2 years is 25. The rate of interest per annum is:
(a)5% (b) 7%
(c) 10% (d)12%
- 113.** The difference between the compound interest and simple interest for the amount Rs. 5000 in 2 years is Rs. 32. The rate of interest is:
(a)5% (b)8%
(c) 10% (d)12%
- 114.** The difference between the compound interest and simple interest on a certain sum for 2 years at 10% per annum is Rs. 300. Find the sum.
(a) Rs. 31000 (b)31500
(c) 30000 (d)30500
- 115.** The difference between the compound interest and the simple interest on a certain sum at 5% per annum for 2 years is Rs. 1.50. The sum is
(a) Rs. 600 (b) Rs. 500
(c) Rs. 400 (d) Rs. 300
- 116.** The difference between the compound interest compounded annually and the simple interest on a sum of Rs. 1000 at a certain rate of interest for 2 years is Rs. 10. The rate of interest per annum is:
(a) 5% (b) 6%
(c) 10% (d) 12%
- 117.** The difference between the simple and compound interest on a certain sum of money at 5% rate of interest per annum for 2 years is Rs. 15. Then the sum is:
(a) 6500 (b) 5500
(c) 6000 (d) 7000
- 118.** The difference between the simple and compound interest on a certain sum of the money for 2 years at 4% per annum is Rs. 4. The sum is:
(a) Rs. 2500 (b) Rs. 2400
(c) Rs. 2600 (d) Rs. 2000
- 119.** The principal, which will amount to Rs. 270.40 in 2 years at the rate of 4% per annum compound interest is:
(a) Rs. 200 (b) Rs. 225
(c) Rs. 250 (d) Rs. 220
- 120.** The simple interest and compound interest on a certain sum of money with a given rate for a period of 2 years are Rs. 900 and Rs. 954 respectively. The sum of money is:
(a) Rs. 3700 (b) Rs. 3650
(c) Rs. 3850 (d) Rs. 3750

Principal	Amount
20	21
20	21
20	21
<hr/>	<hr/>
8000	9261

1261 →

According to the question,

1261 units = Rs. 11261

1 unit = Rs. 1261/1261 = Rs. 1

8000 units = 8000 × 1 = Rs. 8000

Thus, Hence Required Principal = Rs. 8000

8. (c) Rate% = 4% time = (t₁) = 1 year

Amount = Rs. 7803

When interest is compounded half-yearly

New Rate% = 4/2 = 2%

Time = 1 × 2 = 2 years

Required Rate% for 2 years CI

= 2 + 2 + (2 × 2)/100 = 4.04%

According to the question,

(100 + 4.04)% of sum = Rs. 7803

Sum = 7803/104.04 × 100 = Rs. 7500

Alternate:

Time = 2 years,

Rate% = 4/2, 2% = 1/50

Principal	Amount
50	51
50	51
<hr/>	<hr/>
2500	2601

+101
units

According to the question,

2601 units = Rs. 7803/2601 = Rs. 3

2500 units = Rs. 3 × 2500 = 7500 Rs.

Thus, Hence Sum = Rs. 7500

9. (b)

5% = 1/20 = 21/20 (21 → Installment, 20 = Principal)

Year	Principal	Installment
→ I	20 ₂₁	→ 21 ₂₁ (i)
→ II	400	→ 441 (ii)

Since Installment is equal hence multiply equation (i) by 21

→ total principal = 420 + 400 = 820 units

→ 820 units → Rs. 15

→ 441 units → Rs. 6615

→ Each installment

= Rs. 6615

10. (b) Principal = Rs. 21000

Rate = 10% = 1/10 = 11/10 (11 → Installment, 10

→ Principal)

Principal	Installment
10 ₁₁	11 ₁₁
100	121

Note: Installment will be equal in both cases. So equate the installment.]

Principal	Installment
10 ₁₁	11 ₁₁
<hr/>	<hr/>
100	121
210	121

Principal

10₁₁

100

↓ +

100

210

Installment

11₁₁

121

121

121

According to the question,

210 units = Rs. 21000

1 unit = Rs. 21000/210 = Rs. 100

121 units = 121 × 100 = Rs. 12100

Alternate:

Rate → 10% = 1/10

Each installment of 2 years

→ 10/11 × (10 + 11)/11 × Installment = P.A.

= 21000

Each installment = 12100

Method

R = 10%

= 1/10 → 10/(10 + 1) → 10/11 (10 = a, 11 = b)

Installment for 2 year

= a/b × (a + b)/b × Installment = P.A.

Note: Each installment for three years

= a/b³ (a² + ab + b²) × Installment = P.A.

11. (b) Time = 2 years

Rate % = 4%

= 1/25 = 26/25 (26 → Installment, 25 = Amount)

	Amount	Installment
1 st year →	25 ₂₆	26 ₂₅
2 nd year →	625	676

Note: Installment is same in both cases. Hence,

equal the installment

Hence, after that new ratio,

	Amount	Installment
1 st year →	650	676
2 nd year →	625	676
	<hr/>	<hr/>
	1275	

676 units = Rs. 16224

1 unit = Rs. 24

1275 units = 24 × 1275 = Rs. 30600

Total amount = Rs. (30600 + 16224)

= 46824

12. (d) Principal = Rs. 2000,

Rate % = 5% = 1/20

Time = 3 years

Principal	Amount
20	21
20	21
20	21
<hr/>	<hr/>
8000	9261

According to the question,

676 units = Rs. 16224

1 unit = Rs. 24

1275 units = 24 × 1275 = Rs. 30600

Total amount = Rs. (30600 + 16224)

= 46824

12. (d) Principal = Rs. 2000,

Rate % = 5% = 1/20

Time = 3 years

Principal

20

20

20

8000

Amount

21

21

21

9261

According to the question,

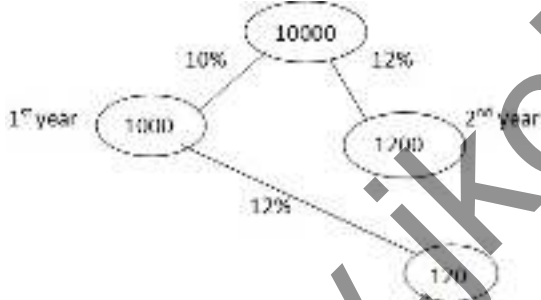
8000 units = Rs. 2000
 1 unit = Rs. 2000/8000
 9261 units = Rs. 2000/8000 × 9261
 = Rs. 2315.25

13. (c) Rate (R_1) = 4%, $t = 1$ years
 Case I: Rate (%) = 4%
 Case II: When interest is compounded half-yearly
 New Rate% = $6/2 = 3\%$
 Time (t_2) = $1 \times 2 = 2$ years
 Effective Rate % for 2 years
 = $3 + 3 + (3 \times 3)/100 = 6.09\%$
 Difference in Rates = $(6.09 - 4)\%$
 = 2.09%

According to the question,
 2.09% of sum = Rs. 104.50
 Sum = $104.50/2.09 \times 100 = \text{Rs. } 5000$

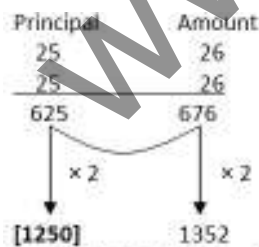
14. (b) Principal (P_1) = Rs. 6000
 Rate % = 5 %
 $t = 2$ years
 Simple Interest = $(6000 \times 5 \times 2)/100$
 Rs. 600
 Principal (P_2) = 5000,
 Rate% = 8%, $t = 2$ years
 2 years effective Rate for CI
 = $8 + 8 + (8 \times 8)/100 = 16.64\%$
 Compound interest = $5000 \times 16.64/100$
 = Rs. 832
 Difference = Rs. $(832 - 600) = \text{Rs. } 232$

15. (b) $P = \text{Rs. } 10000$
 $t = 2$ years
 $R_1 = 10\%$, $R_2 = 12\%$



Amount = Principal + CI
 Amount = $10000 + (1000 + 1200 + 120)$
 = 12320

16. (d) $4\% \frac{1}{25} = \frac{26}{25} (26 \rightarrow \text{Amount, } 25 \rightarrow \text{Principal})$



17. (b) Amount = Rs. 2916
 Time = 2 years
 Rate % = 8 %
 Effective Rate % of CI for 2 years
 = $8 + 8 + (8 \times 8)/100 = 16.64\%$

Required sum = $2916/(100 + 16.64) \times 100$
 = Rs. 2500
 Required Simple Interest = $(2500 \times 9 \times 3)/100 = \text{Rs. } 675$

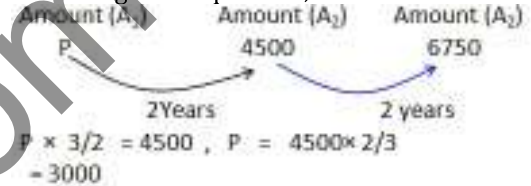
18. (c) Amount (A_1) = Rs. 4500
 $t_1 = 2$ years
 Amount (A_2) = Rs. 6750
 $t_2 = 4$ years
 Let the Rate % = $R\%$
 Principal = Rs. P
 According to the question,
 Case (i) $4500 = P(1 + R/100)^2$ (i)
 Case (ii) $6750 = P(1 + R/100)^4$ (ii)
 By dividing equation (ii), by equation (i)
 $6750/4500 = (1 + R/100)^2$
 $3/2 = (1 + R/100)^2$ (iii)
 From equation (i) & (ii)
 $4500 = P \times 3/2$
 $P = \text{Rs. } 3000$

Hence, Required Principal = Rs. 3000
 Alternate:

Note: In such type of questions to save your valuable time follow the given below method.

Let principal = Rs. P

According to the question,



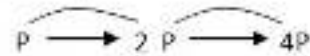
Hence, Required principal = Rs. 3000

19. (B) Note: For detailed follow the previous question solution.

Principal : Amount Time (years)
 1 : 2^2 10

$$2^2 - 1 = 4 \quad [20 \text{ years}]$$

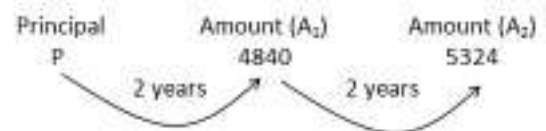
Alternate: 10 yrs 10 yrs



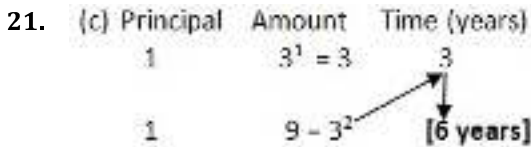
Time = $2 \times 10 = 20$ years

Hence, Principal amount will be four times itself in 20 years

20. (a) Amount (A_1) = Rs 4840
 Amount (A_2) = Rs. 5324
 Let the principal = Rs. P



Required Rate%
 = $(5324 - 4840)/4840 \times 100 = 10\%$



Hence, Required time = 6 years

22. (a) Note: In such type of questions to save your valuable time follow the given below method.



Hence, required time = 45 years

Alternate:

(1) Let Principal = P

Amount = 2 P

Case (I) By using formula,

$$2P = P (1 + R/100)^{15} \dots\dots\dots (i)$$

Case (II) : Let after n years it will become 8 times

$$8P = P (1 + R/100)^n \dots\dots\dots(ii)$$

From equation (i)

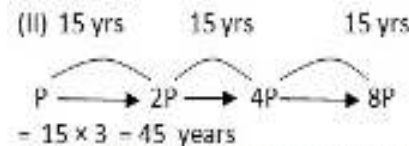
$$2 = (1 + R/100)^{15}$$

Cubing both sides

$$(2)^3 = (1 + R/100)^{45} \dots\dots\dots (iii)$$

thus, Here n = 45 years

Alternate :

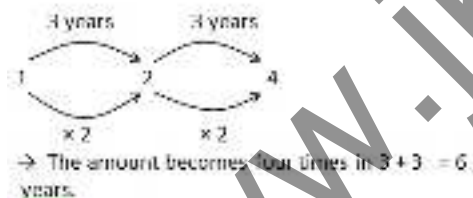


23. Note : Amount will be same in the same period of time.

(b) Year	Principal	Amount
3	1 →	2
6	2 →	4

→ The amount becomes fourtimes in 6 years.

Alternate:



24. (b) Let the principal = P,

Case I: Time = 3 years,

Amount = 8 P

$$8P = P (1 + R/100)^3$$

$$(2)^3 = (1 + R/100)^3$$

Talking cube root of both sides,

$$2 = (1 + R/100)$$

$$\rightarrow R = 100\%$$

Case II: Let after t years it will be 16 times

$$16P = P (1 + R/100)^t$$

$$16 = (2)^t$$

$$(2)^4 = (2)^t$$

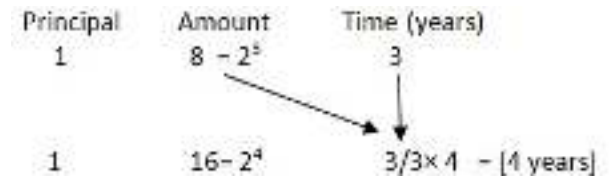
$$t = 4 \text{ years}$$

Hence, Required time (t) = 4 years

Alternate

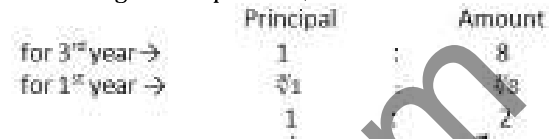
Note: In such type of questions to save your valuable

time follow the given below method.



25. (a) Let Principal = 1 unit
 Thus, Amount = $1 \times 8 = 8$ units

According to the question,



$$\text{Required Rate \%} = 1/1 \times 100 = 100\%$$

26. (b) Let Principal = P,
 Rate = R%, t = 4 years

Thus, Amount = 2P,

$$\text{Case(I): } 2P = P (1 + R/100)^4$$

$$2 = (1 + R/100)^4 \dots\dots\dots(i)$$

Case (ii): Let after t years it will be 8 times

$$8P = P (1 + R/100)^t$$

$$(2)^3 = (1 + R/100)^t \dots\dots\dots (ii)$$

By using equation (i) & equation (ii)

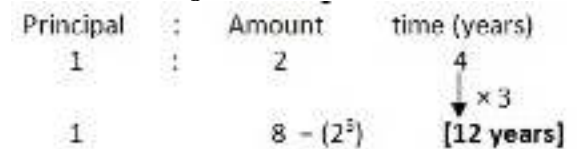
$$(1 + R/100)^{12} = (1 + R/100)^t$$

By comparing both sides,

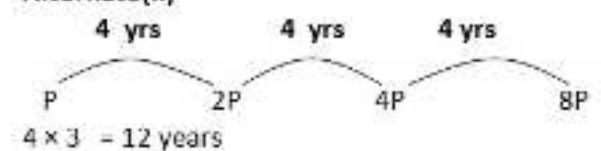
$$t = 12 \text{ years}$$

Alternate:

Note: In such type of questions to save your valuable time follow the given below method.



Alternate(II)



27. (a) Amount (A₁) Amount (A₂)

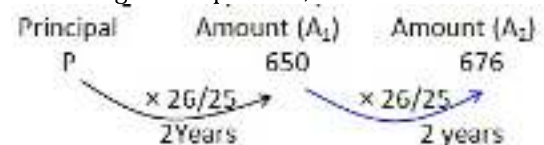
2400 2520

+ 120

$$\text{Required Rate \%} = 120/2400 \times 100 = 5\%$$

28. (c) Let the principal = P

According to the question,



Note: In compound interest amount increase in same ratio.

$$P \times 26/25 = 650$$

$$P = (650 \times 25)/26 = \text{Rs. } 625$$

Hence, Required Principal = Rs. 625
 29. (c) Principal : Amount : time (years)
 1 : 2 : 6
 $2^3 - 8$ [18 years]

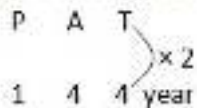
30. (a) $5\% = 1/20$
 1st year Amount 20×22 Installation 21×22
 2nd year 400 441
 Make Installment Same
 1st year 420 441
 2nd year 400 441
 820 882
 $\times 40$ $\times 40$
 32800 Ans. 17640

31. (b) Let Rate % = R%
 Let Principal = Rs. P
 According to the question,



Required rate% = $(10648 - 9680)/9680 \times 100 = 0\%$

32. (b) According to the question



33. (c) 4 yrs 4 yrs
 P → 2P → 4P
 $= 2 \times 4 = 8$ years

34. (b) Note: For detailed solution of such type of question follow the solution of previous question, Let Principal = 1 unit



35. (a)
 [5] [25] [45] [85]
 Sum 2 times 2 times 2 times
 8 times
 in [15 years] (5 + 5 + 5)

Year	Principal	Amount
5	1 →	2
10	2 →	4
15	4 →	8
20	8 →	16

(d) Amount after 20 years = 16×12000
 = Rs. 192000

37. (b) Rate of interest = (r)
 $= 35/4\% \rightarrow 7/80 \rightarrow 87/80$ (87 = Installment, 80 = Principal)

Year	Principal	Ins
→ I	80×80	→
→ II	6400	→

Thus, Each installment = 7569

38. (b) Principal = Rs. 210
 Rate% = 10% = $1/10 = (1 \rightarrow \text{Installment}, 10 \rightarrow \text{Principal})$

Principal	Installment
10×11	11×11
100	121

Note: Installment is same in both cases. So equate the installment.

Principal	Installment
110	121
100	121
210	121

According to the question,

210 units → Rs. 210
 1 unit → Rs. 1
 121 units → $1 \times 121 = \text{Rs. } 121$
 Hence, required value of installment = Rs. 121

Alternate:

Rate of Interest = 10% = $1/10$
 Each installment for 2 years = $10/11 \times (10 + 11)/11 \times \text{Installment} = \text{P.A.}$

→ $10/11 \times 21/11 \times \text{Installment} = 210$
 → Installment = 121

Method: Rate = 10%
 $= 1/10 = 11/10$ (b → 11, 10 → a)

For 2 years
 $= a/b \times (a + b)/b \times \text{Installment} = \text{P.A.}$

For 3 years
 $= a/b^3 (a^2 + b^2 + ab) \times \text{Installment} = \text{P.A.}$

39. (a) Rate% = 10%

Let time = t years
 Principal = Rs. 3200
 Amount = Rs. 3362

Note: When interest is calculated quarterly.

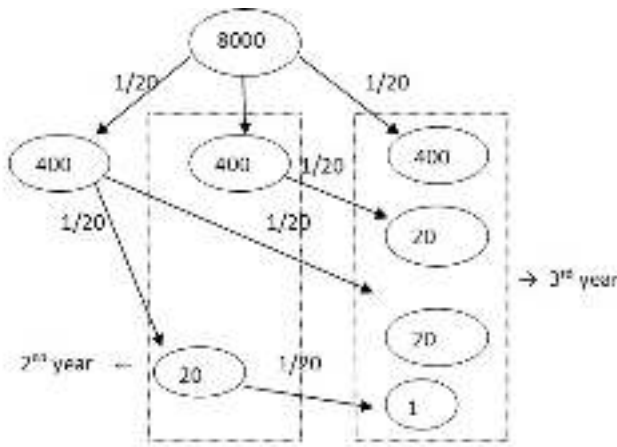
New Rate % = $10/4 = 2.5\%$

Time = 4t

By using formula,
 $3362 = 3200(1 + 2.5/100)^{4t}$
 $3362/3200 = (41/40)^{4t}$
 $\rightarrow 1681/1600 = (41/40)^{4t}$
 $\rightarrow 1681/1600 = (41/40)^{4t}$
 $\rightarrow (41/40)^2 = (41/40)^{4t}$

On comparing both sides
 $4t = 2 \rightarrow t = 1/2$ years

40. (c) Rate % = $1/20$, time = 3 years
 Let Principal = $(20)^3$ 8000 units



Difference of interest for 3 years and 2 years $(400 + 20 + 20 + 1) = 441$

According to the question,

8000 units = Rs. 6000

1 unit = Rs. $6000/8000$

41 units = Rs. $6000/8000 \times 441 = \text{Rs. } 330.75$

41. (d) Principal = Rs. 8000

Amount = Rs. 8820

Let Rate % = R_1

Time = 2 years

By using formula,

$$8820 = 8000 (1 + R/100)^2$$

$$8820/8000 = (1 + R/100)^2$$

$$441/400 = (1 + R/100)^2$$

Taking square root of both sides

$$21/20 = (1 + R/100)$$

$R = 5\%$

42. (a) Let the principal = Rs. P and the Rate of Interest = R%



Difference = Rs. 96

$$\text{Required Rate\%} = 96/3840 \times 100 = 2.5\%$$

43. (b) Let Principal = Rs. P

Principal : Amount (A_1) : Amount (A_2)

$$(A_2)/(A_1) = 10000/7000 = 10/7$$

Note: Amount will increase in multiple,

$$\text{Thus, } P \times 10/7 = 7000$$

$P = \text{Rs. } 4900$

Thus, Hence required principal = Rs. 4900

44. (d) Amount = $6000 (1 + 5/100)^2$

$$\rightarrow \text{Amount} = 6000 \times 21/20 \times 21/20$$

$$\rightarrow \text{Amount} = \text{Rs. } 6615$$

45. (c) SI for 1 year = Rs. 260

SI for 2 years

$$= 26 \times 2 = \text{Rs. } 520$$

Difference in (CI - SI)

$$(540.80 - 520) = \text{Rs. } 20.8$$

$$\text{Required Rate\%} = 20.8/260 \times 100 = 8\% \text{ Rs.}$$

46. (b) Note: For detailed solution of such type of questions, check the solution of previous question.

	Amount	Principal
	3000	3993
3 rd year \rightarrow	$\sqrt[3]{1000}$	$\sqrt[3]{1331}$
1 st year \rightarrow	10	11

$+ 1 \text{ units}$

$$\text{Rate\%} = 1/10 \times 100 = 10\%$$

47. (c) $A = P (1 + R/100)^n$

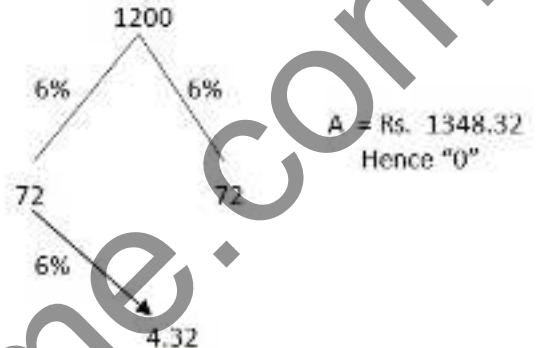
$$1348.32 = 1200 (1 + R/100)^n$$

$$134832/120000 = (1 + R/100)^2$$

$$2809/2500 = (1 + R/100)^2$$

$$53/50 = 1 + R/100 = R = 6\%$$

Or Choose with options



48. (c) $A = P (1 + 1/100)^3$

$$1331/1000 = (1 + R/100)^3$$

$$(11/10)^3 = (1 + R/100)^3$$

$$11/10 - 1 = R/100 = 1/10$$

$R = 10\%$

Alternate:

$$A/\sqrt[3]{1331} : P/\sqrt[3]{1000}$$

$$11 : 10$$

$+ 1$

$$\text{So rate} = 1/10 \times 100 = 10\%$$

49. (a) Principal = Rs. 32000

CI = Rs. 5044

$$\text{Amount} = (32000 + 5044) = \text{Rs. } 37044$$

Time = 9 month, Let Rate = R %

Interest is being compounded quarterly

$$\text{Time} = 9 \times 4/12 = 3$$

$$\text{Rate\%} = 4 R\%$$

According to the question,

	Principal	Amount
	32000	37044
3 rd year \rightarrow	8000	9261
1 st year \rightarrow	20	21

$+ 1$

$$\text{Required Rate\%} = 1/20 \times 100 = 5\%$$

$$\text{New Rate\%} = 4 R\% = 4 \times 5 = 20\%$$

50. (c) Principal = Rs. 2304,

Amount = Rs. 2500

Time = 2 years,

Let Rate% = R%

By using formula,

$$2500 = 2304 (1 + R/100)^2$$

$$2500/2304 = (1 + R/100)^2$$

$$(25/24)^2 = (1 + R/100)$$

By taking square root of both sides,

$25/24 = (1 + R/100)$
 $R/100 = 25/24 - 1$
 $\rightarrow R = 100/24 = 25/6 \%$
 Rate = $25/6 \%$
 Alternate:

	Principal	:	Amount
for 2 nd year \rightarrow	2304	:	2500
for 1 st year \rightarrow	24	:	25

$\xrightarrow{+1}$

Required rate% = $1/24 \times 100$
 = $25/6$

Required rate% = $1/24 \times 100$
 = $25/6$

51. (a) Principal Amount
 1 \rightarrow 4

$\rightarrow 4 = 1(1 + r/100)^2$
 $\rightarrow 4 = (1 + r/100)^2$

Alternate:

	Principal	:	Amount
\rightarrow	1	:	4
\rightarrow	1	:	2

\rightarrow Rate of interest = $(2 - 1)/1 \times 100$
 = 100%

52. (a) In these type of questions go through options to save your valuable time.

Option (a) \rightarrow Rate of interest = 5 %
 \rightarrow Amount = Principal $(1 + \text{Rate}/100)^n$
 $\rightarrow 1102.5 = 1000(1 + 5/100)^2$
 $\rightarrow 1102.5/1000 = 441/400$
 $\rightarrow 1.1025 = 1.1025$
 \rightarrow L.H.S. = R.H.S.

Option (a) is correct.

53. (b) Time (t) = 2 years,
 Rate % = 4%

Effective rate of CI for 2 years
 = $4 + 4 + (4 \times 4)/100 = 8.16 \%$
 Effective Rate of SI for 2 years = 8%

According to the question,
 8.16% of sum = Rs. 2448
 1% of sum = Rs. $2448/8.16 \times 8 =$ Rs. 2400

54. (c) Rate % = 10%, time = 2 years

Effective Rate% of CI for 4 years = 46.41%
 Effective Rate % of SI for 4 years = 40%
 According to the question,
 Required difference = $32000 \times (46.41 - 40)/100 =$
 Rs. 2051.20

55. (a) According to the question,
 Amount = $P [1 + R/(2 \times 100)^3]$
 = $2315.25 = 2000(1 + R/200)^3$
 $= 2315.25/2000 = (1 + R/200)^3$
 $= 231525/20000 = (1 + R/200)^3$
 $= 1 + R/200 = 21/20 = R = 10 \%$

56. (d) Let the principal
 = Rs. P,
 Time = 2 years
 Amount = 2.25P

Let Rate = R %
 By using formula = $P(1 + R/100)^2$
 $225/100 = (1 + R/100)^2$
 $(15/10)^2 = (1 + R/100)^2$
 $R/100 = 15/10 - 1$
 $\rightarrow R/100 = 5/10$

Alternate:

Note: In such type of questions to save your valuable time follow the given below method.

3 rd year \rightarrow	$\sqrt[3]{1000}$:	$\sqrt[3]{1331}$
1 st \rightarrow	10	:	11

$\xrightarrow{+1 \text{ units}}$

Rate % = $1/10 \times 100 = 10 \%$

57. (b) Let the principal = 8 units
 Thus, Amount = $8 \times 27/8 = 27$ units

	Principal	:	Amount
3 rd year \rightarrow	8	:	27
1 st year \rightarrow	8	:	27
1 st year \rightarrow	2	:	3

$\xrightarrow{+1 \text{ unit}}$

Required Rate% = $1/2 \times 100 = 50 \%$

58. (c) CI for year = Rs. 101.50, Rate% = 3 %

Effective Rate : of CI for 2 year
 $3 + 3 + (3 \times 3)/100 = 6.09 \%$
 Effective Rate% of SI for 2 years
 = $3 + 3 = 6 \%$

According to the question,
 Simple interest = $101.50/6.09 \times 100$

59. (a) Rate % = 12%

Time = 2 years
 Effective Rate% of CI for 2 years
 = $12 + 12 + (12 \times 12)/100$
 = 25.44%

Effective Rate % of SI for 2 year = $12 \times 2 = 24 \%$

According to the question,
 Required SI = $2544/25.44 \times 24 =$ Rs. 2400
 Required Sum = Rs. 2400

60. (b) Rate% = $25/2\% = 1/8 = 9/8$ (9 \rightarrow Amount, 8 \rightarrow Principal)

Principal	Amount
8	9
<u>8</u>	<u>9</u>
64	81

$\xrightarrow{+17 \text{ units}}$

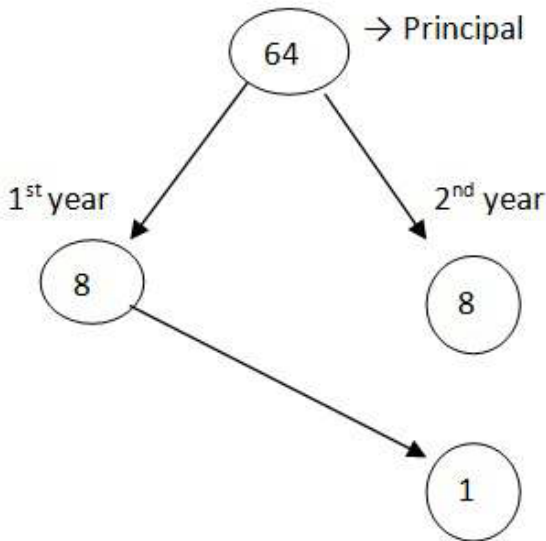
According to the question,

17 units = Rs. 510
 1 unit = Rs. 30
 64 units = Rs. $30 \times 64 =$ Rs. 1920
 Hence, Principal = Rs. 1920
 SI for 2 years
 = $25/2 \times 2 = 25 \%$
 Required SI = $(1920 \times 25)/100 =$ Rs. 480
 Hence, Required SI = Rs. 480

Alternate :

Note: In such type of questions to save your valuable time follow the given below method.

Let principal = $(8)^2 = 64$ units



C for 2 years = $(8 + 8 + 1) = 17$ units

SI for 2 years = $(8 + 8) = 16$ units

According to the question,

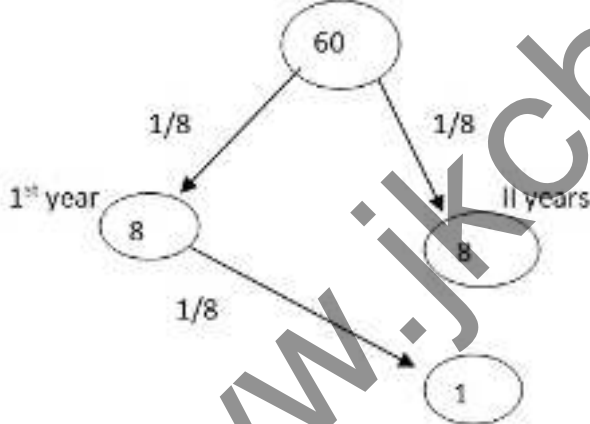
174 units = Rs. 510

1 units = Rs. $510/17 = \text{Rs. } 30$

16 units = Rs. $30 \times 16 = \text{Rs. } 30$

61. (d) Rate % = $25/2\% = 1/8$

Let the principal = $(8)^2 = 64$ units



C.I. = $(8 + 8 + 1) = 17$ units

S.I. = $(8 + 8) = 16$ units

According to the question,

17 units → Rs. 510

1 Unit → Rs. 30

16 units → $30 \times 16 = \text{Rs. } 480$

Thus, Simple Interest = Rs. 480

62. (b) Rate % = 5 %

Time = 3 years

Compound Interest = Rs. 252.20

Effective Rate % of CI for 3 years

= 15.7625%

Effective Rate % of SI for 3 years = $5 \times 3 = 15\%$

Required SI = $252.20/15.7625 \times 15 = 240$

63. (d) Time = 2 years,

Rate = 4 %

Compound Interest = Rs. 102

Note: $[CI \text{ for } 2 \text{ years} = R + R + (R \times R)/100]$

Where R → Rate of interest

Combined Rate% o CI for 2 years

= $4 + 4 + (4 \times 4)/100 = 8.161\%$

SI for two years

= $2 \times 4 = 8\%$

According to the question,

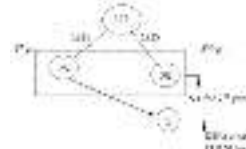
SI for 2 years

= $102/8.16 \times 8 = \text{Rs. } 100$

Alternate:

Rate = 4 % $1/25$

Principal = $(25)^2 = 625$



CI for 2 years = $(25 + 25 + 1) = 51$ Units

SI for 2 years = $(25 + 25) = 50$

According to the question, 51 Units = Rs. 102

1 units = Rs. $102/51 = \text{Rs. } 2$

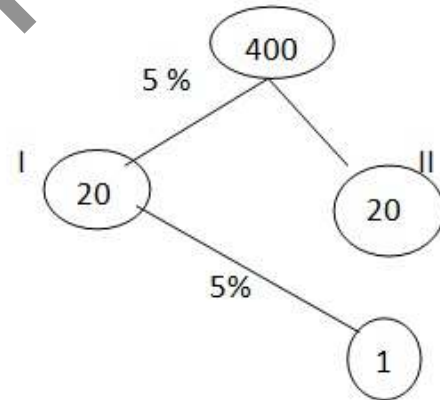
2 units = Rs. $50 \times 2 = \text{Rs. } 100$

Hence, SI for 2 years

= Rs. 100

64. (b) Rate of interest = 5 % = $1/20$

Let principal = $(20)^2 = 400$



→ 1 unit → Rs. 6

→ 400 units → Rs. 2400

→ Principal → Rs. 2400

65. (a) Time = 3 years, Rate = 5%

Difference between CI & SI = Rs. 15.25

Effective Rate% CI in 3 years = 15.7625%

Effective Rate % SI in 3 years = $5 \times 3 = 15\%$

According to the question,

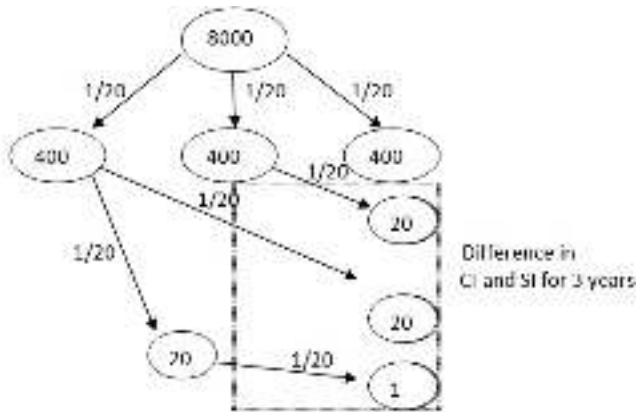
$(15.7625 - 15)\%$ of sum = Rs. 15.25

Sum = $15.25/0.7625 \times 100 = \text{Rs. } 2000$

Alternate:

Rate% = 5 % = $1/20$

Let total principal = $(20)^3 = 8000$ units



According to the question,

61 units = Rs. 15.25

8000 units = $(15.25 \times 8000) / 61 = \text{Rs. } 2000$

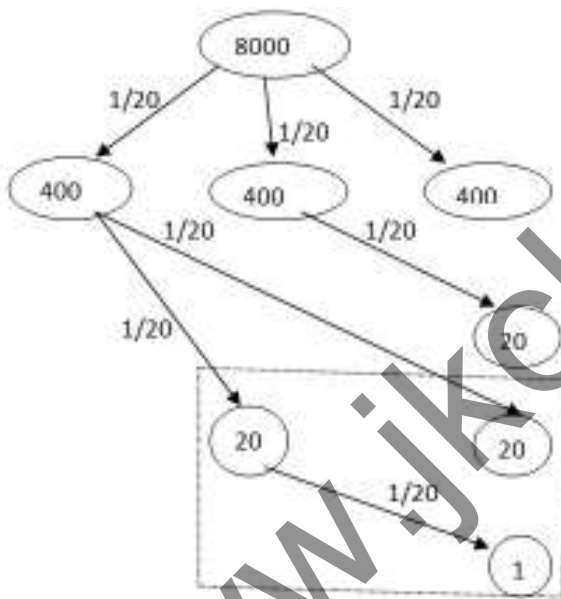
Hence, Required sum = Rs. 2000

66. (d) $5\% = 1/20$

Let sum = $(20)^3 = 8000$ units

Time = 3 years

Note: In this question time is 3 years hence so for making calculation easier we assumed sum 8000 units.



According to the question,

61 units = Rs. 36.60

8000 units = Rs. $36.60 \times 8000 / 61$

Sum = Rs. 4800

Hence, Required sum = Rs. 4800

Alternate:

Note: In such type of questions to save your valuable time follow the given below method.

Rate % = 5%

Effective Rate of CI for 3 years

= 15.76.25%

Effective Rate of SI for 3 years

= $5 \times 3 = 15\%$

According to the question,

$(15.7625 - 15)\%$ of sum = Rs. 36.60

0.7625% of sum = Rs. 36.60

Sum = $36.60 / 0.7625 \times 100 = \text{Rs. } 4800$

67. (a) Case I: SI for 1 years = $6 + 6 = 12\%$

Case II: CI is compounded half yearly

Rate = $12/2 = 6\%$

$t = 1 \times 2 = 2$

Effective Rate% for 2 half year = $6 + 6 + (6 \times 6) / 100 = 12.36\%$

According to the question, $(12.36 - 12)\% = \text{Rs. } 36$
1% of sum = $36 / 0.36$

100% of sum = $36 / 0.36 \times 100 = \text{Rs. } 10000$

68. (b) Rate % = 4%

Time = 2 years

Difference between CI and SI = Rs. 10

Difference = $R^2 / 100 = (4)^2 / 100 = 0.16\%$

0.16% of sum = Rs. 800

Sum = $800 / 0.16 \times 100 = \text{Rs. } 500000$

69. (c) $R_1 = 4\%$, $R_2 = 5\%$, $R_3 = 6\%$

$4\% = 1/25$, $5\% = 1/20$, $6\% = 3/50$

Principal	Amount
25	26
20	21
50	53
25000	28938

According to the question,

25000 units = 10000

1 unit = $10000 / 25000 = 0.4$

3938 units = $0.4 \times 3938 = \text{Rs. } 1575.20$

70. (a) Effective rate for half year = $10/2 = 5\%$

Time = $2n$ years

$\rightarrow 926.10 = 800 (1 + 5/100)^{2n}$

$\rightarrow 926.10 / 800 = (21/20)^{2n}$

$\rightarrow (21/20)^3 = (21/20)^{2n}$

$\rightarrow 2n = 3 \rightarrow n = 3/2$

\rightarrow Required time = $3/2$ years

71. (c) Principal = Rs. 2000

Amount = Rs. 2420

Rate % = 10%

By using formula,

$2420 = 2000 (1 + 10/100)^n$

$2420 / 2000 = (1 + 1/10)^n$

$121/100 = (11/10)^n$

$(11/10)^2 = (11/10)^n$

$n = 2$ years

Hence, Required time

= 2 years

Alternate :

Note: In such type of questions to save your valuable time follow the given below method.

Principal : Amount
 Ratio → 2000 : 2420
 100 : 121

Rate = 10% = 1/10

Principal : Amount
 1st year → 10 : 11
 2nd year → 10 : 11
 Ratio → 100 : 121

Note: Now after 2nd year both the principal and amount will be in the same ratio

Hence, required time = 2 years

72. (a) Principal (P) = Rs. 1000

Amount (A) = Rs. 1331

Rate % = 20%

Let Required time = t years

According to the question,

Note: When interest is compounded half-yearly,

Rate % = 20/2 = 10%

Time = 2t years

By using formula,

$$1331 = 1000 (1 + 10/100)^{2t}$$

$$1331/1000 = (11/10)^{2t}$$

$$(11/10)^3 = (11/10)^{2t}$$

By equating both sides

$$2t = 3 \rightarrow t = 3/2 \text{ years}$$

73. (a) Principal = Rs. 1000

Amount = Rs. 1331

Rate = 10%

Let time = n year

By using formula,

$$\text{Amount} = \text{Principal} (1 + R/100)^n$$

$$1131 = 100 (1 + 10/100)^n$$

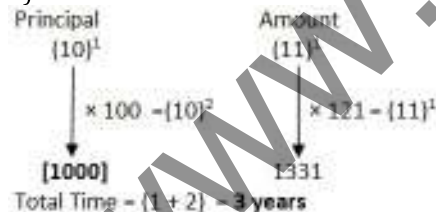
$$1331/1000 = (11/10)^n$$

$$(11/10)^3 = (11/10)^n$$

$$n = 3 \text{ years}$$

Hence, Required time = 3 years

Alternate: Rate% = 10% = 11/10 (11 → A, 10 → P)



74. (a) According to the question,

$$\text{Amount} = P [1 + R/(2 \times 100)]^{2 \times t}$$

$$\rightarrow 68921 = 64000 [1 + 5/2 \times 100]^{2 \times t}$$

$$= 68921/64000 = (1 + 5/40)^{2 \times t}$$

$$\rightarrow (41/40)^3 = (41/40)^{2 \times t}$$

$$\rightarrow 2t = 3 \rightarrow t = 3/2$$

75. (c) Rate of interest r = 25/2% = 1/8

Year	Principal	Installment
→ I	8 _{x9}	9 _{x9}
→ II	64	81

Since, Installment is equal hence multiply equation

(i) by 9

→ Total principal = 72 + 64 = 136 units

136 units → 6800

1 unit → 50

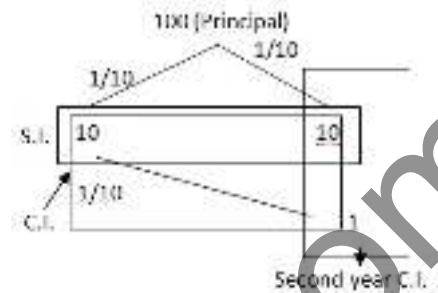
81 units → 4050

→ Each installment = Rs. 4050

76. (b) Let the principal = Rs. 10

According to the question,

$$R = 10\% = 1/10$$



2nd year C.I interest = 11 units

11 units - 132

1 unit - 12

100 units - 12 × 100 = 1200

77. (c) CI for 2 years = Rs. 282.15

SI for 2 years = Rs. 270

SI for 1 years = 270/2 = Rs. 135

Difference between CI and SI = (282.15 - 270) = Rs. 12.15

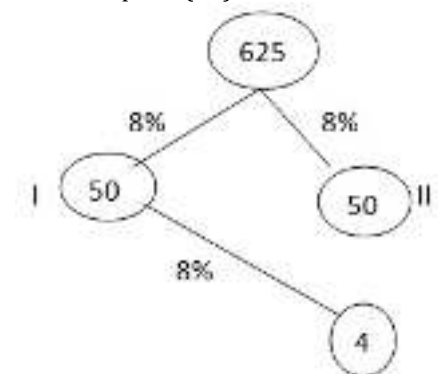
Required Rate % = 12.15/135 × 100 = 9%

Note: Always remember for first year CI and SI will be same.

78. (c) When the money is compounded half yearly the effective rate of interest for 6 months = 16/2 = 8%

$$= 2/25$$

$$\text{Let Principal} = (25)^2 = 625$$



→ 4 units → 56

→ 1 unit → 14

→ Principal → 14 × 625 = Rs. 8750

79. (b) Rate % = 10%, Time = 1 year

Case (I): When interest is calculate yearly, Rate% = 10%

Case (II): When interest in calculated half yearly.

→ New Rate % = 10/2 = 5%

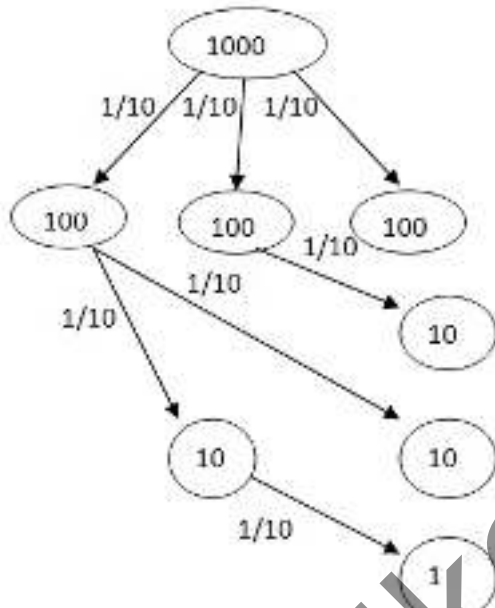
Time = 1 × 2 = 2 years

→ Effective Rate % = 5 + 5 + (5 × 50)/100 = 10.25%

Different in rates = (10.25 - 10)% = 0.25%

According to the question,
 0.25% of sum = Rs. 180
 Sum = $180/0.25 \times 100 = \text{Rs. } 72000$

80. (d) Time = 3 years
 Rate = 10%
 CI for 2 years = $10 + 10 + (10 \times 10)/100 = 21\%$
 CI for 3 years = $10 + 21 + (21 \times 10)/100 = 33.1\%$
 SI for 3 years
 = $3 \times 10 = 30\%$
 Difference in CI and SI = $(33.1 - 30)\% = 3.1\%$
 According to the question,
 3.1% of sum = Rs. 31
 1% of sum = Rs. $31/3.1$
 Sum = Rs. $31/3.1 \times 100 = \text{Rs. } 1000$
 Alternate:
 $10\% = 1/10$
 Let Principal = $(10)^3 = 1000$ units



SI for 3 years = $100 \times 3 = 300$ units
 CI for 3 years = $(100 \times 3 + 10 \times 3 + 1) = 331$ units
 Difference = $(331 - 300) = 31$ units
 According to the question,
 31 units = Rs. 31
 1 unit = Rs. 1

1000 units = Rs. $1 \times 1000 = \text{Rs. } 1000$
 Hence, Required sum = Rs. 1000

81. (a) Rate % = 5% , time = 2 years
 Effective Rate % of CI for 2 years
 = $5 + 5 + (5 \times 5)/100 = 10.25\%$
 Effective Rate % of SI for 3 years
 = $2 \times 5 = 10\%$

According to the question,
 $(10.25 - 10)\%$ of sum = Rs. 25
 Sum = $25/0.25/100 = \text{Rs. } 10000$

82. (c) For 2 years
 Difference between C.I and S.I.
 $\rightarrow C.I - S.I. = P (P/100)^2$
 $\rightarrow 63 = P \times (5/100)^2$
 $\rightarrow 63 \times 20 \times 20 = P$
 $\rightarrow \text{Principal} = \text{Rs. } 25200$
 Therefore P.A = Rs. 25200

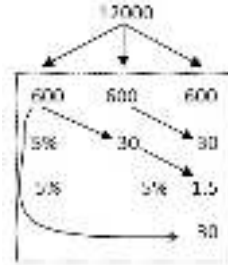
83. (c) Principal = Rs. 5000
 Rate % = 10%
 Time = 2 years
 SI for 2 years = $(5000 \times 2 \times 10)/100 = \text{Rs. } 1000$
 Note: When interest is compounded semi annually,
 New Rate % = $10/2 = 5\%$
 Time = $2 \times 2 = 4$ years
 Effective Rate % of for 4 years
 = 21.55%
 Required CI = $(5000 \times 21.55)/100$
 = Rs. 1077.53
 Thus, Required amt. = Rs. $(1077.53 - 1000) = \text{Rs. } 77.53$

84. (b) With smart approach
 \rightarrow Principal Amt. = Rs. 25000
 \rightarrow Time = 2 years
 $\rightarrow R_1 = 4\%$, $R_2 = 5\%$ Annually
 $\rightarrow 4\% = 1/25$, $5\% = 1/20$

P.A.	Amount
25	26
20	21
<hr/>	
500	546
$\downarrow \times 50$	$\downarrow \times 50$
25000	[27300]

So amount will be Rs. 27300
 after 2 years

85. (a) P.A. = Rs. 12000
 Thus, Interest being compounded quarterly
 effective R% = $20/4 = 5\%$
 \rightarrow Time = $9/12 = 3/4 \times 4 = 3$ years

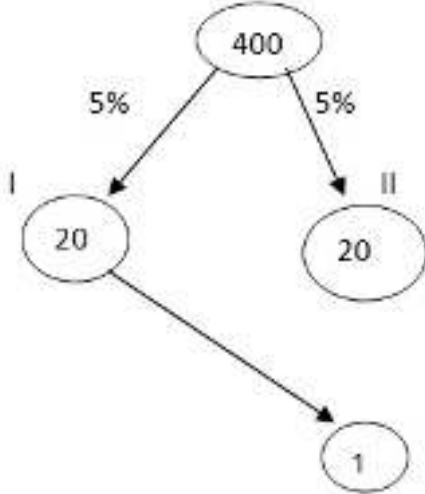


\rightarrow Total CI will be = Rs. 1891.50

86. (d) Required Rate %
 = $(238.50 - 225)/225 \times 100 = 6\%$
 87. (d) Effective Rate of CI for 2 years
 = $5 + 5 + (5 \times 5)/100 = 10.25\%$
 Effective Rate of SI for 3 years = $6 \times 3 = 18\%$
 According to the question,
 Required SI = $246/10.25 \times 18 = 432$
 88. (c) Difference In CI and SI for 2 years
 = $(40.80 - 40) = \text{Rs. } 0.80$
 SI for first year = $40/2 = \text{Rs. } 20$
 Required Rate % = $0.80/20 \times 100 = \%$
 89. (a) SI for 3 years = Rs. 3000
 SI for 2 years = Rs. $3000/3 \times 2 = \text{Rs. } 2000$

SI for 1 year = Rs. 1000
 CI for 2 years = Rs. 2050
 Required difference = (2050 - 2000)
 = Rs. 50
 Required Rate% = $50/1000 \times 100 = 5\%$
 According to the question,
 5% of sum = 1000
 Sum = $1000/5 \times 100 = \text{Rs. } 20000$

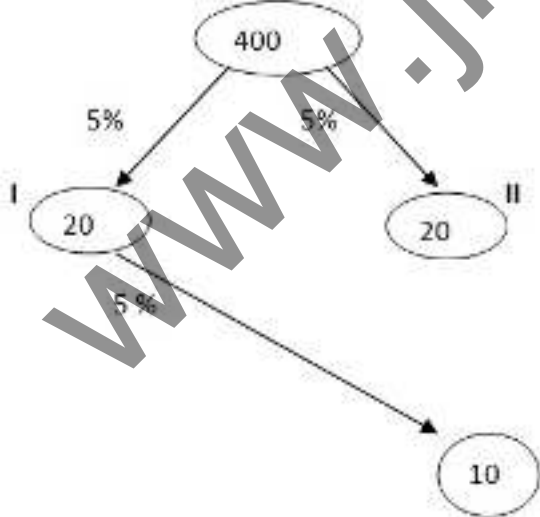
90. (c) Rate of interest 5% = $1/20$
 Let principal = $(20)^2 = 400$ units



→ Total interest = 41 units → Rs. 328
 1 unit → Rs. 8
 400 units → Rs. 3200
 → Principal = Rs. 3200

91. (d) Time = 2 year, Rate % = 10%
 Effective Rate% of CI for 2 year = $10 + 10 + (10 \times 10)/100$
 Effective Rate% of SI for 2 years = $2 \times 10 = 20\%$
 Required SI = $420/21 \times 20 = 400$ Rs.

92. (a) Rate of interest = 5% = $1/20$
 Let principal = $(20)^2 = 400$ units



→ Total compound interest
 41 units → Rs. 410
 1 unit → Rs. 10
 40 units → Rs. 400
 → Total simple interest = Rs. 400

Alternate

Total compound interest for 2 years at 5% p.a. = $5 + 5 + (5 \times 5)/100$
 = 10.25%

Total simple interest = 10%

→ 10.25% → 410

→ 10% → 400

→ Simple interest = Rs. 400

93. Rate % = 5%

Time = 2 years

SI for 2 years = $5 \times 2 = 10\%$

CI for 2 years = 10.25%

According to the question,

Required SI = $328/10.25 \times 10 = 320$

94. (b) Compound Interest - Simple Interest

$615 - 600 = \text{Rs. } 15$

Simple interest for one year = $600/2 = \text{Rs. } 300$

→ Rate of interest = $15/300 \times 100$

= 5%

→ Principal = Rs. 6000

95. (b) Principal = Rs. 10000

Time = 2 years

Rate % = 4%

When the interest is compounded half-yearly, time

= $2 \times 2 = 4$

Rate = $4/2\% = 2\%$

By using formula,

Amount = $10000 \times (1 + 2/100)^4$

Amount : Rs. 10824.32

Compound interest = Amount - Principal

CI = Rs. $(10824.32 - 10000) = 824.32$

Alternate :

CI for 2 year

= $2 + 2 + (2 \times 2)/100 = 4.04\%$

CI for 4 year

= $4.04 + 4.04 + (4.04 \times 4.04)/100$

= $8.08 + 0.1632 = 824.32\%$

According to the question,

CI = $10000 \times 8.2432/100$

= 824.32

96. (c) Principal = Rs. 16000

Rate% = 20%

Time = 9 months

When interest is being compounded quarterly,

Time = $9/12 \times 4 = 3$

Rate = $20/4\% = 5\% = 1/20$

Principal	Amount
20	21
20	21
20	21
8000	9261

+ 1261

According to the question,

8000 units = Rs. 16000

1 unit = Rs. 2

1261 units = Rs. 2×1261

= Rs. 2522

97. (a) 4% = $1/25$, 3% = $3/100$

	Principal	Amount
First year →	25	26
2 nd year →	100	103
	2500	2678

+ 178

According to the question,
 2500 units = Rs. 2000
 1 unit = Rs. 2000/2500
 178 units = Rs. 2000/2500 × 178
 = Rs. 142.40

Alternate:

Principal = Rs. 2000,

Time = 2 years

1st year Rate % = 4 %

IInd year % = 3%

Total CI = (80 + 64 + 2.4) = Rs. 142.40

98. (c) Principal = Rs. 30000

CI = Rs. 4347,

Rate% = 7 %

By using formula,

$$\rightarrow (3000 + 4347) = 30000 (1 + 7/100)^t$$

$$34347 = 3000 (1 + 7/100)^t$$

$$\rightarrow 34347/3000 = (107/100)^t$$

$$\rightarrow (11449/10000) = (107/100)^t$$

$$\rightarrow (107/100)^2 = (107/100)^t$$

t = 2 years

99. (b) Principal = Rs. 5000

Time = 3 years, Rate % = 10% = 1/10

Principal	Amount
10	11
10	11
10	11
1000	1331

331 units

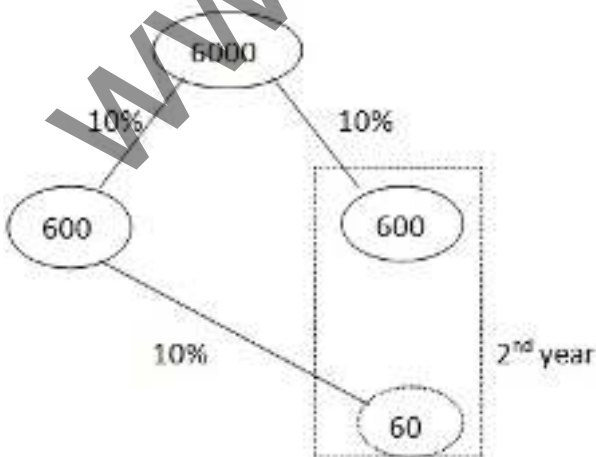
1000 units = Rs. 5000

1 unit = Rs. 5

331 units = 331 × 5 = Rs. 1655

100 (c) P = Rs. 6000, Rate % = 10%

Time (t₁) = 3/2 years



2nd year CI = 660

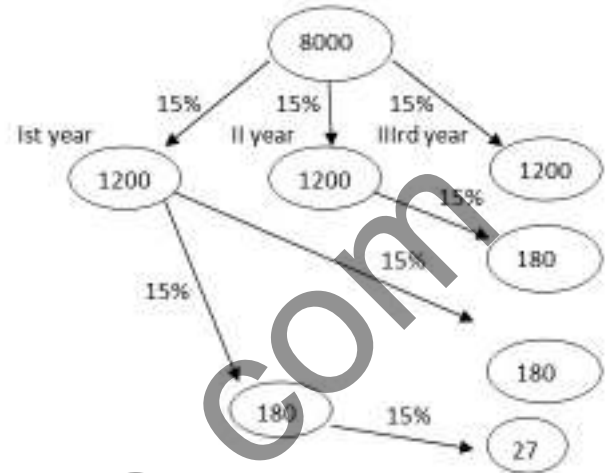
6 months 2nd year CI = 330

Total CI = (600 + 330) = 930

101 (c) Principal = Rs. 8000,

Rate = 15%

Time = 2 years 4 months



12 month CI for 3rd year

$$= (1200 + 180 \times 2 + 27)$$

$$= (1200 + 360 + 27)$$

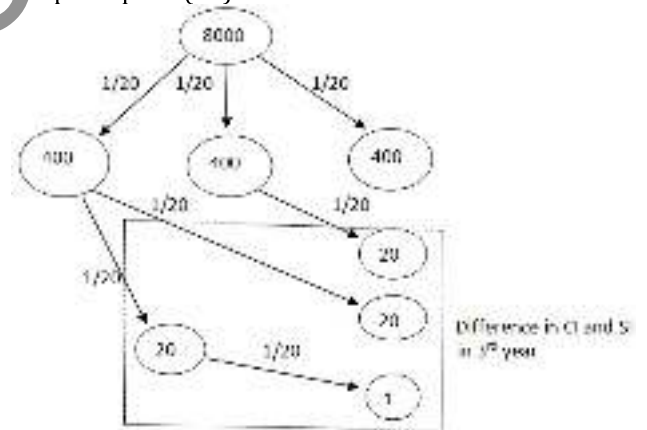
12 months CI for 3rd year

$$= 1587/12 \times 4 = 529$$

Total CI = (1200 × 2 + 180 + 529) = Rs. 3109

102 (a) Rate % = 5%, Time = 3 years

Let principal = (20)³ = 8000 units



According to the question,

$$(20 + 20 + 20 + 1) \text{ units} = \text{Rs. } 122$$

61 unit = Rs. 2

8000 units = Rs. 2 × 8000 = Rs. 16000

Thus, Hence Required sum = Rs. 16000

103 (c) Rate % = 8%, Time = 2 years

Effective Rate% of CI for 2 year

$$= 8 + 8 + (8 \times 8)/100 = 16.64\%$$

According to the question,

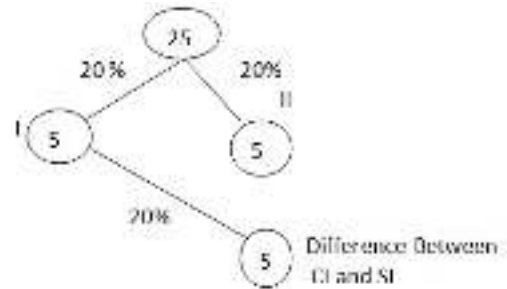
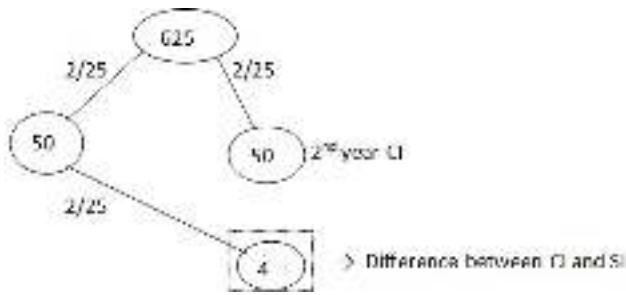
0.64% of sum = Rs. 768

$$\text{Sum} = 768/0.64 \times 100 = \text{Rs. } 120000$$

Alternate:

Rate = 8% 8/100 = 2/25

$$\text{Let sum} = (25)^2 = 625 \text{ units}$$



According to the question,
 4 units = Rs. 768
 1 unit = Rs. 192
 625 units = Rs. 192 × 625
 = Rs. 120000

- 104** (a) Rate % = 10%, Time = 2 years
 Effective Rate% of CI for 2 years
 $= 10 + 10 (10 \times 10)/100 = 21\%$
 Effective Rate % of SI for 2 years
 $= 10 + 10 = 20\%$
 Difference in Rate % = $(21 - 20)\% = 1\%$

According to the question,
 1 % of sum = Rs. 40
 Sum = Rs. 40/1 × 100 = Rs. 4000

- 105** (d) Note: For detailed solution check earlier question solution of same type.
 Rate% for 2 years CI.
 $= 4 + 4 + (4 \times 4)/100 = 8.16\%$
 Rate% for 2 years SI = $(4 + 4) = 8\%$
 Required difference = $(8.16 - 8)\% = 0.16\%$
 Required difference = $2500 \times 0.16/100 = Rs. 4$

Alternate:
 For t = 2 years
 $CI - SI = P (R/100)^2$
 $= 2500 (4/100)^2 = Rs. 4$

- 106** (d) Rate% = 10%
 Time = 2 years
 Rate % for 2 year compound interest
 $= 10 + 10 + (10 \times 10)/100 = 20\%$
 Rate for 2 years SI = $10 + 10 = 20\%$
 Difference in Rate % = $(21 - 20) = 1\%$
 1% of sum = Rs. 65
 Sum = $65/1 \times 100 = Rs. 6500$

- 107** (C) Required difference = $R^2/100\%$
 $= 4^2/100\% = 0.16\%$
 According to the question,
 0.16% of sum = Rs. 1
 Sum = $1/0.16 \times 100 = Rs. 625$

- 108** (b) Rate% = 4%
 Time = 2 years
 Difference between CI and SI = Rs. 10
 Difference = $R^2/100 = (4)^2/100 = 0.16\%$
 0.16% of sum = Rs. 10
 Sum = $10/0.16 \times 100 = Rs. 6250$
 Hence, Required sum = Rs. 6250

- 109** (d) Required sum = $8/0.16 \times 100 = Rs. 5000$

- 110** (b) Rate of interest = $20\% = 1/5$
 Let Principal = $(5)^2 = 25$

→ 1 unit → Rs. 48
 → Principal = $48 \times 25 = Rs. 1200$

- 111** (c) Time = 2 years, Rate = 10%
 Case I: When interest compounded annually
 2 years CI Rate % = $10 + 10 + (10 \times 10)/100 = 21\%$
 2 years SI Rate % = $10 + 10 = 20\%$
 According to the question,
 $(21 - 20)\%$ of sum = Rs. 28
 Sum = $29/1 \times 100 = Rs. 2800$
 Case II: When interest is compounded half - yearly
 Rate = $10/2 = 5\%$
 Time = $2 \times 2 = 4$
 Effective Rate % of CI for 2 half yearly
 $= 5 + 5 + (5 \times 5)/100 = 10.25\%$
 Effective Rate % of CI for 4 half yearly
 $= 10.25 + 10.25 + (10.25 \times 10.25)/100 = 20.50 + 1.050625 = 21.55\%$
 Effective rate % of SI for 4 years = $5 \times 4 = 20\%$
 Difference in Rate% = $(21.55 - 20) = 1.55\%$
 Required difference = $1.55/100 \times 2800 = 43.4$
 Hence, Required Difference = Rs. 43.4

- 112** (a) For 2 year
 $D/P = (r/100)^2$
 Where D = Difference between CI and SI
 P = Principal
 R = Rate of Interest
 $\rightarrow 25/10000 = r^2/10000$
 $\rightarrow r^2 = 25 \rightarrow r = 5\%$

- 113** (b) Principal = Rs. 5000, Time = 2 years
 Let Rate = R%
 Difference between CI and SI
 Rs. 32
 By using formula,
 Principal = $(\text{difference} \times 100^2)/R^2$
 $5000 = 32 \times 100^2/R^2$
 $R^2 = (32 \times 10000)/5000 = 64$
 $= R = 8\%$

Hence, Required Rate% = 8 %

- 114** (c) Rate% = 10%, Time = 2 years
 Effective Rate% of CI for 2 years = $10 + 10 (10 \times 10)/100 = 21\%$
 Effective Rate % of SI for 2 year
 $= 2 \times 10 = 20\%$
 Account to the question,
 1 % of sum = Rs. 300
 Sum = Rs. 30000

- 115** (a) Required difference Rate % = $R^2/100 = 5^2/100 = 0.25\%$
 Required sum = $1.50/0.25 \times 100 = Rs. 600$

116 (c) Note : In such type of questions use given below formula, when 2 years CI and SI difference is given.
 [Principal = (Difference × 100²)/R²]
 Where R = Rate %
 Principal = Rs. 1000,
 Time = 2 years,
 Difference = Rs. 10,
 Put the value in formula,
 $1000 = (10 \times 100^2)/R^2$
 $1000 = (100000)/R = 10\%$
 Alternate : Note : We can also solve it by using options.

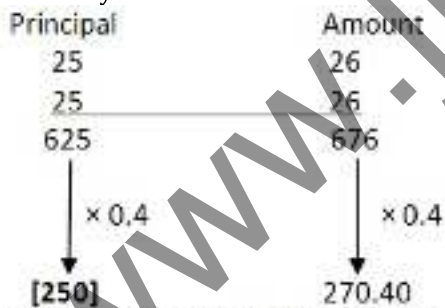
Option(c): Rate % = 10%
 SI for 2 years = $10 \times 2 = 20\%$
 CI for 2 years = $10 + 10 + (10 \times 10)/100$
 Difference in Rates = $(21 - 20) = 1\%$
 Required difference = $1000 \times 1/100 = \text{Rs. } 10$
 Hence, The difference between CI and SI is same as mentioned in question, Hence, Option (c) is correct.

117 (c) SI for = 2 years = $5 + 5 + (5 \times 5)/100 = 10.25\%$
 Difference = $(10.25 - 10)\% = 0.25\%$
 0.25% of sum = Rs. 15
 Sum = $15/0.25 \times 100 = 15 \times 10000/25$
 Sum = Rs. 6000
 Alternate:

Note: In such type of questions always remember the difference between CI and SI for 2 years = $r^2/100\%$
 Difference = $(5)^2/100 = 0.25\%$
 Hence, Required sum = $15/0.25 \times 100 = \text{Rs. } 6000$

118 (a) Difference = $R^2/100 = (4)^2/100 = 0.16\%$
 According to the question,
 0.16% of sum = Rs. 4
 Sum = $4/0.16 \times 100 = \text{Rs. } 2500$

119 (c) $4\% = 1/25 = 26/25$ (26 → Amount, 25 → Principal)
 Time = 2 years



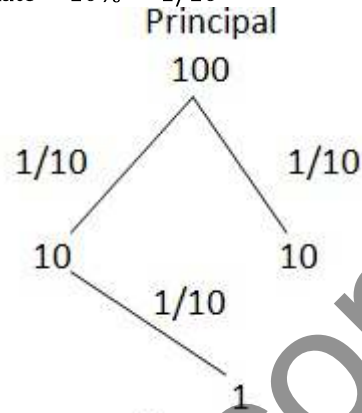
Hence, Required Principal = Rs. 250

120 (d) SI for 2 years = Rs. 900
 SI for 1 year = $900/2 = \text{Rs. } 450$
 CI for 2 years = Rs. 954
 Difference between CI for SI = $(954 - 900) = \text{Rs. } 54$
 Required Rate% = $54/450 \times 100 = 12\%$
 Required sum = $450/12 \times 100 = \text{Rs. } 3750$

121 (d) Rate% = 4% = Time (t_1) = 2 years
 SI for 2 years = $4 \times 2 = 8\%$
 CI for 2 year = $4 + 4 + (4 \times 4)/100$

= 8.16%
 Required CI = $80/8 \times 8.16 = \text{Rs. } 81.6$

122 (a) Let the principal = Rs. 100
 According to the question,
 Rate = $10\% = 1/10$



Interest = 21
 Principal = 100
 Amount = $21 + 100 = 121$
 121 units 2420
 1 unit $2420/121$
 100 units $2420/121 \times 100 = 2000$
 Thus, Principal = Rs. 2000

123 (a) Let the time = T years,
 Rate % = 10%
 Note: When interest is calculated semi-annually.
 New time = 2t years
 Rate % = $10/2 = 5\%$
 By using formula,
 $92610 = 80000 (1 + 5/100)^{2t}$
 $= 9261/8000 = (21/20)^{2t}$
 $= (21/20)^3 = (21/20)^{2t}$
 Comparing both sides,
 $2t = 3 \rightarrow t = 3/2$ years

124 Rate of depreciation = 4% = $1/25$

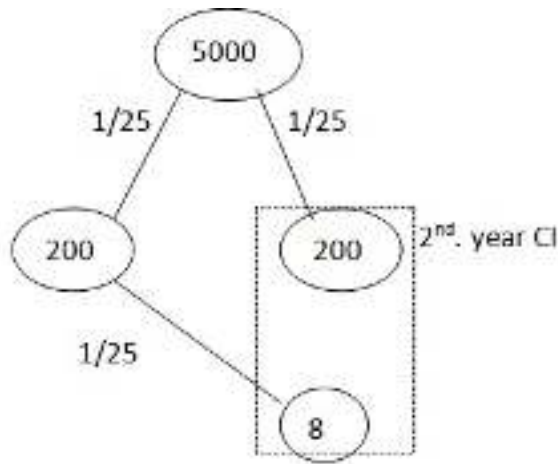
Year	Value at the beginning	Value at the end
I	25	24
II	625	576

→ 625 units → 62500
 → 1 units → 100
 → 576 units → 57600

Present value of motor bike = Rs. 57600

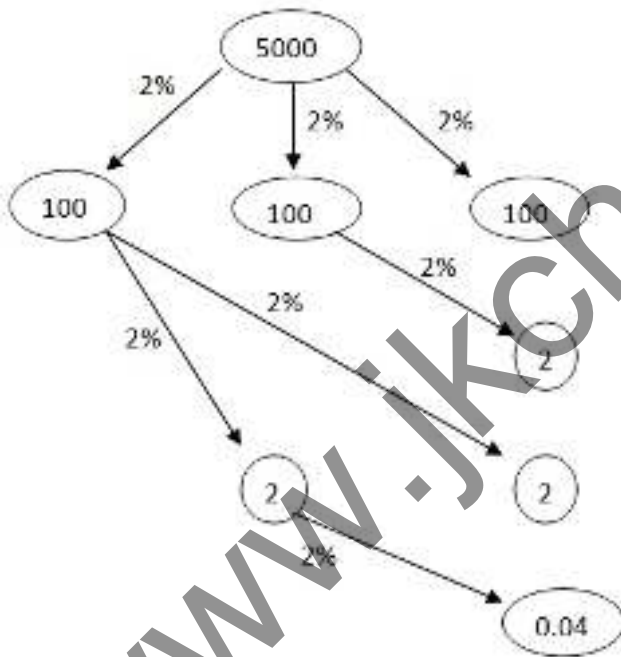
125 (b) Principal = Rs. 250
 $R_1 = 4\%$, $R_2 = 8\%$
 Amount after 1st year = $250 (1 + 4/100) = \text{Rs. } 260$
 Amount after IInd year, = $260 (1 + 8/100) = \text{Rs. } 280.80$

126 (a) Principal (P) = Rs. 5000
 $t = 1.5$ years = $3/2$ years,
 Rate% = 4% = $1/25$
 Case (I) When interest is compounded annually



2nd year CI
 = (200 + 8) = Rs. 208
 5 months CI in 2nd year
 = $208/12 \times 6 = 104$
 Total interest = Rs. (200 + 104)
 = Rs. 304

Case (II): When interest is compounded half yearly
 Rate % = $4/2 = 2\%$
 Time = $3/2 \times 2 = 3$ years



Total compound interest
 = $(100 \times 3 + 6 + 0.04)$
 = Rs. (300 + 6.04)
 = Rs. 306.04
 Difference = Rs. (306.04 - 304)
 = Rs. 2.04

Alternate:

Case I: When interest is calculated yearly,
 Effective Rate % = $4 + 2 + (4 \times 2)/100$
 = 6.08%

Case II. When interest is calculated half-yearly,
 Rate% = $4/2 = 2\%$
 Time = $3/2 \times 2 = 3$ years

Effective Rate % = 6.1208%

Difference in Rates = $(6.1208 - 6.08)\% = 0.0408\%$

Required difference
 = $(5000 \times 0.0408)/100$
 = 2.06

- 127 (a) Effective Rate % of SI = $10 + 10/2 = 15\%$
 Note : When interest is compounded Half-yearly,
 When interest is compounded Half-yearly,
 New Rate% = $10/2 = 5\%$
 Time $3/2 \times 2 = 3$ years
 Effective Rate % of CI for 3 years = 15.7625%
 According to the question,
 0.7625% of sum = Rs. 244
 Sum = $244/0.7625 \times 100 = \text{Rs. } 32000$

- 128 (b) According to the question,
 Principal = Rs. S
 Rate = 2 r% p.a.
 Time = 3 years
 Thus, $A = P (1 + R/100)^T = A = S (1 + 2r/100)^3$
 $A = S (1 + R/100)^3$





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