CHAPTER 7

Simple & Compound Interest

1. A sum of money at compound interest doubles itself in 15 years. It will become eight times of itself in
(SSC CGL 1st Sit. 2010)
   (a) 45 years
   (b) 48 years
   (c) 54 years
   (d) 60 years

2. At what rate per cent per annum will a sum of ` 1,000 amount to ` 1,102.50 in 2 years at compound interest?
(SSC CGL 1st Sit. 2010)
   (a) 5
   (b) 5.5
   (c) 6
   (d) 6.5

3. What annual payment will discharge a debt of ` 6,450 due in 4 years at 5% per annum simple interest ?
(SSC CGL 1st Sit. 2010)
   (a) ` 1,400
   (b) ` 1,500
   (c) ` 1,550
   (d) ` 1,600

4. In how many years will a sum of ` 800 at 10% per annum compound interest, compounded semi-annually becomes ` 926.10 ?
(SSC CGL 2nd Sit. 2010)
   (a) $1\frac{1}{2}$
   (b) $1\frac{2}{3}$
   (c) $2\frac{1}{3}$
   (d) $2\frac{1}{2}$

5. In how many years will a sum of money double itself at $6\frac{1}{4}\%$ simple interest per annum ?
(SSC CGL 2nd Sit. 2010)
   (a) 24
   (b) 20
   (c) 16
   (d) 12

6. A sum of ` 12,000, deposited at compound interest becomes double after 5 years. How much will it be after 20 years ?
(SSC CGL 2nd Sit. 2010)
   (a) ` 1,44,000
   (b) ` 1,20,000
   (c) ` 1,50,000
   (d) ` 1,92,000

7. A sum of money placed at compound interest doubles itself in 4 years. In how many years will it amount to four times itself?
(SSC CGL 1st Sit. 2011)
   (a) 12 years
   (b) 13 years
   (c) 8 years
   (d) 16 years

8. The simple interest on a sum for 5 years is one fourth of the sum. The rate of interest per annum is
(SSC CGL 1st Sit. 2011)
   (a) 5%
   (b) 6%
   (c) 4%
   (d) 8%

9. The difference between the compound interest and simple interest on ` 10,000 for 2 years is ` 25. The rate of interest per annum is
(SSC CGL 2nd Sit. 2011)
   (a) 5%
   (b) 7%
   (c) 10%
   (d) 12%

10. A sum of ` 12,000 deposited at compound interest becomes double after 5 years. After 20 years, it will become
(SSC CGL 2nd Sit. 2011)
    (a) ` 48,000
    (b) ` 96,000
    (c) ` 1,90,000
    (d) ` 1,92,000

11. Simple interest on a certain sum for 6 years is $\frac{9}{25}$ of the sum. The rate of interest is
(SSC CGL 2nd Sit. 2011)
    (a) 6%
    (b) $6\frac{1}{2}\%$
    (c) 8%
    (d) $8\frac{1}{2}\%$

12. The difference between the compound interest and simple interest for the amount ` 5,000 in 2 years is ` 32. The rate of interest is
(SSC CGL 2nd Sit. 2011)
    (a) 5%
    (b) 8%
    (c) 10%
    (d) 12%

13. If ` 5,000 becomes ` 5,700 in a year's time, what will ` 7,000 become at the end of 5 years at the same rate of simple interest?
(SSC CGL 1st Sit. 2012)
    (a) ` 10,500
    (b) ` 11,900
    (c) ` 12,700
    (d) ` 7, 700

14. Prabhat look a certain amount as a loan from a bank at the rate of 8% p.a. simple interest and gave the same amount to Ashish as a loan at the rate of 12% p.a. If at the end of 12 years, he made a profit of ` 960 in the deal, then the original amount was:
(SSC CGL 1st Sit. 2012)
    (a) ` 3356
    (b) ` 1000
    (c) ` 2000
    (d) ` 3000

15. A person takes a loan of ` 10,000 partly from a bank at 8% p.a. and remaining from another bank at 10% p.a. He pays a total interest of ` 950 per annum. Amount of loan taken from the first bank (in `) is
(SSC CGL 1st Sit. 2012)
    (a) 2500
    (b) 5200
    (c) 2050
    (d) 5020

16. The difference between C. I. (Compound Interest) and S.I. (Simple Interest) on a sum of ` 4,000 for 2 years at 5% p.a. payable yearly is
(SSC CGL 2nd Sit. 2012)
    (a) ` 20
    (b) ` 10
    (c) ` 50
    (d) ` 60

17. A principal of ` 10,000, 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:
(SSC CHSL 2012)
    (a) 12,000
    (b) 12,320
    (c) 12,500
    (d) 11,320

18. The difference between the interests received from two different banks on ` 500 for 2 years is ` 2.50. The difference between their rates is: (SSC CHSL 2012)
(a) 0.5% (b) 2.5% (c) 0.25% (d) 1%

19. A sum becomes ` 2,916 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 (SSC CHSL 2013)
(a) ` 625 (b) ` 600 (c) ` 675 (d) ` 650

20. A sum of money becomes 1.331 times in 3 years as compound interest. The rate of interest is (SSC Multi-Tasking 2013)
(a) 50% (b) 8% (c) 7.5% (d) 10%

21. A person deposited ` 500 for 4 years and ` 600 for 3 years at the same rate of simple interest in a bank. Altogether he received ` 190 as interest. The rate of simple interest per annum was (SSC Multi-Tasking 2013)
(a) 3% (b) 4% (c) 5% (d) 2%

22. A sum of money placed at compound interest doubles itself in 5 years. It will amount to eight times of itself in : (SSC Sub. Ins. 2013)
(a) 15 years (b) 12 years
(c) 10 years (d) 20 years

23. The value of a machine depreciates every year by 10%. if its present value is ` 50,000 then the value of the machine after 2 years is _____. (SSC CGL 1st Sit. 2013)
(a) ` 40,500 (b) ` 40,050
(c) ` 45,000 (d) ` 40,005

24. The time in which ` 80,000 amounts to ` 92,610 at 10% p.a. at compound interest, interest being compounded semi annually is : (SSC CGL 1st Sit. 2013)
(a) 3 years (b) $1\frac{1}{2}$ years
(c) 2 years (d) $2\frac{1}{2}$ years

25. The interest on a certain sum of money is ` 22 and the true discount on the same sum for the same time and at the same rate is ` 20, find the sum. (SSC CGL 1st Sit. 2013)
(a) ` 220 (b) ` 200
(c) ` 210 (d) ` 212

26. There is 100% increase to an amount in 8 years, at simple interest. Find the compound interest of ` 8000 after 2 years at the same rate of interest. (SSC CGL 1st Sit. 2013)
(a) ` 2500 (b) ` 2000
(c) ` 2250 (d) ` 2125

27. The simple interest an ` 4,000 in 3 years at the rate of x% per annum equals the simple interest on ` 5,000 at the rate of 12% per annum in 2 years. The value of x is (SSC CGL 2nd Sit. 2013)
(a) 8% (b) 9% (c) 10% (d) 6%

28. Two equal sums were borrowed at 8% simple interest per annum for 2 years and 3 years respectively. The difference in the interest was ` 56. The sums borrowed were (SSC CGL 2nd Sit. 2013)
(a) ` 800 (b) ` 700
(c) ` 560 (d) ` 350

29. If the compound interest on a certain sum for two years at 12% per annum is ` 2,544, the simple interest on it at the same rate for 2 years will be (SSC CGL 2nd Sit. 2013)
(a) ` 2,400 (b) ` 2,500
(c) ` 2,480 (d) ` 2.440

30. X borrowed some money from a source at 8% simple interest and lent it to Y at 12% simple interest on the same day and gained ` 4,800 after 3 years. The amount X borrowed, in `, is (SSC Multi-Tasking 2014)
(a) 42,000 (b) 60,000
(c) 1,20,000 (d) 40,000

31. A man borrowed some money from a private organisation at 5% simple interest per annum. He lended 50% of this money to another person at 10% compound interest per annum and thereby the man made a profit of ` 3205 in 4 years. The man borrowed (SSC CGL 2nd Sit. 2014)
(a) ` 80,000 (b) ` 1,00,000
(c) ` 1,20,000 (d) ` 1,50,000

32. Ram borrows a certain sum of money at 8% per annum simple interest and Rahim borrows ` 2,000 at 5% per annum simple interest. If the interest at the end of 3 years is equal, then the amount borrowed by Ram is (SSC Multi-Tasking 2014)
(a) ` 1,250 (b) ` 1,500
(c) ` 2,000 (d) ` 1,000

33. A sum amounts double in 8 years by simple interest. Then the rate of simple interest p.a. is (SSC Sub. Ins. 2014)
(a) 10% (b) 12.5%
(c) 15% (d) 20%

34. Rekha invested a sum of ` 12000 at 5% per annum compound interest. She received an amount of ` 13230 after n years. Find n. (SSC Sub. Ins. 2014)
(a) 2.8 years (b) 3.0 years
(c) 2.5 years (d) 2.0 years

35. The population of a village increases by 5% annually. If its present population is 4410, then its population 2 years ago was (SSC CHSL 2014)
(a) 4500 (b) 4000
(c) 3800 (d) 3500

36. A sum of ` 210 was taken as a loan. This is to be paid back in two equal instalments. If the rate of interest be 10% compounded annually, then the value of each instalment is (SSC CHSL 2014)
(a) ` 127 (b) ` 121
(c) ` 210 (d) ` 225

37. A certain amount of money earns ` 540 as Simple Interest in 3 years. If it earns a Compound Interest of ` 376.20 at the same rate of interest in 2 years, find the amount. (in rupees) (SSC Sub. Ins. 2015)
(a) 2100 (b) 1600
(c) 1800 (d) 2000

38. The compound interest on ` 12000 for 9 months at 20% per annum, interest being compounded quarterly is : (SSC CHSL 2015)
(a) ` 1750 (b) ` 1891.10
(c) ` 2136.40 (d) ` 2089.70

39. The income of a company increases 20% per annum. If its income is ` 26,64,000 in the year 2012, then its income in the year 2010 was : **(SSC CHSL 2015)**
(a) ` 28,20,000
(b) ` 28,55,,000
(c) ` 18,50,000
(d) ` 21,20,000

40. The population of a town increases by 5% every year. If the present population is 9261, the population 3 years ago was **(SSC CGL 1ˢᵗ Sit. 2015)**
(a) 5700
(b) 6000
(c) 7500
(d) 8000

41. In certain years a sum of money is doubled itself at $6\frac{1}{4}$% simple interest per annum, then the required time will be **(SSC CGL 1ˢᵗ Sit. 2015)**
(a) $12\frac{1}{2}$ years
(b) 8 years
(c) $10\frac{2}{3}$ years
(d) 16 years

42. A certain sum will amount to ` 12,100 in 2 years at 10% per annum of compound interest, interest being compounded annually. The sum is: **(SSC CGL 1ˢᵗ Sit. 2016)**
(a) ` 12000
(b) ` 6000
(c) ` 8000
(d) ` 10000

43. The simple interest on a certain sum of money at the rate of 5% per annum for 8 years is ` 840. Rate of interest for which the same amount of interest can be received on the same sum after 5 years is **(SSC CGL 1ˢᵗ Sit. 2016)**
(a) 7%
(b) 8%
(c) 9%
(d) 10%

44. What would be the compound interest of ` 25000 for 2 yrs. at 5% per annum **(SSC CGL 1ˢᵗ Sit. 2016)**
(a) 2500
(b) 2562.5
(c) 2425.25
(d) 5512.5

45. Alipta got some amount of money from her father. In how many years will the ratio of the money and the interest obtained from it be 10:3 at 6% simple interest per annum? **(SSC CGL 2ⁿᵈ Sit. 2016)**
(a) 7 years
(b) 3 years
(c) 5 years
(d) 4 years

46. A sum of money placed at compound interest double itself at 2 years. The year it will take to amount 4 times itself is **(SSC Sub. Ins. 2016)**
(a) 6
(b) 4
(c) 8
(d) 3

47. A sum of ` $x$ was put at simple interest at a certain rate for 2 years. Had it been put at 3% higher rate, it would have fetched ` 300 more. The value of 4x is **(SSC Sub. Ins. 2016)**
(a) ` 16, 000
(b) ` 20,000
(c) ` 36, 000
(d) ` 24,000

48. A person lent certain sum of money at 5% per annum simple interest and in 15 years the interest amounted to ` 250 less than the sum lent. What was the sum lent (in `)? **(SSC CGL 2017)**
(a) 1000
(b) 1500
(c) 2400
(d) 3000

49. A certain sum of money triples itself in 5 years at simple interest. In how many years it will be five times? **(SSC CGL 2017)**
(a) 5
(b) 8
(c) 10
(d) 15

50. The difference between the compound interest compounding half yearly for 1 year and the simple interest for 1 year on a certain sum of money lent out at 8% per annum is ` 64. What is the sum (in `)? **(SSC CGL 2017)**
(a) 40000
(b) 42000
(c) 44000
(d) 44800

51. A sum of ` 400 becomes ` 448 at simple interest in 2 years. In how many years will the sum of ` 550 amounts to ` 682 at the same rate? **(SSC CGL 2017)**
(a) 2
(b) 3
(c) 3.5
(d) 4

52. The simple interest on sum for 5 years is 3/5 th of the sum. The rate of interest per annum is: **(SSC MTS 2017)**
(a) $12\frac{1}{2}$%
(b) 10%
(c) 12%
(d) 8%

53. What is the compound interest (in ` ) on ` 12500 at the rate of 12% per annum compounded yearly for 2 years? **(SSC Sub. Ins. 2017)**
(a) 3000
(b) 2980
(c) 3050
(d) 3180

54. An amount was lent for two years at the rate of 20% per annum compounding annually. Had the compounding been done half yearly, the interest would have increased by 241. What was the amount (in `) lent? **(SSC Sub. Ins. 2017)**
(a) 10000
(b) 12000
(c) 20000
(d) 24000

55. A sum of ` 18,000 is invested for 16 months at 8% per annum compounded half-yearly. What is the percentage gain at the end of 16 months, to the nearest whole number? **(SSC Sub. Ins. 2018)**
(a) 9%
(b) 11%
(c) 10%
(d) 12%

56. A sum of ` 12,800 is invested partly at 15% per annum and the remaining at 12% per annum simple interest. If the total interest at the end of 3 years is ` 5,085, then how much money was invested at 15% per annum? **(SSC Sub. Ins. 2018)**
(a) ` 5,300
(b) ` 7,500
(c) ` 5,800
(d) ` 5,200

57. A borrowed a sum of ` 3,000 from his friend B on 31 December 2007 on the condition that he would return the same after one year with simple interest at 15% per annum. However, A gets into a position of returning the sum on 31 August 2008. How much amount had A to return to B? **(SSC CHSL-2018)**
(a) ` 3,300
(b) ` 3,200
(c) ` 3,310
(d) ` 3,305

58. The difference between the compound interest and simple interest on ` $x$ at 8% per annum for 2 years is ` 19.20. What is the value of x? **(SSC CGL-2018)**
(a) 2,500
(b) 3,200
(c) 2,800
(d) 3,000

59. The difference between compound interest and simple interest on ` $x$ at 15% per annum for 2 years is ` 9. What is the value of x? **(SSC CGL 2018)**
  (a) 600   (b) 400   (c) 450   (d) 500

60. A sum of ` 10000 is invested in three schemes of simple interest. The annual interest rates are respectively, 4%, 6% and 10%. ` 4000 were invested in the first scheme. If the total interest earned after five years is ` 2800, then how much money was invested in the third scheme? **(SSC MTS 2018)**
  (a) ` 1500    (b) ` 5000   (c) ` 1000    (d) ` 3000

61. A sum of ` 1200 is invested at compound interest (compounded half yearly). If the rate of interest is 10% per annum, then what will be the amount after 18 months? **(SSC MTS 2018)**
  (a) ` 1389.15      (b) ` 1185.45
  (c) ` 1563.25      (d) ` 1295.35

62. ` 4,300 becomes ` 4,644 in 2 years at simple interest. Find the principle amount that will become ` 10104 in 5 years at the same rate of interest. **(SSC CGL 2019-20)**
  (a) ` 8,420      (b) ` 9,260
  (c) ` 5,710      (d) ` 7,200

63. What will be the compound interest on a sum of ` 1200 for 2 years at the rate of 20% per annum when the interest is compounded yearly? **(SSC MTS 2019-20)**
  (a) ` 624    (b) ` 504   (c) ` 576    (d) ` 528

64. The simple interest on a sum for a certain number of years, same as the rate percentage of the interest, is equal to the sum itself. The number of years is equal to **(SSC MTS 2019-20)**
  (a) 5   (b) 12   (c) 8   (d) 10

65. In how many years will the simple interest on a sum of money be equal to the principle at rate of $12\frac{2}{4}\%$ p.a.? **(SSC CHSL 2019-20)**
  (a) 7 years   (b) 8 years
  (c) 6 years   (d) 5 years

66. Two equal sums were lent on simple interest at 6 % and 10 % per annum respectively. The first sum was recovered two years later than the second sum and the amount in each case was ` 1105. What was the sum (in `) lent in each scheme? **(SSC CGL 2020-21)**
  (a) 850   (b) 936   (c) 891   (d) 900

67. A man invests an amount of ` 1,05,750 at simple interest in the name of his son, daughter and his wife in such a way that they get the same interest after 3, 4 and 5 years, respectively. If the rate of interest is 5% per annum, then the amount invested for the wife is : **(SSC CHSL 2020-21)**
  (a) ` 30,000      (b) ` 28,000
  (c) ` 25,000      (d) ` 27,000

68. Eight copies of a book can be bought for a certain sum payable at the end of a year and ten copies of the same book can be bought for the same sum in case money. What is the rate percentage of the interest? **(SSC MTS 2020-21)**
  (a) 10%   (b) 25%
  (c) 30%   (d) 15%

69. A farmer borrowed ` 1,32,000 from a money lender to do cultivation in his field. The rate of interest is 12.5% p.a. compounded annually. At the end of two years, he cleared his loan by paying ` 1,07,062.50 and his scooter. The cost (in `) of the scooter is: **(SSC MTS 2020-21)**
  (a) 75,000   (b) 45,000
  (c) 50,000   (d) 60,000

70. A sum amounts to ` 7,562 in 4 years and to ` 8,469.44 in 5 years at a certain rate per cent per annum, when the interest is compounded yearly. The rate of interest is : **(SSC Sub-Inspector 2020-21)**
  (a) 12%   (b) 15%   (c) 20%   (d) 8%

71. Sunita invested ` 12,000 on simple interest at The rate of 10 % p.a. to obtain a total amount of ` 20,400 after a ceitair period. For how many years did she invest to obtain the above amount ? **(SSC Sub-Inspector 2020-21)**
  (a) 8   (b) 9   (c) 6   (d) 7

1. **(a)** $A = P\left(1 + \dfrac{R}{100}\right)^T$

   $2 = 1\left(1 + \dfrac{Rate}{100}\right)^{15}$

   Cubing on both sides, we have

   $8 = 1\left(1 + \dfrac{Rate}{100}\right)^{45}$

   Required time = 45 years

2. **(a)** $A = P\left(1 + \dfrac{R}{100}\right)^T$

   $\Rightarrow \dfrac{1102.50}{1000} = \left(1 + \dfrac{R}{100}\right)^2$

   $\Rightarrow \dfrac{11025}{10000} = \left(1 + \dfrac{R}{100}\right)^2$

   $\Rightarrow \left(\dfrac{105}{100}\right)^2 = \left(1 + \dfrac{R}{100}\right)^2$

   $\Rightarrow 1 + \dfrac{R}{100} = \dfrac{105}{100}$

   $\Rightarrow \dfrac{R}{100} = \dfrac{105}{100} - 1$

   $\Rightarrow R = 5\%$

3. **(b)** Let the annual instalment be `x.

   $\therefore \left(x + \dfrac{x \times 3 \times 5}{100}\right) + \left(x + \dfrac{x \times 2 \times 5}{100}\right)$

   $\qquad\qquad + \left(x + \dfrac{x \times 1 \times 5}{100}\right) + x = 6450$

   $\Rightarrow \dfrac{115x}{100} + \dfrac{110x}{100} + \dfrac{105x}{100} + x = 6450$

   $\Rightarrow 115x + 110x + 105x + 100x$
   $= 6450 \times 100$

   $\Rightarrow 430x = 6450 \times 100$

   $\therefore x = \dfrac{6450 \times 100}{430} = `1500$

4. **(a)** Rate = 10% per annum = 5% half yearly

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

   $\Rightarrow 926.10 = 800\left(1 + \dfrac{5}{100}\right)^T$

   $\Rightarrow \dfrac{9261}{8000} = \left(\dfrac{21}{20}\right)^T$

   $\Rightarrow \left(\dfrac{21}{20}\right)^3 = \left(\dfrac{21}{20}\right)^T$

   $\therefore$ Time = 3 half years = $1\dfrac{1}{2}$ years

5. **(c)** $T = \dfrac{SI \times 100}{P \times R}$ (For double SI = P = x)

   $= \dfrac{x \times 100}{x \times \dfrac{25}{4}} = 16$ year.

6. **(d)** $A = P\left(1 + \dfrac{R}{100}\right)^T$

   $\Rightarrow 24000 = 12000\left(1 + \dfrac{R}{100}\right)^5$

   $\Rightarrow 2 = \left(1 + \dfrac{R}{100}\right)^5$

   $\Rightarrow 2^4 = \left(1 + \dfrac{R}{100}\right)^{20} = 16$ times

   i.e. The sum amounts to `192000.

7. **(c)** $A = P\left(1 + \dfrac{R}{100}\right)^T$

   $\Rightarrow 2 = 1\left(1 + \dfrac{R}{100}\right)^4$

   $\Rightarrow 2^2 = \left(1 + \dfrac{R}{100}\right)^8 = 8$ yrs

8. **(a)** $\dfrac{\text{Simple Interest}}{\text{Principal}} = \dfrac{1}{4}$

   $\therefore$ Rate $= \dfrac{S.I. \times 100}{\text{Principal} \times \text{Time}}$

   $= \dfrac{1 \times 100}{4 \times 5} = 5\%$ per annum

9. **(a)** Difference $= \dfrac{PR^2}{10000} \Rightarrow 25 = \dfrac{10000 \times R^2}{10000}$

   $\Rightarrow R = 5\%$

10. **(d)** $A = P\left(1 + \dfrac{R}{100}\right)^T$

    $\Rightarrow \dfrac{A}{P} = \left(1 + \dfrac{R}{100}\right)^T$

$$\Rightarrow 2 = \left(1 + \frac{R}{100}\right)^5$$

$$\Rightarrow 2^4 = \left(1 + \frac{R}{100}\right)^{20} \Rightarrow 16 = \left(1 + \frac{R}{100}\right)^{20}$$

Hence, the principal will become 16 times i.e.
` (16×12000)
= ` 192000

11. **(a)** Rate $= \dfrac{SI \times 100}{Principal \times Time}$

$$= \frac{9}{25} \times \frac{100}{6} = 6\% \text{ per annum}$$

12. **(b)** Difference of 2 years

$$P\left(\frac{R}{100}\right)^2$$

$$\Rightarrow 32 = \frac{5000 \times R^2}{10000}$$

$$\Rightarrow R^2 = \frac{32 \times 10000}{5000} = 64$$

$$\Rightarrow R = \sqrt{64} = 8\%$$

13. **(b)** Interest = 5700 − 5000 = ` 700

$$\therefore \text{Rate} = \frac{700 \times 100}{5000 \times 1} = 14\%$$

Case II,
Interest

$$= \frac{Principal \times Time \times Rate}{100}$$

$$\frac{7000 \times 5 \times 14}{100} = ` 4900$$

Amount = 7000 + 4900 = ` 11900

14. **(c)** Difference of rates = 4%

$$\therefore \frac{Principal \times Time \times Rate}{100} = 960$$

$$\Rightarrow \frac{x \times 12 \times 4}{100} = 960$$

$$\Rightarrow x = \frac{960 \times 100}{12 \times 4} = ` 2000$$

15. **(a)** If the amount of loan taken from the first bank be ` x, then

$$\frac{x \times 8 \times 1}{100} + \frac{(10000 - x) \times 10}{100} = 950$$

$$\Rightarrow 8x + 100000 - 10x = 95000$$

$$\Rightarrow 2x = 100000 - 95000 = 5000$$

$$\Rightarrow x = ` 2500$$

Alternate Method:

Final rate or interest $= \dfrac{950 \times 100}{10000} = 9.5\%$

using all igation method

8%   10%

9.5%

0.5%   1.5%

First amount : Second amount = 1 : 3

Received amount $= 10000 \times \dfrac{1}{4} = 2500$

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16. **(b)** Required difference $= \dfrac{PR^2}{(100)^2} \Rightarrow \dfrac{4000 \times 5 \times 5}{100 \times 100} = ` 10$

17. **(b)** $A = P\left(1 + \dfrac{r_1}{100}\right)\left(1 + \dfrac{r_2}{100}\right)$

$$A = 10000\left(1 + \frac{10}{100}\right)\left(1 + \frac{12}{100}\right)$$

$$A = 10000\left(\frac{110}{100}\right)\left(\frac{112}{100}\right)$$

A = 12320

18. **(c)** Let r_1 and r_2 are the rates of interests.
So, the difference in S.I

$$= \frac{\begin{array}{c}principal \times time \times difference \ between \\ the \ rates \ of \ interests\end{array}}{100}$$

$$\Rightarrow 2.50 = \frac{500 \times 2 \times (r_1 - r_2)}{100}$$

So, $(r_1 - r_2) = \dfrac{2.50 \times 100}{500 \times 2} = 0.25$

19. **(c)** $2916 = P\left(1 + \dfrac{8}{100}\right)^2$

$$P = \frac{2916}{(1.08)^2} = 2500$$

$$S.I = \frac{2500 \times 9 \times 3}{100} = 675$$

20. **(d)** $P\left(1 + \dfrac{R}{100}\right)^3 = 1.331P \Rightarrow \left(1 + \dfrac{R}{100}\right)^3 = 1.331$

$$\left(1 + \frac{R}{100}\right)^3 = \left(\frac{11}{10}\right)^3$$

$$1 + \frac{R}{100} = \frac{11}{10} \Rightarrow \frac{R}{100} = \frac{11}{10} - 1 \Rightarrow \frac{R}{100} = \frac{1}{10}$$

R = 10%

21. (c) S.I (Simple Interest)

$$= \frac{\text{Principle}_1 \times \text{Rate} \times \text{Time}_1}{100} + \frac{\text{Principle}_2 + \text{Rate} \times \text{Time}_2}{100}$$

$$190 = \frac{500 \times R \times 4}{100} + \frac{600 \times R \times 3}{100}$$

$$190 = 20R + 18R \Rightarrow 38R = 190 \Rightarrow R = 5\%$$

22. (a) $A = P\left(1 + \dfrac{R}{100}\right)^T \Rightarrow 2 = 1\left(1 + \dfrac{R}{100}\right)^5$

Cubing both sides.

$$2^3 = 1\left(1 + \frac{R}{100}\right)^{15}$$

Therefore, T = 15 years.

23. (a) Depriciated value

$$= 50000\left(1 - \frac{10}{100}\right)^2 = 50000 \times \frac{9 \times 9}{100} = ` 40500$$

24. (b) Time = T half year

= R = 5% per half year

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

$$\Rightarrow \frac{92610}{80000} = \left(1 + \frac{5}{100}\right)^T \Rightarrow \frac{9261}{8000} = \left(\frac{21}{20}\right)^T$$

$$\Rightarrow \left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^T$$

$$\Rightarrow T = 3 \text{ half years}$$

$$\therefore T = 3 \text{ half years or } 1\frac{1}{2} \text{ year}$$

25. (a) $\text{Sum} = \dfrac{\text{S.I.} \times \text{True discount}}{\text{S.I.} - \text{True discount}} = \dfrac{22 \times 20}{22 - 20} = ` 220$

26. (d) Principal = ` 8000

SI = 8000

$$\therefore \text{Rate} = \frac{\text{S.I} \times 100}{\text{Principal} \times \text{Time}}$$

$$= \frac{8000 \times 100}{8000 \times 8} = \frac{25}{2}\%$$

$$\therefore \text{C.I.} = P\left[\left(1 + \frac{R}{100}\right)^T - 1\right]$$

$$= 8000\left[\left(1 + \frac{25}{200}\right)^2 - 1\right]$$

$$= 8000\left(\frac{81}{64} - 1\right) = \frac{8000 \times 17}{64} = ` 2125$$

27. (c) $\text{S.I.} = \dfrac{\text{Principal} \times \text{Time} \times \text{Rate}}{100}$

$$\therefore \frac{4000 \times 3 \times x}{100}$$

$$= \frac{5000 \times 2 \times 12}{100} \Rightarrow x = \frac{5 \times 2 \times 12}{4 \times 3}$$

$$= 10\% \text{ per annum}$$

28. (b) Let principal be represented by P.

Ist Case :

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{P \times 8 \times 2}{100}$$

IInd Case :

$$\text{S.I} = \frac{P \times R \times T}{100} = \frac{P \times 8 \times 3}{100}$$

According to question

$$\frac{P \times 8 \times 3}{100} - \frac{P \times 8 \times 2}{100} = 56$$

$$\frac{P \times 8}{100} = 56 \Rightarrow P = \frac{56 \times 100}{8} = 700$$

29. (a) $\text{C.I.} = P\left[\left(1 + \dfrac{R}{100}\right)^T - 1\right]$

$$\Rightarrow 2544 = P\left[\left(1 + \frac{12}{100}\right)^2 - 1\right]$$

$$\Rightarrow 2544 = P\left[\left(\frac{28}{25}\right)^2 - 1\right]$$

$$\Rightarrow 2544 = P\left(\frac{784}{625} - 1\right)$$

$$\Rightarrow 2544 = P\left(\frac{784 - 625}{625}\right) = \frac{P \times 159}{625}$$

$$\Rightarrow P = \frac{2544 \times 625}{159} = ` 10000$$

$$\therefore \text{S.I.} = \frac{P \times R \times T}{100}$$

$$= \frac{10000 \times 2 \times 12}{100} = ` 2400$$

30. (d) Let X borrow ` P

He has to return total amount,

$$A = P + \frac{P \times 8 \times 3}{100}$$

Total amount x get from y, $A' = P + \frac{P \times 12 \times 3}{100}$

According to question
$A' - A = 4800$

$$\left(P + \frac{36P}{100}\right) - \left(P + \frac{24P}{100}\right) = 4800$$

$$\frac{12P}{100} = 4800$$

$$\Rightarrow P = \frac{4800 \times 100}{12} = 40,000$$

31. (b) Let the required amount = P

$$\frac{P}{2}\left[\left(1 + \frac{10}{100}\right)^4 - 1\right] - \frac{P \times 4 \times 5}{100} = 3205$$

$$\frac{P}{2}\left[\left(\frac{11}{10}\right)^4 - 1\right] - \frac{P}{5} = 3205$$

$$\frac{P}{2}\left[\frac{14641}{10000} - 1\right] - \frac{P}{5} = 3205$$

$$\frac{P}{2}\left[\frac{4641}{10000}\right] - \frac{P}{5} = 3205$$

$$\frac{4641P}{20000} - \frac{P}{5} = 3205$$

$$\frac{641P}{20000} = 3205$$

$$P = \frac{3205}{641} \times 20000 = `10,0000$$

32. (a) Let Ram borrowed ` P

$$\frac{P \times 8 \times 3}{100} = \frac{2000 \times 5 \times 3}{100}$$

$$P = \frac{2000 \times 5}{8} = `1,250$$

33. (b) Let P be the principle amount and R be rate of interest.

$$2P = P + \frac{P \times R \times 8}{100}$$

$$R = \frac{100}{8} = 12.5\%$$

34. (d) P = ` 12000, Rate = 5 %, Time (n) = ?, Amount = 13230

$$A = P\left(1 + \frac{R}{100}\right)^T \Rightarrow 13230 = 12000\left(1 + \frac{5}{100}\right)^n$$

$$\Rightarrow \frac{13230}{12000} = \left(\frac{21}{20}\right)^n \Rightarrow \frac{1323}{1200} = \left(\frac{21}{20}\right)^n \Rightarrow \frac{441}{400} = \left(\frac{21}{20}\right)^n$$

$$\left(\frac{21}{20}\right)^2 = \left(\frac{21}{20}\right)^n$$

$$\therefore n = 2 \text{ years}$$

35. (b) Population 2 years ago $= \frac{4410}{\left(1 + \frac{5}{100}\right)^2} = \frac{4410}{441} \times 400$

$$= 4000$$

36. (b) Let each installment be x.

$$A = \frac{x}{\left(1 + \frac{R}{100}\right)} + \frac{x}{\left(1 + \frac{R}{100}\right)^2}$$

$$\Rightarrow 210 = \frac{x}{\left(1 + \frac{10}{100}\right)} + \frac{x}{\left(1 + \frac{10}{100}\right)^2}$$

$$= x \times \frac{100}{110} + x + \frac{100 \times 100}{110 \times 110}$$

$$\Rightarrow 210 = \frac{10x}{11} + \frac{100}{121}x$$

$$\Rightarrow 210 = x\left[\frac{10}{11} + \frac{100}{121}\right]$$

$$\Rightarrow 210 = \frac{x[110 + 100]}{121}$$

$$\Rightarrow 210 = \frac{x \times 210}{121}$$

$$\Rightarrow x = \frac{210 \times 121}{210} = 121$$

37 (d) Let amount is P, rate is r and time is t.

$$S.I. = \frac{P \times r \times t_1}{100}$$

and $C.I. = P\left(1 + \frac{r}{100}\right)^{t_2} - P$

from question, we have
S.I. = ` 540, C.I. = ` 376.20
$t_1 = 3$ years, $t_2 = 2$ years

$$\therefore 540 = \frac{P \times r \times 3}{100}$$

$$P.r. = \frac{540 \times 100}{3} = 18000 \qquad \ldots(1)$$

Again, $376.20 = P\left(1 + \dfrac{r}{100}\right)^2 - P$

$376.20 = \dfrac{P.r^2}{100^2} + \dfrac{2.P.r}{100} \Rightarrow \dfrac{(P.r).r}{(100)^2} + \dfrac{2Pr}{100}$

$376.20 = \dfrac{18000 \times r}{10000} + \dfrac{2 \times 18000}{100}$

$376.20 = 1.8\,r + 360$

$1.8\,r = 16.20$

$r = 9\%$

$P = \dfrac{18000}{9} = ₹\,2000$

38. (b) P = ₹ 12000;
R = 20% per annum = 5% per quarter
T = 9 months = 3 quarters

So, $A = 12000\left(1 + \dfrac{5}{100}\right)^3 = 12000 \times 1.05 \times 1.05 \times 1.05$

$= ₹\,13891.1$

So, CI = 13891.10 − 12000 = ₹ 1891.10

39. (c) Income in 2012 = ₹ 26,64,000
Every year % of increase in income = 20%

So, income of company in 2010 = $26,64,000 \times \dfrac{100}{120} \times \dfrac{100}{120}$

$= ₹\,18,50,000$

40. (d) Population 3 yrs. ago = $\dfrac{9261}{\left(1 + \dfrac{5}{100}\right)^3}$

$= \dfrac{9261 \times 20 \times 20 \times 20}{21 \times 21 \times 21} = 8000$

41. (d) Let x be the principal amount
'y' be the time to double the money.
Then interest will also be 'x'.

∴ $x = \dfrac{x \times 25 \times y}{4 \times 100} \Rightarrow 400 = 25y \Rightarrow y = 16$ years

42 (d) Final rate of interest for two pens

$= x + y + \dfrac{xy}{100}$

$= 10 + 10 + \dfrac{10 \times 10}{100} = 21\%$

Let principal be P.

$\Rightarrow P \times \dfrac{121}{100} = 12100$

$P = 100 \times 100 = ₹\,10000$

43. (b) When P = P, R = 5%, T = 8yr, then SI = 840

$\dfrac{PRT}{100} = 840$

$\dfrac{P \times 5 \times 8}{100} = 840$

$P = 2100$

Case II: When P = 2100, R = ?, T = 5, SI = 840

$\Rightarrow \dfrac{2100 \times 5 \times R}{100} = 840$

or R = 8%

44. (b) $CI = P\left[1 + \dfrac{R}{100}\right]^t - P$

$= 25000\left[1 + \dfrac{5}{100}\right]^2 - 25000$

$= 25000\left[\left(\dfrac{105}{100}\right)^2 - 1\right]$

$= 25000\left[\dfrac{11025 - 10000}{10000}\right]$

$= 5 \times \dfrac{1025}{2} = 2562.5$

45. (c) Let principal = 10x
Interest = 3x

$\dfrac{PRT}{100} = SI$; $\dfrac{10x \times 6 \times T}{100} = 3x$

T = 5 years

46. (b) Let the sum be ₹ 1 which becomes ₹ 2 after 2 years

$\Rightarrow 2 = \left(1 + \dfrac{R}{100}\right)^2$ ... (i)

Let the sum of ₹ 1 becomes ₹ 4 after 'n' years

$\Rightarrow 4 = 1\left(1 + \dfrac{R}{100}\right)^n \Rightarrow 2^2 = 1\left(1 + \dfrac{R}{100}\right)^n$

$\left[1\left(1 + \dfrac{R}{100}\right)^2\right]^2 = \left(1 + \dfrac{R}{100}\right)^n$

n = 4 years

47. (b) Let the sum be ₹ x & original rate R%, then,

$\left(\dfrac{x \times (R + 3) \times 2}{100}\right) - \left(\dfrac{x \times R \times 2}{100}\right) = 300$

$6x = 300 \times 100 \Rightarrow x = 5000$

The value of 4x = 4 × 5000 = 20000

48. (a) Let principal = x
Then,
∴ Simple Interest = x − 250
According to question,

$$(x - 250) = \frac{x \times 5 \times 15}{100}$$
$$100x - 25000 = 75x$$
$$25x = 25000$$
$$\therefore x = \frac{25000}{25} = 1000$$

49. (c) Here,
$P = x, T = 5, A = 3x$
$\therefore S.I = 3x - x = 2x$
$$\therefore 2x = \frac{x \times 5 \times r}{100} \quad \therefore r = 40\%$$
Now,
$P = x$
$A = 5x$
$\therefore S.I. = 5x - x = 4x$
$T = ?$
$$\therefore 4x = \frac{x \times 40 \times T}{100}$$
$$\therefore T = \frac{4x \times 100}{x \times 40} = 10 \text{ years.}$$

50. (a) According to question,
$$64 = \left[P\left(1 + \frac{8}{200}\right)^2 - P \right] - \left[\frac{P \times 8 \times 1}{100} \right]$$
$$64 = \frac{51P}{625} - \frac{2P}{25}$$
$$64 = \frac{51P - 50P}{625}$$
$$\therefore 64 = \frac{P}{625}$$
$$\therefore P = 625 \times 64 = 40,000.$$

51. (d) Here,
$P = 400$
$A = 448$
$T = 2 \text{ years}$
$R = ?$
$\because A = P + S.I$
$\therefore S.I = A - P$
$= 448 - 400 = 48$
$$48 = \frac{400 \times R \times 2}{100}$$
$$\therefore R = \frac{48 \times 100}{400 \times 2} = 6\%$$
Now
$P = 550$
$A = 682$
$R = 6\%$
$T = ?$

$\because S-I = 682 - 550 = 132$
$$\therefore 132 = \frac{550 \times 6 \times T}{100}$$
$$\therefore T = \frac{132 \times 100}{550 \times 6} = 4 \text{ years}$$

52. (c) Here
Let $P = x$
$$S.I = \frac{3x}{5}$$
$T = 5$
$R = ?$
According to question,
$$\frac{3x}{5} = \frac{x \times R \times 5}{100}$$
$$\therefore R = \frac{3x \times 100}{25x} = 12\%$$
$\therefore$ The rate of interest per annum 12%

53. (d) Here,
$P = 12500, R = 12\%, T = 2 \text{ years}, C.I. = ?$
$$\because C.I. = P\left(1 + \frac{r}{100}\right)^n - P$$
$$= 12500\left(1 + \frac{12}{100}\right)^2 - 12500$$
$$= 12500 \times \frac{28}{25} \times \frac{28}{25} - 12500$$
$$= 15680 - 12500 = 3180$$
$\therefore$ Compound interest = ` 3180

54. (a) Let sum ` $= x$
C.I. when compounded half yearly
$$= \left[x\left(1 + \frac{20}{200}\right)^4 - x \right] = \frac{4641x}{10000}$$
C.I. when compound annually
$$= \left[x\left(1 + \frac{20}{100}\right)^2 - x \right] = \frac{11x}{25}$$
Now, $\frac{4641x}{10000} - \frac{11x}{25} = 241$
$\therefore x = 10000$
$\therefore$ sum = ` 10000

55. (b) Time $= \frac{16}{12}$ years $= \frac{16 \times 2}{12}$ half years
Rate $= \frac{8\%}{2} = 4\%$ half year
Gain $= P\left(1 + \frac{r}{100}\right)^t - P$

$$=18000\left(1+\frac{4}{100}\right)^{\frac{16\times2}{12}}-18000$$

56. (a) Let the money invested at 15% p.a. is x.
then amount invested at 12% p.a. is $(12800-x)$
ATQ.

$$\frac{x\times15\times3}{100}+\frac{(12800-x)\times12\times3}{100}=5085$$

$$\frac{(15-12)3x}{100}+128\times12\times3=5085$$

$$\frac{9x}{100}=5085-4608$$

$$\frac{9x}{100}=477$$

$$x=\frac{477\times100}{9}=₹\,5300$$

$$\%\,\text{Gain}=18000\frac{\left[\left(1+\frac{4}{100}\right)^{\frac{8}{3}}-1\right]}{18000}\times100$$

$$=\left[(1.04)^{8/3}-1\right]\times100\approx11\%$$

57. (a) Rate of interest (r) = 15%

time (t) = 8 months = $\frac{2}{3}$ years.

Sample interest (S.I.) = $\frac{prt}{100}=\dfrac{3000\times15\times\frac{2}{3}}{100}=300$

$\therefore$ Amount A = P + S.I. = 3000 + 300 = ₹ 3300

58. (d) We know that, for time 2 years,

Difference between C.I. & S.I. = $P\left(\dfrac{R}{100}\right)^2$

$$19.2=x\left(\frac{8}{100}\right)^2\Rightarrow x=\frac{19.2}{0.0064}=₹\,3000$$

59. (b) For 2 years,

C.I. – S.I. = $P\left(\dfrac{R}{100}\right)^2\Rightarrow9=x\left(\dfrac{15}{100}\right)^2$

$$x=\frac{9\times10000}{225}=400$$

60. (c) Let the amount invested in third scheme is x then amount invested in second scheme is
$1000-4000-x=(6000-x)$

Now, S.I. = $\dfrac{P.r.t}{100}$

$$2800=\frac{4000\times4\times5}{100}+\frac{(6000-x)\times6\times5}{100}+\frac{x\times10\times5}{100}$$

$$2800=800+1800-\frac{30x}{100}+\frac{x}{2}$$
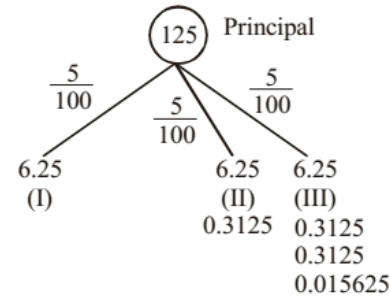
$$200=\left(\frac{-3+5}{10}\right)x\Rightarrow x=1000$$

Hence, money invested in third scheme = ₹ 1000.

61. (a) P = 1200
Time = 18 month for half yearly time becomes twice
= 18 × 2 = 36 month = 3 year
Rate = 10% = 5% = for half yearly
Let the principal = 125

Total amount → $125+6.25+6.25+6.25+0.3125$
$+0.3125+0.3125+0.015625$

$\Rightarrow144.703125$ unit
125 unit $\to1200$ (given)

$$144.703125\to\frac{1200}{125}\times144.703125$$

Amount = ₹ 1389.15

62. (a) P = 4300, A = 4644, T = 2 years
$\therefore$ S.I = 4644 – 4300 = 344

$\therefore\quad344=\dfrac{4300\times R\times2}{100}\quad\therefore\quad R=4\%$

Now, A = 10104, P = ?, T = 5, R = 4%

$(10104-P)=\dfrac{P\times5\times4}{100}\Rightarrow P=8420$

63. (d) Let Principal = 100
Combined Rate % = 20 + 20 + 4 = 44%

Compound Interest = $\dfrac{1200}{100}\times44$

= ₹ 528

64. (d) Interest = principal
Time = rate

$$I=\frac{I\times t\times t}{100}$$

$$\Rightarrow t^2=100$$
$$\Rightarrow t=10\text{ years}$$

65. (b) Rate of interest $(r\%)=12\frac{2}{4}\%=\frac{50}{4}\%$.

Let simple interest = Sum of money = P.

Then, time $= \dfrac{\text{S.I.} \times 100}{\text{Sum} \times \text{Rate}}$

$= \dfrac{P \times 100}{P \times \dfrac{50}{4}} = 8$ years.

66. (a) Let sum is P and the second sum is recovered after t years.

According to the questions,

$\dfrac{P \times 6 \times (1+2)}{100} = \dfrac{P \times 10 \times t}{100}$

$\Rightarrow \quad 6t + 12 = 10t$

$\Rightarrow \quad 4t = 12$

$\Rightarrow \quad t = 3$ years

Amount $= P + \dfrac{P \times 10 \times 3}{100}$

$\Rightarrow \quad 1105 = \dfrac{130P}{100}$

$\Rightarrow \quad P = `850$

67. (d) Let the amount invested be x, y and z.

According to the question,

$\dfrac{x \times 3 \times 5}{100} = \dfrac{y \times 4 \times 5}{100} = \dfrac{z \times 5 \times 5}{100} = k$

(where, k is a constant)

$x = \dfrac{20}{3}k$

$y = 5k$

$z = 4k$

∴ Amount invested for the wife

$= \dfrac{105750}{\left(\dfrac{20}{3}k + 5k + 4k\right)} \times 4k$

$= \dfrac{(105750) \times 3}{20k + 15k + 12k} \times 4k$

$= \dfrac{105750 \times 3}{47k} \times 4k = `27,000$

68. (b) Let the sum is `80

Amount payble at the end of a year $= `80$

Amount payble for a book at the end of year

$= \dfrac{80}{8} = `10$

Amount payble in cash for 10 books $= `80$

Amount payble in cash for one book $= \dfrac{80}{10} = `8$

∴ Interest $= 10 - 8 = `2$

Let the rate percentage is r.

Then,

Interest $= \dfrac{\text{Principal} \times r \times 1}{100}$

$\Rightarrow 2 = \dfrac{8 \times r \times 1}{100}$

$\Rightarrow r = 25\%$

69. (d) Borrowed amount $= `1,32,000$

Rate of interest $= 12.5\%$ p.a.

Time $= 2$ years.

Payble around at the end of 2nd year

$= \text{Principal} \left(1 + \dfrac{r}{100}\right)^t$

$= 1,32,000 \left(1 + \dfrac{1}{8}\right)^2$

$= 1,32,000 \times \dfrac{9}{8} \times \dfrac{9}{8} = 1,67,062.50$

∴ The cost of the scooter

$= 167062.50 - 107062.50 = `60,000$

70. (a) $\dfrac{8469.44}{7562} = \left(1 + \dfrac{R}{100}\right)^{5-4}$

$= \dfrac{846944}{756200} = \left(1 + \dfrac{R}{100}\right)$

$= \dfrac{105868}{94525} - 1 = \dfrac{R}{100}$

$= 1.12 - 1 = \dfrac{R}{100}$

$= 0.12 = \dfrac{R}{100}$

$\Rightarrow R = 12\%$

71. (d) Simple Interest $= 20400 - 12000 = 8400$

S.I. $= \dfrac{p \times r \times t}{100}$

$8400 = \dfrac{12000 \times 10 \times t}{100}$

$t = 7$ years

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