11 COMPOUND INTEREST

Importance : In examinations of different levels 1 or 2 questions of compound interest are essentially asked, they differ in difficulty level. Questions are of limited variety and hence, marks may be ensured with preparation.

Scope of questions : Questions asked in different examinations are mainly of two types – Based on compound interest only and based on both of simple interest and compound interest. Rate of interest may be yearly, half yearly or quarterly. EMI (Equal Monthly Installments) based questions are also asked.

Way to success : Questions can be solved easily by learning basic concepts and formulae learning squares and cubes of numbers will increase speed.

RULE 1 : If A = Amount, P = Principal, r = Rate of Compound Interest (C.I.), n = no. of years then,

$$A = P\left(1+\frac{r}{100}\right)^n, \text{ C.I.} = A - P$$

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

RULE 2 : Compound interest is calculated on four basis:

	Rate	Time(n)
Annually	r%	t years
Half–yearly (Semi-annually)	$\frac{r}{2}$%	t × 2 years
Quarterly	$\frac{r}{4}$%	t × 4 years
Monthly	$\frac{r}{12}$%	t × 12 years

RULE 3 : If there are distinct 'rates of interest' for distinct time periods i.e.,

Rate for 1st year $\rightarrow r_1$%

Rate for 2nd year $\rightarrow r_2$ %

Rate for 3rd year $\rightarrow r_3$ % and so on

Then $A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)\left(1+\frac{r_3}{100}\right)$.....

C.I. = A – P

RULE 4 : If the time is in fractional form i.e.,

t = nF, then

$$A = P\left(1+\frac{r}{100}\right)^n \left(1+\frac{rF}{100}\right) \text{ e.g. } t = 3\frac{5}{7} \text{ yrs, then}$$

$$A = P\left(1+\frac{r}{100}\right)^3 \left(1+\frac{r}{100}\times\frac{5}{7}\right)$$

RULE 5 : A certain sum becomes 'm' times of itself in 't' years on compound interest then the time it will take to become m^n times of itself is t × n years.

RULE 6 : The difference between C.I. and S.I. on a sum 'P' in 2 years at the rate of R% rate of compound interest will be

$$\text{C.I} - \text{S.I.} = P\left(\frac{R}{100}\right)^2 = \frac{\text{S.I.}\times R}{200}$$

For 3 years, $\text{C.I.} - \text{S.I.} = P\left(\frac{R}{100}\right)^2 \times\left(3+\frac{R}{100}\right)$

RULE 7 : If on compound interest, a sum becomes ₹ A in 'a' years and ₹ B in 'b' years then,

(i) If b – a = 1, then, $R\% = \left(\frac{B}{A}-1\right)\times 100\%$

(ii) If b – a = 2, then, $R\% = \left(\sqrt{\frac{B}{A}}-1\right)\times 100\%$

(iii) If b – a = n then, $R\% = \left[\left(\frac{B}{A}\right)^{\frac{1}{n}}-1\right]\times 100\%$

where n is a whole number.

RULE 8 : If a sum becomes 'n' times of itself in 't' years on compound interest, then $R\% = \left[n^{\frac{1}{t}}-1\right]\times 100\%$

RULE 9 : If a sum 'P' is borrowed at r% annual compound interest which is to be paid in 'n' equal annual installments including interest, then

(i) for n = 2, Each annual installment

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

(ii) For n = 3, Each annual installment

$$= \frac{P}{\left(\frac{100}{100+r}\right)+\left(\frac{100}{100+r}\right)^2+\left(\frac{100}{100+r}\right)^3}$$

RULE 10 : The simple interest for a certain sum for 2 years at an annual rate interest R% is S.I., then

$$\text{C.I.} = \text{S.I.}\left(1+\frac{R}{200}\right)$$

RULE 11 : A certain sum at C.I. becomes x times in n_1 year and y times in n_2 years then $x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

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QUESTIONS ASKED IN PREVIOUS SSC EXAMS

TYPE–I

1. At what percent per annum will ₹ 3000/- amounts to ₹ 3993/- in 3 years if the interest is compounded annually?
(1) 9% (2) 10%
(3) 11% (4) 13%
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting) & (SSC SAS Exam. 26.06.2010 (Paper-I)

2. The compound interest on ₹ 10,000 in 2 years at 4% per annum, the interest being compounded half-yearly, is :
(1) ₹ 636.80 (2) ₹ 824.32
(3) ₹ 912. 86 (4) ₹ 828. 82
(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

3. In how many years will ₹ 2,000 amounts to ₹ 2,420 at 10% per annum compound interest?
(1) 3 years (2) $2\frac{1}{2}$ years
(3) 2 years (4) $1\frac{1}{2}$ years
(SSC CGL Prelim Exam. 27.02.2000 (IInd Sitting & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting)

4. In what time will ₹ 1000 becomes ₹ 1331 at 10% per annum compounded annually ?
(1) 3 years (2) $2\frac{1}{2}$ years
(3) 2 years (4) $3\frac{1}{2}$ years
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting) & (SSC MTS Exam-. 24.03.2013 (Ist Sitting)

5. The principal, which will amount to ₹ 270.40 in 2 years at the rate of 4% per annum compound interest, is
(1) ₹ 200 (2) ₹ 225
(3) ₹ 250 (4) ₹ 220
(SSC CPO S.I. Exam. 05.09.2004)

6. A sum of money on compound interest amounts to ₹ 10648 in 3 years and ₹ 9680 in 2 years. The rate of interest per annum is :
(1) 5% (2) 10%
(3) 15% (4) 20%
(SSC CPO S.I. Exam. 26.05.2005)

7. At what rate per cent per annum will ₹ 2304 amount to ₹ 2500 in 2 years at compound interest ?
(1) $4\frac{1}{2}\%$ (2) $4\frac{1}{5}\%$
(3) $4\frac{1}{6}\%$ (4) $4\frac{1}{3}\%$
(SSC CPO S.I. Exam. 05.09.2004) & (SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

8. A sum becomes ₹ 1,352 in 2 years at 4% per annum compound interest. The sum is
(1) ₹ 1,225 (2) ₹ 1,270
(3) ₹ 1,245 (4) ₹ 1,250
(SSC CGL Prelim Exam. 11.05.2003 (IInd Sitting) & (SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting) & (SSC CISF ASI Exam. 29.08.2010)

9. The compound interest on ₹ 16,000 for 9 months at 20% per annum, interest being compounded quarterly, is
(1) ₹ 2,520 (2) ₹ 2,524
(3) ₹ 2,522 (4) ₹ 2,518
(SSC CPO S.I. Exam. 03.09.2006)

10. 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 ₹ 10,000 for 3 years will be
(1) ₹ 1,600 (2) ₹ 1,625.80
(3) ₹ 1,575.20 (4) ₹ 2,000
(SSC CPO S.I. Exam. 03.09.2006)

11. The compound interest on ₹ 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
(1) ₹ 142.40 (2) ₹ 140.40
(3) ₹ 141.40 (4) ₹ 143.40
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

12. At what rate per annum will ₹ 32000 yield a compound interest of ₹ 5044 in 9 months interest being compounded quarterly ?
(1) 20% (2) 32%
(3) 50% (4) 80%
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

13. The compound interest on ₹ 8,000 at 15% per annum for 2 years 4 months, compounded annually is:
(1) ₹ 2980 (2) ₹ 3091
(3) ₹ 3109 (4) ₹ 3100
(SSC CPO S.I. Exam. 16.12.2007)

14. In what time will ₹ 10,000 amount to ₹ 13310 at 20% per annum compounded half yearly?
(1) $1\frac{1}{2}$ years (2) 2 years
(3) $2\frac{1}{2}$ years (4) 3 years
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

15. A certain sum of money yields ₹ 1261 as compound interest for 3 years at 5% per annum. The sum is
(1) ₹ 9000 (2) ₹ 8400
(3) ₹ 7500 (4) ₹ 8000
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

16. A certain sum, invested at 4% per annum compound interest, compounded halfyearly, amounts to ₹ 7,803 at the end of one year. The sum is
(1) ₹ 7,000 (2) ₹ 7,200
(3) ₹ 7,500 (4) ₹ 7,700
(SSC CGL Prelim Exam. 27.07.2008 (IInd Sitting)

17. A certain sum amounts to ₹ 5,832 in 2 years at 8% per annum compound interest, the sum is
(1) ₹ 5,000 (2) ₹ 5,200
(3) ₹ 5,280 (4) ₹ 5,400
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

18. The compound interest on ₹ 6,000 at 10% per annum for $1\frac{1}{2}$ years, when the interest being compounded annually, is
(1) ₹ 910 (2) ₹ 870
(3) ₹ 930 (4) ₹ 900
(SSC CPO S.I. Exam. 09.11.2008)

19 In what time ₹ 8,000 will amount to ₹ 9,261 at 10% per annum compound interest, when the interest is compounded half yearly ?
(1) $3\frac{1}{2}$ years (2) $1\frac{1}{2}$ years
(3) $2\frac{1}{2}$ years (4) 2 years
(SSC CPO S.I. Exam. 09.11.2008)

20. At what rate per cent per annum will a sum of ₹ 1,000 amounts to ₹ 1,102.50 in 2 years at compound interest ?
(1) 5% (2) 5.5%
(3) 6% (4) 6.5%
(SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

21. In how many years will a sum of ₹ 800 at 10% per annum compound interest, compounded semi-annually becomes ₹ 926.10 ?
(1) $1\frac{1}{2}$ years (2) $1\frac{2}{3}$ years
(3) $2\frac{1}{3}$ years (4) $2\frac{1}{2}$ years
(SSC CGL Tier-I Exam. 16.05.2010 (Second Sitting)

22. An amount of ₹ 6,000 lent at 5% per annum compound interest for 2 years will become
(1) ₹ 600 (2) ₹ 6,600
(3) ₹ 6,610 (4) ₹ 6,615
(SSC (South Zone) Investigator Exam. 12.09.2010)

23. In what time will ₹ 1000 amounts to ₹ 1331 at 20% per annum, compounded half yearly ?
(1) $1\frac{1}{2}$ years (2) 2 years
(3) 1 year (4) $2\frac{1}{2}$ years
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

24. The compound interest on ₹30,000 at 7% per annum for a certain time is ₹4,347. The time is
(1) 3 years (2) 4 years
(3) 2 years (4) 2.5 years
(SSC Sub-Inspector & LDC Exam. 21.10.2012 (Ist Sitting)

25. A sum of ₹ 8000 will amount to ₹ 8820 in 2 years if the interest is calculated every year. The rate of compound interest is
(1) 6% (2) 7%
(3) 3% (4) 5%
(SSC Sub-Inspector & LDC Exam. 28.10.2012, Ist Sitting)

26. 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 :
(1) ₹ 12,000 (2) ₹ 12,320
(3) ₹ 12,500 (4) ₹ 11,320
(SSC Sub-Inspector & LDC Exam. 04.11.2012, Ist Sitting)

27. The sum of money that yields a compound interest of ₹420 during the second year at 5% p.a is
(1) ₹4,000 (2) ₹42,000
(3) ₹8,000 (4) ₹21,000
(SSC Graduate Level Tier-I Exam. 11.11.2012, Ist Sitting)

28. A man saves ₹ 2000 at the end of each year and invests the money at 5% compound interest. At the end of 3 years he will have :
(1) ₹ 4305 (2) ₹ 6305
(3) ₹ 4205 (4) ₹ 2205
(SSC Multi-Tasking Staff Exam. 10.03.2013)

29. The time in which ₹ 80,000 amounts to ₹ 92,610 at 10% p.a. compound interest, interest being compounded semi annually is :
(1) $1\frac{1}{2}$ years (2) 2 years
(3) $2\frac{1}{2}$ years (4) 3 years
(SSC Graduate Level Tier-I Exam. 21.04.2013, Ist Sitting)

30. A man borrows ₹ 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 ?
(1) ₹ 12000 (2) ₹ 12100
(3) ₹ 12200 (4) ₹ 12300
(SSC Graduate Level Tier-I Exam. 21.04.2013 IInd Sitting)

31. ₹ 800 at 5% per annum compounded annually will amount to ₹ 882 in
(1) 1 year (2) 2 years
(3) 3 years (4) 4 years
(SSC Constable (GD) Exam. 12.05.2013)

32. The compound interest on ₹ 5,000 for 3 years at 10% p. a. will amount to
(1) ₹ 1,654 (2) ₹ 1,655
(3) ₹ 1,600 (4) ₹ 1,565
(SSC Graduate Level Tier-II Exam. 29.09.2013)

33. A sum of ₹ 3,200 invested at 10% p.a. compounded quarterly amounts to ₹ 3,362. Compute the time period.
(1) $\frac{1}{2}$ year (2) 1 year
(3) 2 years (4) $\frac{3}{4}$ year
(SSC Graduate Level Tier-II Exam. 29.09.2013)

34. The compound interest on a certain sum of money for 2 years at 5% is ₹ 328, then the sum is
(1) ₹ 3000 (2) ₹ 3600
(3) ₹ 3200 (4) ₹ 3400
(SSC CGL Tier-II Exam. 21.09.2014)

35. Two years ago, the value of my motorbike was ₹ 62500. If the value depreciates by 4% every year, now its value is
(1) ₹ 56700 (2) ₹ 57600
(3) ₹ 57500 (4) ₹ 55700
(SSC CGL Tier-II Exam. 21.09.2014)

36. The compound interest on a sum of money for 2 years is ₹ 615 and the simple interest for the same period is ₹ 600. Find the principal.
(1) ₹ 6,500 (2) ₹ 6,000
(3) ₹ 8,000 (4) ₹ 9,500
(SSC CHSL DEO Exam. 16.11.2014) (Ist Sitting)

37. Rekha invested a sum of ₹ 12000 at 5% per annum compound interest. She received an amount of ₹ 13230 after *n* years. Find *n*.
(1) 2.8 years (2) 3.0 years
(3) 2.5 years (4) 2.0 years
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam. 22.06.2014 TF No. 999 KP0)

38. When principal = ₹ S, rate of interest = 2r % p.a, then a person will get after 3 years at compound interest
(1) ₹ $\frac{6Sr}{100}$
(2) ₹ $S\left(1+\frac{r}{100}\right)^3$
(3) ₹ $S\left(1+\frac{r}{50}\right)^3$
(4) ₹ $3S\left(1+\frac{r}{100}\right)^3$
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

COMPOUND INTEREST

39. The sum of money which becomes ₹ 2420 at 10 % rate of compound interest after two years is
(1) ₹ 2000 (2) ₹ 1000
(3) ₹ 2500 (4) ₹ 1500
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

40. On a certain principal the compound interest compounded annually for the second year at 10% per annum is ₹ 132. The principal is
(1) ₹ 1250 (2) ₹ 1000
(3) ₹ 1200 (4) ₹ 1320
(SSC CGL Tier-II Exam. 12.04.2015 TF No. 567 TL 9)

41. The principal that yields a compound interest of Rs. 420 during the second year at 5% per annum is
(1) Rs. 7,000 (2) Rs. 5,000
(3) Rs. 8,000 (4) Rs. 6,000
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

42. In what time will Rs. 64,000 amount to Rs. 68,921 at 5% per annum, interest being compounded half yearly ?
(1) 3 years (2) $2\frac{1}{2}$ years
(3) 2 years (4) $1\frac{1}{2}$ years
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

43. 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
(1) ₹ 8000 (2) ₹ 6000
(3) ₹ 12000 (4) ₹ 10000
(SSC CGL Tier-I Exam, 16.08.2015 (Ist Sitting) TF No. 3196279)

44. At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?
(1) 7.5% (2) 6.5%
(3) 7% (4) 6%
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (IInd Sitting) TF No. 7203752)

45. The compound interest on Rs. 12000 for 9 months at 20% per annum, interest being compounded quarterly is :
(1) Rs. 1750 (2) Rs. 2089.70
(3) Rs. 1891.50 (4) Rs. 2136.40
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

46. The compound interest on Rs. 30,000 at 7% per annum for n years is Rs. 4347. The value of n is
(1) 3 (2) 2
(3) 4 (4) 5
(SSC CGL Tier-II Online Exam.01.12.2016)

47. A sum of Rs. 2420 is accumulated in 2 years at 10% compund interest on a certain amount. Then the original amount is :
(1) Rs. 1000 (2) Rs. 2000
(3) Rs. 1500 (3) Rs. 2500
(SSC CPO Exam. 06.06.2016) (Ist Sitting)

48. The compound interest on a sum of Rs. 5000 at 8% per annum for 9 months when interest is compound quarterly is :
(1) Rs. 300 (2) Rs. 300.12
(3) Rs. 306.04 (4) Rs. 308
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

49. A sum of money invested at compound interest amounts to Rs. 800 in 3 years and to Rs. 840 in 4 years. The rate of interest per annum is :
(1) $2\frac{1}{2}\%$ (2) 4%
(3) 5% (4) $6\frac{2}{3}\%$
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (IInd Sitting)

50. In how many years will a sum of Rs. 800 at 10% per annum compounded semi-annually become Rs. 926.10?
(1) $2\frac{1}{2}$ years (2) 3 years
(3) 2 years (4) $1\frac{1}{2}$ years
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (IInd Sitting)

51. A sum of Rs. 2000 amounts to Rs. 4000 in two years at compound interest. In how many years will the same amount become Rs. 8000 ?
(1) 2 (2) 4
(3) 6 (4) 8
(SSC CGL Tier-I (CBE) Exam. 29.08.2016) (IInd Sitting)

52. The compound interest on Rs. 64,000 for 3 years, compounded annually at 7.5% p.a. is
(1) Rs. 14,400 (2) Rs. 15,705
(3) Rs. 15,507 (4) Rs. 15,075
(SSC CGL Tier-I (CBE) Exam. 01.09.2016) (Ist Sitting)

53. Find the amount which Shyam will get on Rs. 4096, if he gives it for 18 months at $12\frac{1}{2}\%$ per annum, interest being compounded half yearly.
(1) Rs. 5,813 (2) Rs. 4,515
(3) Rs. 4,913 (4) Rs. 5,713
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

54. If Rs. 10000 amounts to Rs. 11664 invested in compound interest (compounded annually) for two years then the annual rate of compound interest is
(1) 10% (2) 9%
(3) 8% (4) 6%
(SSC CGL Tier-I (CBE) Exam. 06.09.2016) (Ist Sitting)

55. The compound interest on Rs. 4000 for 4 years at 10% per annum will be
(1) Rs. 1856.40 (2) Rs. 1600
(3) Rs. 1856 (4) Rs. 1756.60
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

56. A man invested a sum of money at compound interest. It amounted to Rs. 2420 in 2 years and to Rs. 2662 in 3 years. Find the sum.
(1) Rs. 1000 (2) Rs. 2000
(3) Rs. 5082 (4) Rs. 3000
(SSC CGL Tier-II Online Exam.01.12.2016)

57. A sum of Rs. 3000 amounts to Rs. 6000 in two years at compound interest. The interest for four years is :
(1) Rs. 9000 (2) Rs. 12000
(3) Rs. 6000 (4) Rs. 3000
(SSC CGL Tier-I (CBE) Exam. 31.08.2016 (IIIrd Sitting)

58. If a sum of Rs.12500 is invested for 1 year at 12% per annum interest being compounded semi-annually, then interest earned is :
(1) Rs.1505 (2) Rs.1535
(3) Rs.1545 (4) Rs.1550
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IInd Sitting)

59. A sum of money amounts to Rs. 6655 at the rate of 10% compounded annually for 3 years. The sum of money is
(1) Rs. 5000 (2) Rs. 5500
(3) Rs. 6000 (4) Rs. 6100
(SSC CGL Tier-I (CBE) Exam. 06.09.2016 (IIIrd Sitting)

60. In what time (in years) will Rs. 8000 amount to Rs. 9261 at 5% per annum, compounded annually?

(1) 3 (2) $3\frac{1}{2}$

(3) 4 (4) $4\frac{1}{2}$

(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IIIrd Sitting)

61. The compound interest on Rs. 1000 at 10% per annum for 3 years in (Rs.) is :

(1) Rs. 1331 (2) Rs. 331

(3) Rs. 300 (4) Rs. 1300

(SSC CGL Tier-I (CBE) Exam. 08.09.2016 (IInd Sitting)

62. What would be the compound interest of Rs. 25000 for 2 years at the rate of 5% per annum ?

(1) Rs. 2500 (2) Rs. 2562.5

(3) Rs. 2425.25 (4) Rs. 5512.5

(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IInd Sitting)

63. The compound interest on Rs. 24000 at 10% per annum for $1\frac{1}{2}$ years, interest being compounded semi-annually is :

(1) Rs. 3783 (2) Rs. 3777

(3) Rs. 3780 (4) Rs. 3781

(SSC CGL Tier-I (CBE) Exam. 09.09.2016 (IIIrd Sitting)

64. The sum for 2 years gives a compound interest of Rs. 3225 at the rate of 15% per annum. The sum is

(1) Rs. 10000 (2) Rs. 20000

(3) Rs. 15000 (4) Rs. 32250

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

65. In 3 years Rs. 3000 amounts to Rs. 3993 at x% compound interest, compounded annually. The value of x is

(1) 10 (2) 8

(3) 5 (4) $3\frac{1}{3}$

(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

66. The least number of years in which a sum of money on 19% p.a. compound interest will be more than double is

(1) 3 years (2) 4 years

(3) 5 years (4) 2 years

(SSC Multi-Tasking Staff Exam. 30.04.2017)

TYPE–II

1. If the compound interest on a certain sum for 2 years at 3% per annum is ₹ 101.50, then the simple interest on the same sum at the same rate and for the same time will be

(1) ₹ 90.00 (2) ₹ 95.50

(3) ₹ 100.00 (4) ₹ 98.25

(SSC CPO S.I. Exam. 12.01.2003

2. If the compound interest on a sum of money for 3 years at the rate of 5% per annum is ₹ 252.20, the simple interest on the same sum at the same rate and for the same time is

(1) ₹ 220 (2) ₹ 240

(3) ₹ 245 (4) ₹ 250

(SSC CPO S.I. Exam. 07.09.2003)

3. On a certain sum of money the compound interest for 2 years is ₹ 282.15 and the simple interest for the same period of time is ₹ 270. The rate of interest per annum is

(1) 6.07% (2) 10%

(3) 9% (4) 12.15%

(SSC CPO S.I. Exam. 07.09.2003)

4. If the compound interest on a sum for 2 years at $12\frac{1}{2}$% per annum is ₹ 510, the simple interest on the same sum at the same rate for the same period of time is :

(1) ₹ 400 (2) ₹ 480

(3) ₹ 450 (4) ₹ 460

(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

5. The compound interest on a certain sum of money at a certain rate for 2 years is ₹ 40.80 and the simple interest on the same sum is ₹ 40 at the same rate and for the same time. The rate of interest is

(1) 2% per annum

(2) 3% per annum

(3) 4% per annum

(4) 5% per annum

(SSC CPO S.I. Exam. 05.09.2004)

6. The compound interest on a certain sum of money invested for 2 years at 5% per annum is ₹ 328. The simple interest on the sum, at the same rate and for the same period will be

(1) ₹ 320 (2) ₹ 308

(3) ₹ 300 (4) ₹ 287

(SSC CPO S.I. Exam. 05.09.2004) & (SSC CPO S.I. Exam. 26.05.2005)

7. Compound interest on a sum of money for 2 years at 4 per cent per annum is ₹ 2, 448. Simple interest of the same sum of money at the same rate of interest for 2 years will be

(1) ₹ 2,500 (2) ₹ 2,400

(3) ₹ 2,360 (4) ₹ 2,250

(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

8. At a certain rate per annum, the simple interest on a sum of money for one year is ₹ 260 and the compound interest on the same sum for two years is ₹ 540.80. The rate of interest per annum is

(1) 4% (2) 6%

(3) 8% (4) 10%

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

9. The simple interest on a sum of money at 4% per annum for 2 years is ₹ 80. The compound interest in the same sum for the same period is

(1) ₹ 82.60 (2) ₹ 82.20

(3) ₹ 81.80 (4) ₹ 81.60

(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

10. The compound interest on a certain sum of money at 5% per annum for 2 years is ₹ 246. The simple interest on the same sum for 3 years at 6% per annum is

(1) ₹ 435 (2) ₹ 450

(3) ₹ 430 (4) ₹ 432

(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

11. The simple interest and compound interest (compounded annually) on a certain sum of money with a given rate for a period of 2 years are ₹ 900 and ₹ 954 respectively. The sum of money is

(1) ₹ 3700 (2) ₹ 3650

(3) ₹ 3850 (4) ₹ 3750

(SSC CPO S.I. Exam. 09.11.2008)

12. The compound interest on a certain sum of money for 2 years at 10% per annum is ₹420. The simple interest on the same sum at the same rate and for the same time will be

(1) ₹350 (2) ₹375

(3) ₹380 (4) ₹400

(SSC Assistant Grade-III Exam. 11.11.2012 (IInd Sitting)

13. If the compound interest on a certain sum for 2 years at 4% p.a. is ₹ 102, the simple interest at the same rate of interest for two years would be

(1) ₹ 200 (2) ₹ 50
(3) ₹ 150 (4) ₹ 100

(SSC CGL Exam. 04.07.1999 (Ist Sitting) & (SSC Multi-Tasking Staff Exam. 17.03.2013, Kolkata Region)

14. 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.

(1) ₹ 2500 (2) ₹ 2000
(3) ₹ 2250 (4) ₹ 2125

(SSC Graduate Level Tier-I Exam. 21.04.2013)

15. 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

(1) ₹ 2,400 (2) ₹ 2,500
(3) ₹ 2,480 (4) ₹ 2,440

(SSC Graduate Level Tier-I Exam. 19.05.2013)

16. 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

(1) ₹ 600 (2) ₹ 675
(3) ₹ 650 (4) ₹ 625

(SSC Sub-Inspector & LDC Exam. 20.10.2013)

17. The compound interest on a certain sum of money at a certain rate per annum for two years is ₹ 2,050, and the simple interest on the same amount of money at the same rate for 3 years is ₹ 3, 000. Then the sum of money is

(1) ₹ 20,000 (2) ₹ 18,000
(3) ₹ 21,000 (4) ₹ 25, 000

(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (IInd Sitting)

18. The compound interest on a certain sum of money for 2 years at 5% per annum is ₹ 410. The simple interest on the same sum at the same rate and for the same time is

(1) ₹ 400 (2) ₹ 300
(3) ₹ 350 (4) ₹ 405

(SSC CGL Tier-I Exam. 19.10.2014 (Ist Sitting)

19. If the compound interest on a sum for 2 years at $12\frac{1}{2}$ p.a is ₹ 510, the simple interest on the same sum at the same rate for the same period of time is

(1) ₹ 400 (2) ₹ 450
(3) ₹ 460 (4) ₹ 480

(SSC CGL Tier-II Exam. 21.09.2014)

20. 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 Rs. 3,205 in 4 years. The man borrowed.

(1) Rs. 80,000
(2) Rs. 1,00,000
(3) Rs. 1,20,000
(4) Rs. 1,50,000

(SSC CGL Tier-I Exam. 19.10.2014 TF No. 022 MH 3)

21. 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).

(1) 1600 (2) 1800
(3) 2000 (4) 2100

(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 (Ist Sitting) TF No. 8037731)

22. On a certain sum of money, the simple interest for 2 years is Rs. 350 at the rate of 4% per annum. If it was invested at compound interest at the same rate for the same duration as before, how much more interest would be earned ?

(1) Rs. 3.50 (2) Rs. 7
(3) Rs. 14 (4) Rs. 35

(SSC CPO Exam. 06.06.2016) (Ist Sitting)

23. The simple interest on a sum of money for 3 years is Rs. 240 and the compound interest on the same sum, at the same rate for 2 years is Rs. 170. The rate of interest is :

(1) 8% (2) $29\frac{1}{6}\%$
(3) $12\frac{1}{2}$ (4) $5\frac{5}{17}\%$

(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 20.03.2016) (IInd Sitting)

24. The simple interest on a certain sum of money for 2 years at 5% is Rs. 1600. The compound interest at the same rate after 3 years interest compound annually, is

(1) Rs.2520 (2) Rs.2522
(3) Rs.2555 (4) Rs.2535

(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (Ist Sitting)

25. A man borrowed some money from a private organisation at 5% simple interest per annum. He lended this money to another person at 10% compound interest per annum, and made a profit of Rs. 26,410 in 4 years. The man borrowed

(1) Rs. 200000 (2) Rs. 150000
(3) Rs. 132050 (4) Rs. 100000

(SSC CGL Tier-I (CBE) Exam. 31.08.2016) (IInd Sitting)

26. If the simple interest on a sum of money for 2 years at 5% per annum is Rs. 50, the compound interest on the same at the same rate and for the same time is :

(1) Rs. 50.50 (2) Rs. 51.25
(3) Rs. 51.50 (4) Rs. 50.05

(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (IInd Sitting)

27. There is 40% increase in an amount in 8 years at simple interest. What will be the compound interest (in rupees) of Rs 30000 after 2 years at the same rate ?

(1) 6150 (2) 7687.5
(3) 4612.5 (4) 3075

(SSC CHSL (10+2) Tier-I (CBE) Exam. 16.01.2017) (IInd Sitting)

TYPE–III

1. If the difference between the compound interest, compounded every six months, and the simple interest on a certain sum of money at the rate of 12% per annum for one year is ₹ 36, the sum is :

(1) ₹ 10,000 (2) ₹ 12,000
(3) ₹ 15,000 (4) ₹ 9,000

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

2. What is the difference between compound interest on ₹ 5,000 for $1\frac{1}{2}$ years at 4% per annum according as the interest is compounded yearly or half-yearly?

(1) ₹ 2.04 (2) ₹ 3.06
(3) ₹ 8.30 (4) ₹ 4.80

(SSC CGL Prelim Exam. 27.02.2000 (Second Sitting)

3. 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 ₹ 15. Then the sum is :
(1) ₹ 6,500 (2) ₹ 5,500
(3) ₹ 6,000 (4) ₹ 7,000
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

4. If the difference between the compound interest and simple interest on a sum at 5% rate of interest per annum for three years is ₹ 36.60, then the sum is
(1) ₹ 8000 (2) ₹ 8400
(3) ₹ 4400 (4) ₹ 4800
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone)

5. The difference between compound interest and simple interest on ₹ 2500 for 2 years at 4% per annum is
(1) ₹ 40 (2) ₹ 45
(3) ₹ 14 (4) ₹ 4
(SSC CPO S.I. Exam. 12.01.2003

6. The difference between simple and compound interest (compounded annually) on a sum of money for 2 years at 10% per annum is ₹ 65. The sum is
(1) ₹ 65650 (2) ₹ 65065
(3) ₹ 6565 (4) ₹ 6500
(SSC CGL Prelim Exam. 11.05.2003 (Second Sitting)

7. The difference between the compound interest (compounded annually) and the simple interest on a sum of ₹ 1000 at a certain rate of interest for 2 years is ₹ 10. The rate of interest per annum is :
(1) 5% (2) 6%
(3) 10% (4) 12%
(SSC CGL Prelim Exam. 08.02.2004 (Second Sitting)

8. If the difference between the simple and compound interests on a sum of money for 2 years at 4% per annum is ₹ 80, the sum is :
(1) ₹ 5000 (2) ₹ 50000
(3) ₹ 10000 (4) ₹ 1000
(SSC CPO S.I. Exam. 26.05.2005

9. The difference between simple and compound interest on a certain sum of money for 2 years at 4 per cent per annum is ₹ 1. The sum of money is :
(1) ₹ 600 (2) ₹ 625
(3) ₹ 560 (4) ₹ 650
(SSC CGL Prelim Exam. 13.11.2005 (First Sitting) Exam. 26.05.2005)

10. The difference between the simple and compound interest on a certain sum of money for 2 years at 4% per annum is ₹ 4. The sum is
(1) ₹ 2500 (2) ₹ 2,400
(3) ₹ 2,600 (4) ₹ 2,000
(SSC CGL Prelim Exam. 13.11.2005 (Second Sitting)

11. If the difference between the compound and simple interests on a certain sum of money for 3 years at 5% per annum is ₹ 15.25, then the sum is
(1) ₹ 2,000 (2) ₹ 1,000
(3) ₹ 1,500 (4) ₹ 2,500
(SSC CPO S.I. Exam. 03.09.2006)

12. The difference between compound interest and simple interest of a sum for 2 years at 8 per cent is ₹ 768. The sum is
(1) ₹ 1,00,000 (2) ₹ 1,10,000
(3) ₹ 1,20,000 (4) ₹ 1,70,000
(SSC Section Officer (Commercial Audit) Exam. 26.11.2006 (Second Sitting)

13. The difference between the compound and the simple interest on a sum for 2 years at 10% per annum, when the interest is compounded annually, is ₹ 28. If the interest were compounded half-yearly, the difference in the two interests will be
(1) ₹ 44 (2) ₹ 28.35
(3) ₹ 43.41 (4) ₹ 43.29
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

14. A sum of ₹ 6,000 is deposited for 3 years at 5% per annum compound interest (compounded annually). The difference of interests for 3 and 2 years will be
(1) ₹ 75.00 (2) ₹ 30.75
(3) ₹ 330.75 (4) ₹ 375.00
(SSC Section Officer (Commercial Audit) Exam. 30.09.2007 (Second Sitting)

15. The difference between compound interest (compounded annually) and simple interest on a certain sum of money at 10% per annum for 2 years is ₹ 40. The sum is :
(1) ₹ 4000 (2) ₹ 3600
(3) ₹ 4200 (4) ₹ 3200
(SSC CPO S.I. Exam. 16.12.2007)

16. The difference between compound and simple interest on a certain sum for 3 years at 5% per annum is Rs. 122. The sum is
(1) ₹ 16,000 (2) ₹ 15,000
(3) ₹ 12,000 (4) ₹ 10,000
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

17. The difference between simple interest and compound interest of a certain sum of money at 20% per annum for 2 years is ₹ 48. Then the sum is
(1) ₹ 1,000 (2) ₹ 1, 200
(3) ₹ 1, 500 (4) ₹ 2, 000
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

18. The difference between the compound interest and simple interest on ₹ 10,000 for 2 years is ₹ 25. The rate of interest per annum is
(1) 5% (2) 7%
(3) 10% (4) 12%
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

19. If the difference between S.I. and C.I. for 2 years on a sum of money lent at 5% is ₹ 6, then the sum is
(1) ₹ 2200 (2) ₹ 2400
(3) ₹ 2600 (4) ₹ 2000
(SSC CGL Tier-1 Exam. 26.06.2011 (Second Sitting)

20. On a certain sum of money lent out at 16% p.a. the difference between the compound interest for 1 year, payable half yearly, and the simple interest for 1 year is ₹ 56. The sum is
(1) ₹ 1080 (2) ₹ 7805
(3) ₹ 8750 (4) ₹ 5780
(SSC CPO (SI, ASI & Intelligence Officer) Exam. 28.08.2011 (Paper-I)

21. On what sum does the difference between the compound interest and the simple interest for 3 years at 10% is ₹ 31 ?
(1) ₹ 1500 (2) ₹ 1200
(3) ₹ 1100 (4) ₹ 1000
(SSC CGL Prelim Exam. 27.02.200 (First Sitting)

22. The difference between simple and compound interests on a sum of money at 4% per annum for 2 years is ₹ 8. The sum is
(1) ₹ 400 (2) ₹ 800
(3) ₹ 4,000 (4) ₹ 5,000
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

23. 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 ₹ 180. If the rate of interest in both the cases is 10%, then the sum is
(1) ₹ 60,000 (2) ₹ 72,000
(3) ₹ 62,000 (4) ₹ 54,000
(SSC Multi-Tasking (Non-Technical) Staff Exam. 27.02.2011)

24. The difference between the compound interest and the simple interest on a certain sum at 5% per annum for 2 years is ₹ 1.50. The sum is
(1) ₹ 600 (2) ₹ 500
(3) ₹ 400 (4) ₹ 300
(SSC Multi-Tasking Staff Exam. 10.03.2013, Ist Sitting : Patna)

25. What sum will give ₹ 244 as the difference between simple interest and compound interest at 10% in $1\frac{1}{2}$ years compounded half yearly ?
(1) ₹ 40,000 (2) ₹ 36,000
(3) ₹ 32,000 (4) ₹ 28,000
(SSC Graduate Level Tier-II Exam. 29.09.2013

26. The difference between simple and compound interest compounded annually, on a certain sum of money for 2 years at 4% per annum is ₹ 1. The sum (in ₹) is :
(1) 650 (2) 630
(3) 625 (4) 640
(SSC CGL Prelim Exam. 11.05.2003 (First Sitting)

27. The difference between the compound interest and simple interest for the amount ₹ 5,000 in 2 years is ₹ 32. The rate of interest is
(1) 5% (2) 8%
(3) 10% (4) 12%
(SSC CGL Tier-1 Exam. 19.06.2011 (Second Sitting)

28. On what sum of money will the difference between S.I and C.I for 2 years at 5% per annum be equal to ₹ 25 ?
(1) ₹ 10,000 (2) ₹ 10,500
(3) ₹ 9,500 (4) ₹ 9000
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

29. The difference between the compound interest and simple interest on a certain sum for 2 years at 10% per annum is ₹ 300. Find the sum.
(1) ₹ 31,000 (2) ₹ 31,500
(3) ₹ 30,000 (4) ₹ 30,500
(SSC CGL Tier-I Re-Exam. (2013) 27.04.2014)

30. Find the difference between the compound interest and the simple interest on ₹ 32,000 at 10% p.a. for 4 years.
(1) ₹ 2051.20 (2) ₹ 2052.50
(3) ₹ 2025.20 (4) ₹ 2501.20
(SSC CHSL DEO & LDC Exam. 16.11.2014)

31. 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?
(1) Rs. 24,600 (2) Rs. 24,800
(3) Rs. 25,200 (4) Rs. 25,500
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 01.11.2015, IInd Sitting)

32. The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Re. 1. The sum (in Rs.) is :
(1) 620 (2) 630
(3) 640 (4) 625
(SSC CGL Tier-I (CBE) Exam. 09.09.2016) (Ist Sitting)

33. The difference between C I and S I for 2 years at 10% rate of interest is Rs. 4. Find the sum of money.
(1) Rs. 400 (2) Rs. 200
(3) Rs. 300 (4) Rs. 800
(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

34. The difference between simple and compound interest (compounded annually) on a sum of money for 3 years at 10% per annum is Rs. 93. The sum (in Rs.) is :
(1) 30000 (2) 30300
(3) 3000 (4) 3030
(SSC CGL Tier-I (CBE) Exam. 27.08.2016) (Ist Sitting)

35. The difference between compound interest and simple interest on a certain sum of money for 2 years at 5% per annum is Rs. 41. What is the sum of money ?
(1) Rs. 7200 (2) Rs. 9600
(3) Rs. 16400 (4) Rs. 8400
(SSC CGL Tier-I (CBE) Exam. 28.08.2016) (IInd Sitting)

36. If the difference of the compound interest and the simple interest on a sum of money for 3 years is Rs. 186. Find the sum of money, if the rate of interest in both cases be 10%.
(1) Rs. 5500 (2) Rs. 7200
(3) Rs. 6500 (4) Rs. 6000
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

37. The difference between the simple interest and compound interest (compounded annually) on Rs. 40,000 for 3 years at 8% per annum is :
(1) Rs. 684.32 (2) Rs. 788.48
(3) Rs. 784.58 (4) Rs. 4000
(SSC CGL Tier-I (CBE) Exam. 28.08.2016 (IST Sitting)

38. The difference between compound interest and simple interest on an amount of Rs. 15,000 for 2 years is Rs. 96. The rate of interest per annum is
(1) 6% (2) 7%
(3) 8% (4) 9%
(SSC CGL Tier-I (CBE) Exam. 01.09.2016 (IIIrd Sitting)

39. The difference between compound interest and simple interest on Rs. 5000 for 2 years at 8% per annum payable yearly is
(1) Rs. 30 (2) Rs. 31
(3) Rs. 33 (4) Rs. 32
(SSC CGL Tier-I (CBE) Exam. 03.09.2016 (IIIrd Sitting)

40. If the difference between the compound interest and the simple interest on a certain sum at the rate of 5% per annum for 2 years is Rs. 20, then the sum is :
(1) Rs. 2000 (2) Rs. 4000
(3) Rs. 6000 (4) Rs. 8000
(SSC CGL Tier-I (CBE) Exam. 07.09.2016 (IInd Sitting)

TYPE–IV

1. If the amount is 2.25 times of the sum after 2 years at compound interest (compound annually), the rate of interest per annum is :
(1) 25% (2) 30%
(3) 45% (4) 50%
(SSC CGL Prelim Exam. 04.07.1999 (Second Sitting)

2. A sum of money doubles itself in 4 years at compound interest. It will amount to 8 times itself at the same rate of interest in :
(1) 18 years (2) 12 years
(3) 16 years (4) 24 years
(SSC CGL Prelim Exam. 24.02.2002 (First Sitting) & (SSC CPO S.I. Exam. 16.12.2007)

3. A sum borrowed under compound interest doubles itself in 10 years. When will it become fourfold of itself at the same rate of interest ?
(1) 15 years (2) 20 years
(3) 24 years (4) 40 years
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

4. A sum of money becomes eight times of itself in 3 years at compound interest. The rate of interest per annum is
(1) 100% (2) 80%
(3) 20% (4) 10%
(SSC CGL Prelim Exam. 08.02.2004 (First Sitting)

5. 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 :
(1) 15 years (2) 12 years
(3) 18 years (4) 10 years
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Prelim Exam. 13.11.2005 (First Sitting)

6. A sum of money placed at compound interest doubles itself in 5 years. In how many years, it would amount to eight times of itself at the same rate of interest ?
(1) 10 years (2) 15 years
(3) 7 years (4) 20 years
(SSC CGL Prelim Exam. 13.11.2005 (IInd Sitting) & (SSC CPO S.I. Exam. 06.09.2009) & (SSC CAPs S.I. & CISF ASI Exam. 23.06.2013)

7. A sum of money at compound interest doubles itself in 15 years. It will become eight times of itself in
(1) 45 years (2) 48 years
(3) 54 years (4) 60 years
(SSC CGL Prelim Exam. 04.07.1999 (Ist Sitting) & (SSC CGL Tier-I Exam. 16.05.2010 (First Sitting)

8. A sum of ₹ 12,000, deposited at compound interest becomes double after 5 years. How much will it be after 20 years ?
(1) ₹ 1,44,000 (2) ₹ 1,20,000
(3) ₹ 1,50,000 (4) ₹ 1,92,000
(SSC CGL Tier-I Exam. 16.05.2010 (IInd Sitting) & (SSC CGL Tier-I 19.06.2011 (IInd Sitting)

9. At what rate percent per annum of compound interest, will a sum of money become four times of itself in two years ?
(1) 100% (2) 75%
(3) 50% (4) 20%
(SSC (South Zone) Investigator Exam. 12.09.2010)

10. 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 ?
(1) 4 years (2) 6 years
(3) 6.4 years (4) 7.5 years
(SSC CPO S.I. Exam. 12.12.2010 (Paper-I)

11. 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?
(1) 6 years (2) 4 years
(3) 8 years (4) 5 years
(SSC CGL Tier-1 Exam. 19.06.2011 (First Sitting)

12. A sum of money placed at compound interest doubles itself in 4 years. In how many years will it amount to four times itself ?
(1) 12 years (2) 13 years
(3) 8 years (4) 16 years
(SSC CGL Tier-1 Exam. 26.06.2011 (First Sitting)

13. A sum of money at compound interest amounts to thrice itself in 3 years. In how many years will it be 9 times itself ?
(1) 9 years (2) 27 years
(3) 6 years (4) 3 years
(SSC Graduate Level Tier-II Exam.16.09.2012)

14. A sum of money becomes 1.331 times in 3 years as compound interest. The rate of interest is
(1) 8% (2) 7.5%
(3) 10% (4) 50%
(SSC Multi-Tasking Staff Exam. 17.03.2013, IInd Sitting)

15. If a sum of money compounded annually becomes 1.44 times of itself in 2 years, then the rate of interest per annum is
(1) 25% (2) 22%
(3) 21% (4) 20%
(SSC Graduate Level Tier-II Exam. 29.09.2013

16. If the amount is $3\frac{3}{8}$ times the sum after 3 years at compound interest compounded annually, then the rate of interest per annum is
(1) 25% (2) 50%
(3) $16\frac{2}{3}\%$ (4) $33\frac{1}{3}\%$
(SSC CHSL DEO & LDC Exam. 10.11.2013, Ist Sitting)

TYPE–V

1. A sum of money amounts to ₹ 4,840 in 2 years and to ₹ 5,324 in 3 years at compound interest compounded annually. The rate of interest per annum is :
(1) 10% (2) 9%
(3) 11% (4) 8%
(SSC CPO S.I. Exam. 16.12.2007)

2. A certain sum of money amounts to ₹ 2,420 in 2 years and ₹ 2,662 in 3 years at some rate of compound interest, compounded annually. The rate of interest per annum is
(1) 6% (2) 8%
(3) 9% (4) 10%
(SSC CPO S.I. Exam. 09.11.2008)

3. An amount of money at compound interest grows up to ₹ 3,840 in 4 years and up to ₹ 3,936 in 5 years. Find the rate of interest.
(1) 2.5% (2) 2%
(3) 3.5% (4) 2.05%
(SSC Graduate Level Tier-II Exam.16.09.2012)

4. A certain amount of money at r%, compounded annually after two and three years becomes ₹1440 and ₹ 1728 respectively. *r* is
(1) 5 (2) 10
(3) 15 (4) 20
(SSC CHSL DEO & LDC Exam. 28.10.2012 (Ist Sitting)

5. The compound interest on a certain sum for two successive years are ₹ 225 and ₹ 238.50. The rate of interest per annum is :
(1) $7\frac{1}{2}\%$ (2) 5%
(3) 10% (4) 6%
(SSC CHSL DEO & LDC Exam. 21.10.2012 (IInd Sitting)

6. An amount of money appreciates to ₹ 7,000 after 4 years and to ₹ 10,000 after 8 years at a certain compound interest compounded annually. The initial amount of money was
(1) ₹ 4,700 (2) ₹ 4,900
(3) ₹ 4,100 (4) ₹ 4,300
(SSC Multi-Tasking Staff Exam. 17.03.2013, Ist Sitting)

7. A sum of money invested at compound interest amounts to ₹ 650 at the end of first year and ₹ 676 at the end of second year. The sum of money is :
(1) ₹ 600 (2) ₹ 540
(3) ₹ 625 (4) ₹ 560
(SSC CGL Prelim Exam. 24.02.2002 (Ist Sitting) & (SSC CPO S.I. Exam. 07.09.2003)

8. A sum of money invested at compound interest amounts in 3 years to ₹ 2,400 and in 4 years to ₹ 2,520. The interest rate per annum is :
(1) 5% (2) 6%
(3) 10% (4) 12%
(SSC CGL Prelim Exam. 24.02.2002 (Second Sitting)

9. A sum becomes ₹ 4500 after two years and ₹ 6750 after four years at compound interest. The sum is
(1) ₹ 4000 (2) ₹ 2500
(3) ₹ 3000 (4) ₹ 3050
(SSC CGL Prelim Exam. 24.02.2002 (Middle Zone) & (SSC CGL Exam. 13.11.2005)

10. A sum of money at compound interest will amount to ₹ 650 at the end of the first year and ₹ 676 at the end of the second year. The amount of money is
(1) ₹ 1,300 (2) ₹ 650
(3) ₹ 1,250 (4) ₹ 625
(SSC CGL Tier-I Re-Exam. (2013) 20.07.2014 (Ist Sitting)

11. On a certain sum of money, the simple interest for 2 years is Rs. 350 at the rate of 4% per annum. It was invested at compound interest at the same rate for the same duration as before, how much more interest would be earned?
(1) Rs. 3.50 (2) Rs. 7
(3) Rs. 14 (4) Rs. 35
(SSC CAPFs (CPO) SI & ASI, Delhi Police Exam. 05.06.2016) (Ist Sitting)

12. A certain amount grows at an annual interest rate of 12%, compounded monthly. Which of the following equations can be solved to find the number of years, *y*, that it would take for the investment to increase by a factor of 64 ?
(1) $64 = (1.01)^{12y}$
(2) $\frac{1}{64} = (1.04)12y$
(3) $64 = (1.04)12y$
(4) $8 = (1.01)6y$
(SSC CPO SI & ASI, Online Exam. 06.06.2016) (IInd Sitting)

13. The compound interest on a certain sum for 2 years at 10% per annum is Rs. 525 . The simple interest on the same sum for double the time at half the rate per cent per annum is :
(1) Rs. 520 (2) Rs. 550
(3) Rs. 500 (4) Rs. 515
(SSC CGL Tier-I (CBE) Exam. 30.08.2016) (IInd Sitting)

14. A sum of money is invested at 20% compound interest (compounded annually). It would fetch Rs. 723 more in 2 years if interest is compounded half yearly. The sum is
(1) Rs.15,000 (2) Rs.30,000
(3) Rs.20,000 (4) Rs.7,500
(SSC CGL Tier-II (CBE) Exam. 30.11.2016)

TYPE–VI

1. A builder borrows ₹ 2550 to be paid back with compound interest at the rate of 4% per annum by the end of 2 years in two equal yearly instalments. How much will each instalment be ?
(1) ₹ 1352 (2) ₹ 1377
(3) ₹ 1275 (4) ₹ 1283
(SSC CGL Prelim Exam. 27.02.2000 (First Sitting)

2. A man buys a scooter on making a cash down payment of ₹ 16224 and promises to pay two more yearly instalments 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
(1) ₹ 40000 (2) ₹ 46824
(3) ₹ 46000 (4) ₹ 50000
(SSC CGL Prelim Exam. 04.02.2007 (Second Sitting)

3. Kamal took ₹ 6800 as a loan which along with interest is to be repaid in two equal annual instalments. If the rate of interest is $12\frac{1}{2}\%$, compounded annually, then the value of each instalment is
(1) ₹ 8100 (2) ₹ 4150
(3) ₹ 4050 (4) ₹ 4000
(SSC CGL Prelim Exam. 27.07.2008 (First Sitting)

4. A loan of ₹ 12,300 at 5% per annum compound interest, is to be repaid in two equal annual instalments at the end of every year. Find the amount of each instalment.
(1) ₹ 6,651 (2) ₹ 6,615
(3) ₹ 6,516 (4) ₹ 6,156
(SSC CPO S.I. Exam. 06.09.2009)

5. 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
(1) ₹ 127 (2) ₹ 121
(3) ₹ 210 (4) ₹ 225
(SSC CHSL DEO & LDC Exam. 9.11.2014)

6. Rs. 16,820 is divided between two brothers of age 27 years and 25 years. They invested their money at 5% per annum compound interest in such a way that both will receive equal money at the age of 40 years. The share (in Rs.) of elder brother is
(1) 8,280 (2) 8,410
(3) 8,820 (4) 8,000
(SSC CGL Tier-II Exam, 2014 12.04.2015 (Kolkata Region) TF No. 789 TH 7)

7. A sum of money is paid back in two annual instalments of Rs. 17, 640 each, allowing 5% compound interest compounded annually. The sum borrowed was
(1) Rs. 32,800 (2) Rs. 32,200
(3) Rs. 32,000 (4) Rs. 32,400
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

8. Mr. Dutta desired to deposit his retirement benefit of Rs. 3 lacs partly to a post office and partly to a bank at 10% and 6% interests respectively. If his monthly interest income was Rs. 2000, then the difference of his deposits in the post office and in the bank was :
(1) Rs. 50,000 (2) Rs. 40,000
(3) Nil (4) Rs.1,00,000
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (Ist Sitting) TF No. 1375232)

9. The income of a company increases 20% per year. If the income is Rs. 26,64,000 in the year 2012, then its income in the year 2010 was :
(1) Rs. 28,55,000
(2) Rs. 18,50,000
(3) Rs. 28,20,000
(4) Rs. 21,20,000
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 06.12.2015 (IInd Sitting) TF No. 3441135)

TYPE–VII

1. A person deposited a sum of ₹ 6,000 in a bank at 5% per annum simple interest. Another person deposited ₹ 5,000 at 8% per annum compound interest. After two years, the difference of their interests will be
(1) ₹ 230 (2) ₹ 232
(3) ₹ 832 (4) ₹ 600
(SSC CPO S.I. Exam. 03.09.2006)

2. 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 ₹ 104.50 a year. The amount of money he borrows, is
(1) ₹ 6,000 (2) ₹ 5,500
(3) ₹ 5,000 (4) ₹ 4,500
(SSC CGL Prelim Exam. 04.02.2007 (First Sitting)

3. A sum of ₹ 13,360 was borrowed at $8\frac{3}{4}\%$ per annum compound interest and paid back in two years in two equal annual instalments. What was the amount of each instalment ?
(1) ₹ 5,769 (2) ₹ 7,569
(3) ₹ 7,009 (4) ₹ 7,500
(SSC CGL Prelim Exam. 27.07.2008 (Second Sitting)

4. Sita deposited ₹ 5,000 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 semi-annually.
(1) ₹ 50 (2) ₹ 40
(3) ₹ 77.50 (4) ₹ 85.50
(SSC Graduate Level Tier-II Exam.16.09.2012)

5. What does ₹ 250 amounts to in 2 years with compound interest at the rate of 4% in the 1st year and 8% in the second year ?
(1) ₹ 280 (2) ₹ 280.80
(3) ₹ 468 (4) ₹ 290.80
(SSC Constable (GD) Exam. 12.05.2013 Ist Sitting)

6. A man gave 50% of his savings of ₹ 84,100 to his wife and divided the remaining sum among his two sons A and B of 15 and 13 years of age respectively. He divided it in such a way that each of his sons, when they attain the age of 18 years, would receive the same amount at 5% compound interest per annum. The share of B was
(1) ₹ 20,000 (2) ₹ 20,050
(3) ₹ 22,000 (4) ₹ 22,050
(SSC CGL Tier-I Exam. 19.10.2014)

7. Find the rate percent per annum, if Rs. 2000 amounts to Rs. 2,315.25 in a year and a half, interest being compounded half yearly.
(1) 11.5% (2) 10%
(3) 5% (4) 20%
(SSC CAPFs SI, CISF ASI & Delhi Police SI Exam, 21.06.2015 IInd Sitting)

8. A sum of money placed at compound interest doubles itself in 5 years. It will amount to eight times of itself at the same rate of interest in
(1) 20 years (2) 10 years
(3) 12 years (4) 15 years
(SSC CGL Tier-II Exam, 25.10.2015, TF No. 1099685)

9. The sum of money which when given on compound interest at 18% per annum would fetch Rs. 960 more when the interest is payable half yearly than when it was payable annually for 2 years is :
(1) Rs.60,000 (2) Rs. 30,000
(3) Rs. 40,000 (4) Rs. 50,000
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

10. The amount on Rs. 25,000 in 2 years at annual compound interest, if the rates for the successive years be 4% and 5% per annum respectively is :
(1) Rs. 30,000 (2) Rs. 26,800
(3) Rs. 27,300 (4) Rs. 28,500
(SSC CHSL (10+2) LDC, DEO & PA/SA Exam, 15.11.2015 (Ist Sitting) TF No. 6636838)

11. The amount of Rs. 10,000 after 2 years, compounded annually with the rate of interest being 10% per annum during the first year and 12% per annum during the second year, would be (in rupees)
(1) 11,320 (2) 12,000
(3) 12,320 (4) 12,500
(SSC CGL Tier-I (CBE) Exam. 02.09.2016) (Ist Sitting)

12. On a certain principal if the simple interest for two years is Rs. 1400 and compound interest for the two years is Rs. 1449, what is the rate of interest?
(1) 7 per cent (2) 3.5 per cent
(3) 14 per cent (4) 10.5 per cent
(SSC CHSL (10+2) Tier-I (CBE) Exam. 15.01.2017) (IInd Sitting)

13. A man borrowed some money and agreed to pay-off by paying Rs. 3150 at the end of the 1st year and Rs. 4410 at the end of the 2nd year. If the rate of compound interest is 5% per annum, then the sum is
(1) Rs. 5000 (2) Rs. 6500
(3) Rs. 7000 (4) Rs. 9200
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

14. Rs. 260200 is divided between Ram and Shyam so that the amount that Ram receives in 4 years is the same as that Shyam receives in 6 years. If the interest is compounded annually at the rate of 4% per annum then Ram's share is
(1) Rs. 125000 (2) Rs. 135200
(3) Rs. 152000 (4) Rs. 108200
(SSC CGL Tier-II (CBE) Exam. 12.01.2017)

15. B borrows ₹ 5,000 from A at 6% p.a. simple interest and lends it to C at compound interest of 10% p.a. If B collects the money back from C after 2 years and repays A, the profit made by B in the transaction is
(1) ₹ 1,050 (2) ₹ 500
(3) ₹ 450 (4) ₹ 600
(SSC Multi-Tasking Staff Exam. 30.04.2017)

SHORT ANSWERS

TYPE-I

1. (2)	**2.** (2)	**3.** (3)	**4.** (1)
5. (3)	**6.** (2)	**7.** (3)	**8.** (4)
9. (3)	**10.** (3)	**11.** (1)	**12.** (1)
13. (3)	**14.** (1)	**15.** (4)	**16.** (3)
17. (1)	**18.** (3)	**19.** (2)	**20.** (1)
21. (1)	**22.** (4)	**23.** (1)	**24.** (3)
25. (4)	**26.** (2)	**27.** (3)	**28.** (2)
29. (1)	**30.** (2)	**31.** (2)	**32.** (2)
33. (1)	**34.** (3)	**35.** (2)	**36.** (2)
37. (4)	**38.** (3)	**39.** (1)	**40.** (3)
41. (3)	**42.** (4)	**43.** (4)	**44.** (4)
45. (3)	**46.** (2)	**47.** (2)	**48.** (3)
49. (3)	**50.** (4)	**51.** (2)	**52.** (3)
53. (3)	**54.** (3)	**55.** (1)	**56.** (2)
57. (1)	**58.** (3)	**59.** (1)	**60.** (1)
61. (2)	**62.** (2)	**63.** (1)	**64.** (1)
65. (1)	**66.** (2)		

TYPE-II

1. (3)	**2.** (2)	**3.** (3)	**4.** (2)
5. (3)	**6.** (1)	**7.** (2)	**8.** (3)
9. (4)	**10.** (4)	**11.** (4)	**12.** (4)
13. (4)	**14.** (4)	**15.** (1)	**16.** (2)
17. (1)	**18.** (1)	**19.** (4)	**20.** (2)
21. (3)	**22.** (2)	**23.** (3)	**24.** (2)
25. (4)	**26.** (2)	**27.** (4)	

TYPE-III

1. (1)	**2.** (2)	**3.** (3)	**4.** (4)
5. (4)	**6.** (4)	**7.** (3)	**8.** (2)
9. (2)	**10.** (1)	**11.** (1)	**12.** (3)
13. (3)	**14.** (3)	**15.** (1)	**16.** (1)
17. (2)	**18.** (1)	**19.** (2)	**20.** (3)
21. (4)	**22.** (4)	**23.** (2)	**24.** (1)
25. (3)	**26.** (3)	**27.** (2)	**28.** (1)
29. (3)	**30.** (1)	**31.** (3)	**32.** (4)
33. (1)	**34.** (1)	**35.** (3)	**36.** (4)
37. (2)	**38.** (3)	**39.** (4)	**40.** (4)

TYPE-IV

1. (4)	**2.** (2)	**3.** (2)	**4.** (1)
5. (3)	**6.** (2)	**7.** (1)	**8.** (4)
9. (1)	**10.** (2)	**11.** (2)	**12.** (3)
13. (3)	**14.** (3)	**15.** (4)	**16.** (2)

TYPE-V

1. (1)	**2.** (4)	**3.** (1)	**4.** (4)
5. (4)	**6.** (2)	**7.** (3)	**8.** (1)
9. (3)	**10.** (4)	**11.** (2)	**12.** (1)
13. (3)	**14.** (2)		

TYPE-VI

1. (1)	**2.** (2)	**3.** (3)	**4.** (2)
5. (2)	**6.** (3)	**7.** (1)	**8.** (3)
9. (2)			

TYPE-VII

1. (2)	**2.** (3)	**3.** (2)	**4.** (3)
5. (2)	**6.** (1)	**7.** (2)	**8.** (4)
9. (4)	**10.** (3)	**11.** (3)	**12.** (1)
13. (3)	**14.** (2)	**15.** (3)	

EXPLANATIONS

TYPE-I

1. (2) Using Rule 1,
P = ₹ 3000, A = ₹ 3993, n = 3 years

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

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

$$\left(1+\frac{r}{100}\right)^3 = \frac{3993}{3000} = \frac{1331}{1000}$$

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

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

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

$$\Rightarrow \frac{r}{100} = \frac{1}{10} \Rightarrow r = \frac{100}{10}$$

$\therefore$ r = 10%

2. (2) Using Rule 1,

$$A = 10{,}000\left(1+\frac{2}{100}\right)^4$$

$$= 10{,}000\left(\frac{51}{50}\right)^4 = 10824.3216$$

$\therefore$ Interest
= 10,824.3216 – 10,000
= ₹ 824.32

3. (3) Using Rule 1,
According to question,

$$2420 = 2000\left(1+\frac{10}{100}\right)^t$$

$$\frac{2420}{2000} = \left(\frac{11}{10}\right)^t$$

$$\text{or,} \left(\frac{11}{10}\right)^t = \frac{121}{100}$$

$$\text{or,} \left(\frac{11}{10}\right)^t = \left(\frac{11}{10}\right)^2$$

$\therefore$ t = 2 years

4. (1) Using Rule 1,
Let the required time be *n* years.
Then,

$$1331 = 1000\left(1+\frac{10}{100}\right)^n$$

$$\left[\because P_1 = P\left(1+\frac{r}{100}\right)^n\right]$$

$$\Rightarrow \frac{1331}{1000} = \left(\frac{10+1}{10}\right)^n$$

$$\Rightarrow \left(\frac{11}{10}\right)^n = \left(\frac{11}{10}\right)^3$$

$\Rightarrow n = 3$

5. (3) Using Rule 1,
Let the principal be ₹ P.

$$\therefore 270.40 = P\left(1+\frac{4}{100}\right)^2$$

$$\Rightarrow 270.40 = P\ (1 + 0.04)^2$$

$$\Rightarrow P = \frac{270.40}{1.04 \times 1.04} = ₹\ 250$$

6. (2) Using Rule 1,
Let the sum be ₹ P and rate of interest be R% per annum. Then,

$$P\left(1+\frac{R}{100}\right)^2 = 9680 \quad ...(i)$$

$$P\left(1+\frac{R}{100}\right)^3 = 10648 \quad ...(ii)$$

On dividing equation (ii) by (i)

$$1+\frac{R}{100} = \frac{10648}{9680}$$

$$\Rightarrow \frac{R}{100} = \frac{10648}{9680} - 1$$

$$= \frac{10648 - 9680}{9680}$$

$$\Rightarrow \frac{R}{100} = \frac{968}{9680} = \frac{1}{10}$$

$$\Rightarrow R = \frac{1}{10} \times 100 = 10\,\%$$

7. (3) Using Rule 1,
Let the rate per cent per annum be *r*. Then,

$$2500 = 2304\left(1+\frac{r}{100}\right)^2$$

$$\Rightarrow \left(1+\frac{r}{100}\right)^2 = \frac{2500}{2304} = \left(\frac{50}{48}\right)^2$$

$$\Rightarrow 1+\frac{r}{100} = \frac{50}{48} = \frac{25}{24}$$

$$\Rightarrow \frac{r}{100} = \frac{25}{24} - 1 = \frac{1}{24}$$

$$\Rightarrow r = \frac{100}{24} = \frac{25}{6} = 4\frac{1}{6}\,\%$$

8. (4) Using Rule 1,
Let the sum be ₹ *x*.

$$\therefore 1352 = x\left(1+\frac{4}{100}\right)^2$$

$$\Rightarrow 1352 = x\left(1+\frac{1}{25}\right)^2$$

$$\Rightarrow 1352 = x\left(\frac{26}{25}\right)^2$$

$$\Rightarrow x = \frac{1352 \times 25 \times 25}{26 \times 26}$$

= ₹ 1250

9. (3) Using Rule 1,
The interest is compounded quarterly.

$$\therefore R = \frac{20}{4} = 5\%$$

Time = 3 quarters

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

$$= 16000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$= 16000\left[\left(\frac{21}{20}\right)^3 - 1\right]$$

$$= 16000\left(\frac{9261-8000}{8000}\right)$$

$$= 16000 \times \frac{1261}{8000} = ₹\ 2522$$

10. (3) Using Rule 3,
Amount

$$= P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right)$$

$$= 10000\left(1+\frac{4}{100}\right)\left(1+\frac{5}{100}\right)\left(1+\frac{6}{100}\right)$$

$$= 10000 \times \frac{26}{25} \times \frac{21}{20} \times \frac{53}{50}$$

A = ₹ 11575.2
∴ C.I. = ₹ (11575.2–10000)
= ₹ 1575.2

11. (1) Using Rule 3,
Amount

$$= 2000\left(1+\frac{4}{100}\right)\left(1+\frac{3}{100}\right)$$

= 2000 ×1.04 ×1.03
= ₹ 2142.40
∴ CI = ₹ (2142.40 – 2000)
= ₹ 142.40

12. (1) Using Rule 1,
Let the rate of CI be R per cent per annum.

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

$$\Rightarrow 5044 = 32000\left[\left(1+\frac{R}{400}\right)^3 - 1\right]$$

[∵ Interest is compounded quarterly]

$$\Rightarrow \frac{5044}{32000} = \left(1+\frac{R}{400}\right)^3 - 1$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^3 - 1 = \frac{1261}{8000}$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^3 = 1+\frac{1261}{8000}$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^3 = \frac{9261}{8000} = \left(\frac{21}{20}\right)^3$$

$$\Rightarrow 1+\frac{R}{400} = \frac{21}{20} \Rightarrow \frac{R}{400} = \frac{21}{20} - 1 = \frac{1}{20}$$

$$\Rightarrow R = \frac{400}{20} = 20$$

13. (3) Using Rule 1,

$$\text{Amount} = P\left(1+\frac{R}{100}\right)^t$$

$$= 8000\left(1+\frac{15}{100}\right)^{2\frac{1}{3}}$$

$$= 8000\left(1+\frac{3}{20}\right)^2\left(1+\frac{3}{20\times 3}\right)$$

$$= 8000 \times \frac{23}{20} \times \frac{23}{20} \times \frac{21}{20}$$

= ₹ 11109
∴ Compound Interest
= ₹ (11109 – 8000) = ₹ 3109.

14. (1) Using Rule 1 and 2,
The rate of interest is compounded half yearly,
∴ *r* = 10% per half year

Let time = $\frac{T}{2}$ years = half years

According to the question,

$$\text{Amount} = P\left(1+\frac{R}{100}\right)^t$$

$$\Rightarrow 13310 = 10000\left(1+\frac{10}{100}\right)^T$$

$$\Rightarrow \frac{13310}{10000} = \left(\frac{11}{10}\right)^T$$

$$\Rightarrow \left(\frac{11}{10}\right)^T = \frac{1331}{1000} = \left(\frac{11}{10}\right)^3$$

$$\Rightarrow T = 3 \text{ half years} = 1\frac{1}{2} \text{ years}$$

15. (4) Let the principal be ₹ x. Now,

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

$$\Rightarrow 1261 = x\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$\Rightarrow 1261 = x\left(\frac{9261}{8000} - 1\right)$$

$$\Rightarrow 1261 = x\left(\frac{9261-8000}{8000}\right)$$

$$= \frac{1261x}{8000}$$

$$\Rightarrow x = \frac{1261\times 8000}{1261} = ₹\ 8000$$

16. (3) Using Rule 1,
Let the sum be P.
As, the interest is compounded half-yearly,
$\therefore$ R = 2%, T = 2 half years

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

$$\Rightarrow 7803 = P\left(1+\frac{2}{100}\right)^2$$

$$\Rightarrow 7803 = P\left(1+\frac{1}{50}\right)^2$$

$$\Rightarrow 7803 = P\times\frac{51}{50}\times\frac{51}{50}$$

$$\Rightarrow P = \frac{7803\times 50\times 50}{51\times 51} = ₹\ 7500$$

17. (1) Using Rule 1,

$$5832 = P\left(1+\frac{8}{100}\right)^2$$

$$\Rightarrow 5832 = P\left(1+\frac{2}{25}\right)^2$$

$$\Rightarrow 5832 = P\times\frac{27}{25}\times\frac{27}{25}$$

$$\Rightarrow P = \frac{5832\times 25\times 25}{27\times 27} = ₹\ 5000$$

18. (3) Amount

$$= 6000\left(1+\frac{10}{100}\right)\times\left(1+\frac{\frac{1}{2}\times 10}{100}\right)$$

$$= 6000\times\frac{11}{10}\times\frac{21}{20} = ₹\ 6930$$

Aliter : Using Rule 4,
Here, t = nF

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

$\therefore$ CI = ₹ (6930 – 6000) = ₹ 930

19. (2) Using Rule 1 and 2,
Interest is compounded half yearly.
$\therefore$ Rate of interest = 5%

Time = $\frac{n}{2}$ years (let)

or n half-years

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

$$\Rightarrow 9261 = 8000\left(1+\frac{5}{100}\right)^n$$

$$\Rightarrow \frac{9261}{8000} = \left(\frac{21}{20}\right)^n$$

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

$\Rightarrow n$ = 3 half years

$= \frac{3}{2}$ years $= 1\frac{1}{2}$ years

20. (1) Using Rule 1,

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

Let rate be 'r'

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

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

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

$$\Rightarrow 1+\frac{r}{100} = \frac{105}{100}$$

$$\Rightarrow \frac{r}{100} = \frac{5}{100}$$

$\Rightarrow r = 5\%$

21. (1) Using Rule 1 and 2,
Rate = 10% per annum = 5% half yearly

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

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

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

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

$\therefore$ Time = 3 half years

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

22. (4) Using Rule 1,

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

$$= 6000\left(1+\frac{5}{100}\right)^2$$

$$= 6000\times\frac{21}{20}\times\frac{21}{20} = ₹\ 6615$$

23. (1) Using Rule 1 and 2,
Let the required time be t years.
Interest is compounded half yearly.
$\therefore$ Time = $2t$ half years

and rate = $\frac{20}{2} = 10\%$

$$\therefore\ 1000\left(1+\frac{10}{100}\right)^{2t} = 1331$$

$$\Rightarrow \left(\frac{11}{10}\right)^{2t} = \frac{1331}{1000}$$

$$\Rightarrow \left(\frac{11}{10}\right)^{2t} = \left(\frac{11}{10}\right)^3 \Rightarrow 2t = 3$$

$\therefore\ t = \frac{3}{2}$ years or $1\frac{1}{2}$ years

24. (3) Using Rule 1,

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

$\Rightarrow$ 30000 + 4347

$$= 30000\left(1+\frac{7}{100}\right)^T$$

$$\Rightarrow \frac{34347}{30000} = \left(\frac{107}{100}\right)^T$$

$$\Rightarrow \frac{11449}{10000} = \left(\frac{107}{100}\right)^2 = \left(\frac{107}{100}\right)^T$$

$\Rightarrow$ Time = 2 years

25. (4) Using Rule 1,
If the rate of C.I. be r% per annum, then

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

$$\Rightarrow 8820 = 8000\left(1+\frac{r}{100}\right)^2$$

$$\Rightarrow \frac{8820}{8000} = \left(1+\frac{r}{100}\right)^2$$

$$\Rightarrow \frac{441}{400} = \left(\frac{21}{20}\right)^2 = \left(1+\frac{r}{100}\right)^2$$

$$\Rightarrow 1 + \frac{r}{100} = \frac{21}{20}$$

$$\Rightarrow \frac{r}{100} = \frac{21}{20} - 1 = \frac{1}{20}$$

$$\Rightarrow r = \frac{1}{20} \times 100$$

$\therefore r = 5\%$ per annum

26. (2) Using Rule 3,

$$A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)$$

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

$$= 10000 \times \frac{11}{10} \times \frac{28}{25}$$

= ₹ 12320

27. (3) Using Rule 1,

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PR}{100}$$

$$\Rightarrow 420 = P\left[\left(1+\frac{5}{100}\right)^2 - 1\right] - \frac{P\times 5}{100}$$

$$\Rightarrow 420 = P\left[\left(\frac{21}{20}\right)^2 - 1\right] - \frac{5P}{100}$$

$$\Rightarrow 420 = \frac{41P}{400} - \frac{5P}{100} = \frac{21P}{400}$$

$$\Rightarrow P = \frac{420 \times 400}{21} = ₹\ 8000$$

28. (2) Using Rule 1,
Amount

$$= 2000\left(1+\frac{5}{100}\right)^2 + 2000\left(1+\frac{5}{100}\right)$$

$$= 2000 \times \left(\frac{21}{20}\right)^2 + 2000\left(\frac{21}{20}\right)$$

$$= 2000 \times \frac{21}{20} \times \frac{41}{20} = ₹\ 4305$$

$\therefore$ Required amount
= 4305 + 2000 = ₹ 6305

29. (1) Using Rule 1 and 2,
Time = t half year
and R = 5% per half year

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

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

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

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

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

30. (2) If each instalment be x, then
Present worth of first instalment

$$= \frac{x}{1+\frac{10}{100}} = \frac{10x}{11}$$

Present worth of second instalment

$$= \frac{x}{\left(1+\frac{10}{100}\right)^2} = \frac{100}{121}x$$

$$\therefore \frac{10}{11}x + \frac{100}{121}x = 21000$$

$$\Rightarrow \frac{110x+100x}{121} = 21000$$

$$\Rightarrow 210x = 21000 \times 121$$

$$\Rightarrow x = \frac{21000\times 121}{210}\ x = ₹\ 12100$$

Aliter : Using Rule 9,
Here, n = 2, p = ₹ 21000,
r = 10%
Each annual instalment

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

$$= \frac{21000}{\frac{100}{110}+\left(\frac{100}{110}\right)^2}$$

$$= \frac{21000}{\frac{100}{110}+\frac{10000}{12100}}$$

$$= \frac{21000}{\frac{10}{11}+\frac{100}{121}}$$

$$= \frac{21000}{110+100} \times 121$$

$$= \frac{21000}{210} \times 121$$

= 12100

31. (2) Using Rule 1,

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

$$\Rightarrow 882 = 800\left(1+\frac{5}{100}\right)^T$$

$$\Rightarrow \frac{882}{800} = \left(\frac{21}{20}\right)^T$$

$$\Rightarrow \frac{441}{400} = \left(\frac{21}{20}\right)^2 = \left(\frac{21}{20}\right)^T$$

$\therefore$ T = 2 years

32. (2) Using Rule 1,

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

$$= 5000\left[\left(1+\frac{10}{100}\right)^3 - 1\right]$$

$$= 5000\left[\left(\frac{11}{10}\right)^3 - 1\right]$$

$$C.I. = \frac{5000\times 331}{1000} = ₹\ 1655$$

33. (1) Using Rule 1 and 2,

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

$$\Rightarrow \frac{3362}{3200} = \left(1+\frac{10}{400}\right)^{4t}$$

$$\Rightarrow \frac{1681}{1600} = \left(\frac{41}{40}\right)^{4t}$$

$\Rightarrow \left(\frac{41}{40}\right)^2 = \left(\frac{41}{40}\right)^{4t}$

$\Rightarrow 4t = 2 \Rightarrow t = \frac{1}{2}$ year

34. (3) Using Rule 1,
Let the principal be Rs. P

$\therefore$ C.I. $= P\left[\left(1+\frac{R}{100}\right)^2 - 1\right]$

$\Rightarrow 328 = P\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$

$\Rightarrow 328 = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$

$\Rightarrow 328 = P\left(\frac{441}{400} - 1\right)$

$\Rightarrow 328 = P\left(\frac{441-400}{400}\right)$

$\Rightarrow 328 = \frac{41P}{400}$

$\Rightarrow P = \frac{328 \times 400}{41} = ₹\ 3200$

35. (2) Present worth of bike

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

$= 62500\left(1-\frac{4}{100}\right)^2$

$= 62500\left(1-\frac{1}{25}\right)^2$

$= 62500\left(\frac{25-1}{25}\right)^2$

$= \frac{62500 \times 24 \times 24}{25 \times 25}$

$= ₹\ 57600$

36. (2) C.I. – S.I.
$= 615 - 600 = ₹\ 15$

S.I. for 1 year $= \frac{600}{2} = ₹\ 300$

$\therefore$ S.I. for 1 year on ₹ 300
$= ₹\ 15$

$\therefore$ Rate $= \frac{15 \times 100}{300 \times 1} = 5\%$

$\therefore \frac{PRT}{100} = 600$

$\Rightarrow P \times \frac{5 \times 2}{100} = 600$

$\Rightarrow P = 600 \times 10 = ₹\ 6000$

37. (4) Using Rule 1,

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

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

$\Rightarrow \frac{13230}{12000} = \left(1+\frac{1}{20}\right)^n$

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

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

$\Rightarrow n = 2$ years

38. (3) Using Rule 1,
Principal (P) = Rs. S
Rate (R) = $2r$% per annum

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

$= S\left(1+\frac{2r}{100}\right)^3 = S\left(1+\frac{r}{50}\right)^3$

39. (1) Using Rule 1,

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

$\Rightarrow 2420 = P\left(1+\frac{10}{100}\right)^2$

$\Rightarrow 2420 = P\left(1+\frac{1}{10}\right)^2 = P\left(\frac{11}{10}\right)^2$

$\Rightarrow P = \frac{2420 \times 10 \times 10}{11 \times 11} =$ Rs. 2000

40. (3) Using Rule 1,
Let principal be Rs. P.

Interest in 1 year $= \frac{PRT}{100}$

$= \frac{P \times 10}{100} =$ Rs. $\frac{P}{10}$

According to question,

$\therefore P\left[\left(1+\frac{R}{100}\right)^2 - 1\right] - \frac{P}{10}$
$= 132$

$\Rightarrow P\left[\left(1+\frac{10}{100}\right)^2 - 1\right] - \frac{P}{10}$
$= 132$

$\Rightarrow P\left[\left(\frac{11}{10}\right)^2 - 1\right] - \frac{P}{10} = 132$

$\Rightarrow P\left(\frac{121}{100} - 1\right) - \frac{P}{10} = 132$

$\Rightarrow \frac{21P}{100} - \frac{P}{10} = 132$

$\Rightarrow \frac{21P - 10P}{100} = 132$

$\Rightarrow \frac{11P}{100} = 132$

$\Rightarrow P = \frac{132 \times 100}{11} =$ Rs 1200

41. (3) Using Rule 1,
Let the principal be Rs. P.
According to the question,

$P\left(1+\frac{R}{100}\right)^2 - P\left(1+\frac{R}{100}\right) = 420$

$\Rightarrow P\left(1+\frac{R}{100}\right)\left(1+\frac{R}{100}-1\right) = 420$

$\Rightarrow P\left(1+\frac{R}{100}\right) \times \frac{R}{100} = 420$

$\Rightarrow P\left(1+\frac{5}{100}\right) \times \frac{5}{100} = 420$

$\Rightarrow P\left(1+\frac{1}{20}\right) = 420 \times 20$

$\Rightarrow P \times \frac{21}{20} = 420 \times 20$

$\Rightarrow P = \frac{420 \times 20 \times 20}{21} =$ Rs. 8000

42. (4) Using Rule 1,
Time = T half–years

Rate $= \frac{5}{2}$% per half year

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

$\Rightarrow 68921 = 64000\left(1+\frac{5}{200}\right)^T$

$\Rightarrow \frac{68921}{64000} = \left(1+\frac{1}{40}\right)^T$

$\Rightarrow \frac{68921}{64000} = \left(\frac{41}{40}\right)^T$

$\Rightarrow \left(\frac{41}{40}\right)^3 = \left(\frac{41}{40}\right)^T$

$\Rightarrow T = 3$ half years

$= \frac{3}{2} = 1\frac{1}{2}$ years

43. (4) Using Rule 1,

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

$\Rightarrow 12100 = P\left(1+\frac{10}{100}\right)^2$

$\Rightarrow 12100 = P\left(\frac{11}{10}\right)^2$

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

$\Rightarrow P = \frac{12100\times100}{121}$ = Rs. 10000

44. (4) Using Rule 1,

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

$\Rightarrow 1348.32 = 1200\left(1+\frac{R}{100}\right)^2$

$\Rightarrow \frac{1348.32}{1200} = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow \frac{134832}{120000} = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow \frac{11236}{10000} = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow \left(\frac{106}{100}\right)^2 = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow \frac{106}{100} = 1+\frac{R}{100}$

$\Rightarrow 1+\frac{6}{100} = 1+\frac{R}{100}$

$\Rightarrow R = 6\%$ per annum.

45. (3) Using Rule 1,

Rate of interest

$= \frac{20}{4} = 5\%$ per quarter

Time = 3 quarters

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

$= 12000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$

$= 12000\left[\left(1+\frac{1}{20}\right)^3 - 1\right]$

$= 12000\left[\left(\frac{21}{20}\right)^3 - 1\right]$

$= 12000\left(\frac{9261}{8000} - 1\right)$

$= \frac{12000\times1261}{8000}$ = Rs. 1891.5

46. (2) Amount

= Rs. (30000 + 4347)

= Rs. 34347

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

$\Rightarrow 34347 = 30000\left(1+\frac{7}{100}\right)^n$

$\Rightarrow \frac{34347}{30000} = \left(\frac{107}{100}\right)^n$

$\Rightarrow \frac{11449}{10000} = \left(\frac{107}{100}\right)^n$

$\Rightarrow \left(\frac{107}{100}\right)^2 = \left(\frac{107}{100}\right)^n$

$\Rightarrow n = 2$ years

47. (2) Let the principal be Rs. P.

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

$\Rightarrow 2420 = P\left(1+\frac{10}{100}\right)^2$

$\Rightarrow 2420 = P\times\left(1+\frac{10}{100}\right)^2$

$\Rightarrow 2420 = P\left(\frac{11}{10}\right)^2$

$\Rightarrow P = \frac{2420\times10\times10}{11\times11}$

= Rs. 2000

48. (3) Rate of interest $= \frac{8}{4} = 2\%$ per quarter

Time = 3 quarters

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

$= 5000\left[\left(1+\frac{2}{100}\right)^3 - 1\right]$

$= 5000\left[(1.02)^3 - 1\right]$

= 5000 (1.061208 –1)

= 5000 × 0.061208

= Rs. 306.04

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

$\Rightarrow 800 = P\left(1+\frac{R}{100}\right)^3$ ....(i)

and,

$840 = P\left(1+\frac{R}{100}\right)^4$ ....(ii)

On dividing equation (ii) by (i),

$\frac{840}{800} = 1+\frac{R}{100}$

$\Rightarrow \frac{21}{20} = 1+\frac{R}{100}$

$\Rightarrow \frac{R}{100} = \frac{21}{20} - 1 = \frac{1}{20}$

$\Rightarrow R = \frac{1}{20}\times100$

= 5% per annum

50. (4) Rate = 10% Per annum

= 5% per half year

Time = T years = 2T half years

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

$\Rightarrow 926.10 = 800\left(1+\frac{5}{100}\right)^{2T}$

$\Rightarrow \frac{926.1}{800} = \left(1+\frac{1}{20}\right)^{2T}$

$\Rightarrow \frac{9261}{8000} = \left(\frac{21}{20}\right)^{2T}$

$\Rightarrow \left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^{2T}$

$\Rightarrow 2T = 3 \Rightarrow T = \frac{3}{2}$ years

COMPOUND INTEREST

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

$\Rightarrow 4000 = 2000\left(1+\frac{R}{100}\right)^2$

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

$\Rightarrow 1+\frac{R}{100} = \sqrt{2}$ .....(1)

$\therefore 8000 = 2000\left(1+\frac{R}{100}\right)^T$

$\Rightarrow 4 = (\sqrt{2})^T$

$\Rightarrow (\sqrt{2})^4 = (\sqrt{2})^T$

$\Rightarrow T = 4$ years

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

$= 64000\left(1+\frac{7.5}{100}\right)^3$

$= 64000\left(1+\frac{3}{40}\right)^3$

$= 64000\left(\frac{43}{40}\right)^3$

$= \frac{64000\times 43\times 43\times 43}{40\times 40\times 40}$

= Rs. 79507

$\therefore$ C.I. = Rs. (79507 – 64000)

= Rs. 15507

53. (3) Principal = Rs. 4096

Time = $\frac{3}{2}$ years = 3 half years

Rate = $\frac{25}{2}\%$ per annum

= $\frac{25}{4}\%$ per half year

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

$= 4096\left(1+\frac{25}{400}\right)^3$

$= 4096\left(1+\frac{1}{16}\right)^3$

$= 4096\times\frac{17}{16}\times\frac{17}{16}\times\frac{17}{16}$

= Rs. 4913

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

$\Rightarrow 11664 = 10000\left(1+\frac{R}{100}\right)^2$

$\Rightarrow \frac{11664}{10000} = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow \left(\frac{108}{100}\right)^2 = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow 1+\frac{R}{100} = \frac{108}{100}$

$\Rightarrow \frac{R}{100} = \frac{108}{100} - 1 = \frac{8}{100}$

$\therefore R = \frac{8}{100}\times 100$

= 8% per annum

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

$= 4000\left[\left(1+\frac{10}{100}\right)^4 - 1\right]$

$= 4000\left[\left(\frac{11}{10}\right)^4 - 1\right]$

= 4000 (1.4641 – 1)

= 4000 × 0.4641 = Rs. 1856.4

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

$\therefore 2420 = P\left(1+\frac{R}{100}\right)^2$ .... (i)

and, $2662 = P\left(1+\frac{R}{100}\right)^3$ .. (ii)

By equation (ii) ÷ (i)

$\frac{2662}{2420} = 1 + \frac{R}{100}$

$\Rightarrow \frac{R}{100} = \frac{2662}{2420} - 1$

$= \frac{2662-2420}{2420}$

$\Rightarrow \frac{R}{100} = \frac{242}{2420} = \frac{1}{10}$

$\Rightarrow$ R = 10% per annum.

From equation (i),

$2420 = P\left(1+\frac{10}{100}\right)^2$

$\Rightarrow 2420 = P\left(\frac{11}{10}\right)^2$

$\Rightarrow 2420 = P\times\frac{121}{100}$

$\Rightarrow P = \frac{2420\times 100}{121}$

= Rs. 2000

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

$\Rightarrow 6000 = 3000\left(1+\frac{R}{100}\right)^2$

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

On squaring,

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

i.e. Amount

= Rs. (4 × 3000)

= Rs. 12000

$\therefore$ C.I. = Rs. (12000 – 3000)

= Rs. 9000

58. (3) Rate of interest

= 12% per annum

= 6% per half-year

Time = 2 half years

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

$= 12500\left[\left(1+\frac{6}{100}\right)^2 - 1\right]$

$= 12500\left[\left(1+\frac{3}{50}\right)^2 - 1\right]$

$= 12500\left[\left(\frac{53}{50}\right)^2 - 1\right]$

$= 12500\left(\frac{2809}{2500} - 1\right)$

$= \text{Rs.}\left(\frac{12500\times 309}{2500}\right)$

= Rs. 1545

59. (1) Let the principal be Rs. P.

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

$\Rightarrow 6655 = P\left(1+\frac{10}{100}\right)^3$

$\Rightarrow 6655 = P\left(1+\frac{1}{10}\right)^3$

$\Rightarrow 6655 = P\left(\frac{11}{10}\right)^3$

$\Rightarrow P = \frac{6655\times 10\times 10\times 10}{11\times 11\times 11}$

= Rs. 5000

60. (1) Let the time be T years.

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

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

$\Rightarrow \frac{9261}{8000} = \left(1+\frac{1}{20}\right)^T$

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

$\Rightarrow$ T = 3 years

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

$= 1000\left[\left(1+\frac{10}{100}\right)^3 - 1\right]$

$= 1000\left[\left(1+\frac{1}{10}\right)^3 - 1\right]$

$= 1000\left[\left(\frac{11}{10}\right)^3 - 1\right]$

$= 1000\left(\frac{1331}{1000} - 1\right)$

$= \frac{1000\times 331}{1000}$ = Rs. 331

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

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

$= 25000\left[\left(1+\frac{1}{20}\right)^2 - 1\right]$

$= 25000\left(\frac{441}{400} - 1\right)$

$= 2500\left(\frac{441-400}{400}\right)$

$= \frac{25000\times 41}{400}$ = Rs. 2562.5

63. (1) Rate = 10% per annum
= 5% per half year

Time $= 1\frac{1}{2}$ years = 3 half years

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

$= 24000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$

$= 24000\left[\left(1+\frac{1}{20}\right)^3 - 1\right]$

$= 24000\left[\left(\frac{21}{20}\right)^3 - 1\right]$

$= 24000\left(\frac{9261}{8000} - 1\right)$

$= \frac{24000\times 1261}{8000}$ = Rs. 3783

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

$\Rightarrow 3225 = P\left[\left(1+\frac{15}{100}\right)^2 - 1\right]$

$\Rightarrow 3225 = P\left[\left(1+\frac{3}{20}\right)^2 - 1\right]$

$\Rightarrow 3225 = P\left[\left(\frac{23}{20}\right)^2 - 1\right]$

$\Rightarrow 3225 = P\left(\frac{529}{400} - 1\right)$

$\Rightarrow 3225 = P\left(\frac{529-400}{400}\right)$

$\Rightarrow 3225 = P \times \frac{129}{400}$

$\Rightarrow P = \frac{3225\times 400}{129}$

= Rs. 10000

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

$\Rightarrow 3993 = 3000\left(1+\frac{x}{100}\right)^3$

$\Rightarrow \frac{3993}{3000} = \left(1+\frac{x}{100}\right)^3$

$\Rightarrow \frac{1331}{1000} = \left(1+\frac{x}{100}\right)^3$

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

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

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

$\Rightarrow x = \frac{1}{10}\times 100$

= 10% per annum

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

$\Rightarrow 2P = P\left(1+\frac{19}{100}\right)^T$

$\Rightarrow 2 = \left(\frac{119}{100}\right)^T$

$\Rightarrow 2 = (1.19)^T$

If T = 4 years,

$(1.19)^4 > 2$

TYPE-II

1. (3) Let the sum be P.

$\therefore 101.50 = P\left[\left(1+\frac{3}{100}\right)^2 - 1\right]$

$\left[\because \text{C.I.} = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]\right]$

$\Rightarrow 101.50 = P\left[\left(\frac{103}{100}\right)^2 - 1\right]$

$= P\left(\frac{10609-10000}{10000}\right)$

$\Rightarrow$ P = ₹ $\frac{101.50\times 10000}{609}$

= ₹ $\frac{1015000}{609}$

$\therefore$ S.I. $= \frac{1015000\times 2\times 3}{609\times 100}$ = ₹ 100

Aliter : Using Rule 10,
Here, C.I. = Rs 101.50
R = 3%, S.I. = ?

C.I. = S.I. $\left(1+\frac{R}{200}\right)$

101.50 = S.I. $\left(1+\frac{3}{200}\right)$

S.I. $= \frac{101.50\times 200}{203}$

S.I. = ₹ 100

2. (2) Using Rule 1,
Suppose principal be x

$\Rightarrow x\left\{\left(1+\frac{5}{100}\right)^3 - 1\right\} = 252.20$

$\Rightarrow x\left\{\left(\frac{21}{20}\right)^3 - 1\right\} = 252.20$

$\Rightarrow x\left\{\frac{21\times 21\times 21 - 20\times 20\times 20}{20\times 20\times 20}\right\} = 252.20$

$\Rightarrow x\frac{1261}{8000} = 252.20$

$\therefore x = \frac{252 \cdot 20 \times 8000}{1261} = 1600$

$\Rightarrow SI = \frac{1600 \times 5 \times 3}{100} = ₹\ 240$

3. (3) Using Rule 10,
If SI on a certain sum for two years is x and CI is y, then

$y = x\left(1 + \frac{r}{200}\right)$

$\Rightarrow 282.15 = 270\left(1 + \frac{r}{100}\right)$

$\Rightarrow 1 + \frac{r}{200} = \frac{282.15}{270}$

$\Rightarrow \frac{r}{200} = \frac{282.15}{270} - 1$

$\Rightarrow \frac{r}{200} = \frac{12.15}{270}$

$\Rightarrow r = \frac{12.15 \times 200}{270} = 9\%$

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

$\Rightarrow 510 = P\left[\left(1 + \frac{25}{200}\right)^2 - 1\right]$

$\Rightarrow 510 = P\left(\frac{81}{64} - 1\right)$

$\Rightarrow P = \frac{510 \times 64}{17} = 1920$

$\therefore S.I. = \frac{1920 \times 2 \times 25}{100 \times 2} = ₹\ 480$

Aliter : Using Rule 10,
Here, C.I. = ₹ 510

$R = 12\frac{1}{2}\%$, S.I. = ?

$C.I. = S.I.\left(1 + \frac{R}{200}\right)$

$510 = S.I.\left(1 + \frac{25}{400}\right)$

$S.I. = \frac{510 \times 400}{425}$

S.I. = ₹ 480

5. (3) Let the principal be P and rate of interest be r per cent per annum. Then,

$C.I = P\left[\left(1 + \frac{r}{100}\right)^2 - 1\right]$

$\Rightarrow 40.80 = P\left[\left(1 + \frac{r}{100}\right)^2 - 1\right]$....(i)

$S.I. = \frac{P.r.t}{100} \Rightarrow 40 = \frac{Pr \times 2}{100}$ ...(ii)

$\therefore \frac{40.80}{40} = \frac{P\left[\left(1 + \frac{r}{100}\right)^2 - 1\right]}{\frac{2Pr}{100}}$

$\Rightarrow 1.02$

$= \frac{100}{2r}\left[1 + \frac{r^2}{10000} + \frac{2r}{100} - 1\right]$

$\Rightarrow 1.02 = \frac{r}{200} + 1$

$\Rightarrow \frac{r}{200} = 1.02 - 1$

$\Rightarrow r = 0.02 \times 200$

$\therefore r = 4\%$ per annum.

Aliter : Using Rule 10,
Here, C.I. = ₹ 40.80
S.I. = ₹ 40, R = ?

$C.I. = S.I.\left(1 + \frac{R}{200}\right)$

$40.80 = 40\left(1 + \frac{R}{200}\right)$

$\frac{4080}{4000} = 1 + \frac{R}{200}$

$\frac{408}{400} = \frac{200 + R}{200}$

408 = 400 + 2R
2R = 8
R = 4%

6. (1) Let the principal be P.

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

$\Rightarrow 328 = P\left[\left(1 + \frac{5}{100}\right)^2 - 1\right]$

$\Rightarrow 328 = P\left[\frac{441}{400} - 1\right]$

$\Rightarrow 328 = P\left[\frac{441 - 400}{400}\right]$

$\Rightarrow P = \frac{328 \times 400}{41} = ₹\ 3200$

$\therefore S.I. = \frac{PRT}{100} = \frac{3200 \times 5 \times 2}{100} = ₹\ 320$

Aliter : Using Rule 10,
Here, C.I. = ₹ 328,
R = 5%, S.I. = ?

$C.I. = S.I.\left(1 + \frac{R}{200}\right)$

$328 = S.I.\left(1 + \frac{5}{200}\right)$

$328 = S.I.\left(1 + \frac{1}{40}\right)$

$S.I. = \frac{328 \times 40}{41}$

S.I. = 8 x 40 = ₹ 320

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

$2448 = P\left[\left(1 + \frac{r}{100}\right)^t - 1\right]$

or $2448 = P\left[\left(1 + \frac{4}{100}\right)^2 - 1\right]$

$\Rightarrow 2448 = P\left[\frac{676}{625} - 1\right]$

$2448 = P\left[\frac{51}{625}\right]$

$\therefore P = \frac{2448 \times 625}{51}$

P = ₹ 30,000

$\therefore S.I. = \frac{30000 \times 4 \times 2}{100} = ₹\ 2400$

Aliter : Using Rule 10,
Here, C.I. = ₹ 2448
R = 4%, S.I. = ?

$C.I. = S.I.\left(1 + \frac{R}{200}\right)$

$2448 = S.I.\left(1 + \frac{4}{200}\right)$

$2448 = S.I.\left(1 + \frac{1}{50}\right)$

$2448 = S.I.\left(\frac{51}{50}\right)$

$S.I. = \frac{2448 \times 50}{51}$

S.I. = ₹ 2400

8. (3) Using Rule 1,
Let the principal be x and rate of interest be r% per annum.
Now,

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

$260 = \frac{x \times r}{100}$ ....(i)

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

$540.80 = x\left[\left(1+\frac{r}{100}\right)^2 - 1\right]$

$\Rightarrow 540.80 = x\left[1+\frac{2r}{100}+\frac{r^2}{10000}-1\right]$

$\Rightarrow 540.80 = \frac{2xr}{100}+\frac{xr^2}{10000}$

$\Rightarrow 540.80 = 2 \times 260 + \frac{260.r}{100}$

$\Rightarrow 260r = 54080 - 52000$

$\Rightarrow 260r = 2080$

$\Rightarrow r = \frac{2080}{260} = 8\ \%$

9. (4) $\text{Principal} = \frac{\text{S.I.} \times 100}{\text{Time} \times \text{Rate}}$

$= \frac{80 \times 100}{2 \times 4} = ₹\ 1000$

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

$= 1000\left[\left(1+\frac{4}{100}\right)^2 - 1\right]$

$= 1000\left[\left(\frac{26}{25}\right)^2 - 1\right]$

$= 1000\left(\frac{676}{625} - 1\right)$

$= 1000\left(\frac{676-625}{625}\right)$

$= \frac{1000 \times 51}{625} = ₹\ 81.60$

Aliter : Using Rule 10,
Here, S.I. = ₹ 80
R = 4%, C.I. = ?

$C.I. = S.I.\left(1+\frac{R}{200}\right)$

$C.I. = 80\left(1+\frac{4}{200}\right)$

$= 80\left(1+\frac{1}{50}\right)$

$= 80 \times \frac{51}{50} = ₹\ 81.60$

10. (4) Using Rule 1,

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

$246 = P\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$

$\Rightarrow 246 = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$

$\Rightarrow 246 = P\left(\frac{441-400}{400}\right)$

$\Rightarrow 246 = \frac{41P}{400} \Rightarrow P = \frac{246 \times 400}{41}$

$= ₹\ 2400$

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

$= \frac{2400 \times 3 \times 6}{100} = ₹\ 432$

11. (4) Difference of CI and SI for two years
= ₹ (954 – 900) = ₹ 54
∴ Sum= Difference in CI and SI $\times \left(\frac{100}{\text{Rate}}\right)^2$

$\text{Rate} = \frac{2 \times \text{Difference} \times 100}{\text{Simple interest}}$

$= \frac{2 \times 5400}{900} = 12\%$

$\therefore \text{Sum} = 54 \times \left(\frac{100}{12}\right)^2$

$= 54 \times \frac{25}{3} \times \frac{25}{3} = ₹\ 3750$

Aliter : Using Rule 10,
C.I. = Rs. 954, S.I.=Rs. 900, P=?

$C.I. = S.I.\left(1+\frac{R}{200}\right)$

$954 = 900\left(1+\frac{R}{200}\right)$

$\frac{954}{900} = 1+\frac{R}{200}$

$\frac{954}{900} - 1 = \frac{R}{200}$

$\frac{954-900}{900} = \frac{R}{200}$

$\frac{54}{9} = \frac{R}{2}$

$R = 12\%$

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

$900 = \frac{P \times 12 \times 2}{100}$

$P = \text{Rs. } 3750$

12. (4) If the principal be P then

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

$\Rightarrow 420 = P\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$

$\Rightarrow 420 = P\left(\frac{121-100}{100}\right)$

$\Rightarrow 420 = \frac{P \times 21}{100}$

$\Rightarrow P = \frac{420 \times 100}{21} = ₹\ 2000$

$\therefore S.I. = \frac{PRT}{100}$

$= \frac{2000 \times 10 \times 2}{100} = ₹\ 400$

Aliter : Using Rule 10,
Here, C.I. = Rs. 420,
R = 10%, S.I. = ?

$C.I. = S.I.\left(1+\frac{R}{200}\right)$

$420 = S.I.\left(1+\frac{10}{200}\right)$

$420 = S.I.\left(\frac{210}{200}\right)$

$S.I. = \frac{420 \times 200}{210}$

$S.I. = \text{Rs. } 400$

13. (4) If the sum be P, then

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

$\Rightarrow 102 = P\left[\left(1+\frac{4}{100}\right)^2 - 1\right]$

$\Rightarrow 102 = P\left[\left(\frac{26}{25}\right)^2 - 1\right]$

$\Rightarrow 102 = P\left(\frac{676}{625} - 1\right)$

$\Rightarrow 102 = P\left(\frac{676 - 625}{625}\right)$

$\Rightarrow 102 = P \times \frac{51}{625}$

$\Rightarrow P = \frac{102 \times 625}{51} = ₹\ 1250$

$\therefore$ S.I. $= \frac{1250 \times 2 \times 4}{100} = ₹\ 100$

14. (4) Using Rule 1,
Let S.I. = ₹ 100,
& Principal = ₹ 100

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

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

$\therefore$ 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

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

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

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

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

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

$2544 = \frac{P \times 159}{625}$

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

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

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

Aliter : Using Rule 10,
Here, C.I. = Rs. 2544
R = 12%, S.I. = ?

C.I. $= \text{S.I.}\left(1 + \frac{R}{200}\right)$

$2544 = \text{S.I.}\left(1 + \frac{12}{200}\right)$

$2544 = \text{S.I.}\left(\frac{212}{200}\right)$

S.I. $= \frac{2544 \times 200}{212} = ₹\ 2400$

16. (2) Using Rule 1,

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

$\Rightarrow 2916 = x\left(1 + \frac{8}{100}\right)^2$

$\Rightarrow 2916 = x\left(\frac{27}{25}\right)^2$

$\Rightarrow x = \frac{2916 \times 25 \times 25}{27 \times 27}$

= ₹ 2500

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

$= \frac{2500 \times 9 \times 3}{100} = ₹\ 675$

17. (1) Using Rule 6,
S.I. for 3 years = ₹ 3000

S.I. for 2 years $= \frac{3000}{3} \times 2$

= ₹ 2000
C.I. – S.I.
= 2050 – 2000 = ₹ 50

S.I. $= \frac{PR \times 3}{100}$

$\Rightarrow PR = \frac{3000 \times 100}{3}$

= ₹ 100000

$\therefore$ Difference $= \frac{P \times R^2}{10000}$

$\Rightarrow 50 = \frac{P \times (100000)^2}{10000 \times P^2}$

$\Rightarrow P = \frac{1000000}{50} = ₹\ 20000$

18. (1) Compound interest

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

$\Rightarrow 410 = P\left[\left(1 + \frac{5}{100}\right)^2 - 1\right]$

$\Rightarrow 410 = P\left[\left(1 + \frac{1}{20}\right)^2 - 1\right]$

$\Rightarrow 410 = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$

$\Rightarrow 410 = P\left(\frac{441}{400} - 1\right)$

$\Rightarrow 410 = P\left(\frac{41}{400}\right)$

$\Rightarrow P = \frac{410 \times 400}{41} = ₹\ 4000$

$\therefore$ S.I.

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

$= \frac{4000 \times 2 \times 5}{100} = ₹\ 400$

Aliter : Using Rule 10,
Here, C.I. = Rs. 410
R = 5%, S.I. = ?

C.I. $= \text{S.I.}\left(1 + \frac{R}{200}\right)$

$410 = \text{S.I.}\left(1 + \frac{5}{200}\right)$

$410 = \text{S.I.}\left(\frac{205}{200}\right)$

S.I. $= \frac{410 \times 200}{205}$

S.I. = Rs.400

19. (4) Principal = ₹ P (let)

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

$\Rightarrow 510 = P\left[\left(1 + \frac{25}{200}\right)^2 - 1\right]$

$\Rightarrow 510 = P\left[\left(1+\frac{1}{8}\right)^2 - 1\right]$

$\Rightarrow 510 = P\left[\left(\frac{9}{8}\right)^2 - 1\right]$

$\Rightarrow 510 = P\left(\frac{81}{64} - 1\right)$

$\Rightarrow 510 = P\left(\frac{81-64}{64}\right)$

$\Rightarrow 510 = \frac{17P}{64}$

$\Rightarrow P = \frac{510 \times 64}{17} = ₹\ 1920$

$\therefore$ S.I.

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

$= \frac{1920 \times 2 \times 25}{100 \times 2} = ₹\ 480$

Aliter : Using Rule 10,

Here, C.I. = ₹ 510

$R = 12\frac{1}{2}\%$, S.I. = ?

$\text{C.I.} = \text{S.I.}\left(1+\frac{R}{200}\right)$

$510 = \text{S.I.}\left(1+\frac{25}{400}\right)$

$510 = \text{S.I.}\left(\frac{425}{400}\right)$

$\text{S.I.} = \frac{510 \times 400}{425}$

S.I. = ₹ 480

20. (2) Using Rule 1,

Sum borrowed = Rs. x

$\therefore$ Simple interest after 4 years

$= \frac{x \times 4 \times 5}{100} = \text{Rs. } \frac{x}{5}$

Amount lent of on compound interest

$= \text{Rs. } \frac{x}{2}$

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

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

$= \frac{x}{2}\left[(1.1)^4 - 1\right]$

$= \frac{x}{2}(1.4641 - 1)$

$= \text{Rs. } \frac{0.4641x}{2}$

$\therefore \frac{0.4641x}{2} - \frac{x}{5} = 3205$

$\Rightarrow \frac{2.3205x - 2x}{10} = 3205$

$\Rightarrow 0.3205x = 32050$

$\Rightarrow x = \frac{32050}{0.3205} = \text{Rs. } 100000$

21. (3) S.I. for 2 years

$= \frac{2}{3} \times 540 = \text{Rs. } 360$

C.I. – S.I.

= 376.20 – 360 = Rs. 16.20

$\therefore$ Rate of interest

$= \frac{16.20}{180} \times 100$

= 9% per annum

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

$= \frac{180 \times 100}{1 \times 9} = \text{Rs. } 2000$

22. (2) $\text{Principal} = \frac{\text{S.I.} \times 100}{\text{Time} \times \text{Rate}}$

$= \frac{350 \times 100}{2 \times 4} = \text{Rs. } 4375$

$\text{Difference} = \frac{PR^2}{10000}$

$= \frac{4375 \times 4 \times 4}{10000}$

= Rs. 7

23. (3) $\because$ S.I. for 3 years

= Rs. 240

$\therefore$ S.I. for 2 years $= \frac{240}{3} \times 2$

= Rs. 160

$\therefore \frac{PR \times 2}{100} = 160$

$\Rightarrow PR = 160 \times 50 = 8000 \ldots (i)$

Again, C.I. – S.I.

= 170 – 160 = Rs. 10

$\Rightarrow \frac{PR^2}{10000} = 10$

$\Rightarrow \frac{8000 \times R}{10000} = 10$

$\Rightarrow R = \frac{100}{8} = \frac{25}{2} = 12\frac{1}{2}\%$

24. (2) $\text{Principal} = \frac{\text{S.I.} \times 100}{\text{Time} \times \text{Rate}}$

$= \frac{1600 \times 100}{5 \times 2} = \text{Rs. } 16000$

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

$= 16000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$

$= 16000\left[\left(\frac{21}{20}\right)^3 - 1\right]$

$= 16000\left(\frac{9261}{8000} - 1\right)$

$= \frac{16000 \times 1261}{8000} = \text{Rs. } 2522$

25. (4) Let the principal be Rs. P.

For 4 years,

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

$= \frac{P \times 4 \times 5}{100} = \text{Rs. } \frac{P}{5}$

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

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

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

$= P\left(\frac{14641}{10000} - 1\right)$

$= \frac{4641P}{10000}$

According to the question,

$\frac{4641P}{10000} - \frac{P}{5} = 26410$

$\Rightarrow \frac{4641P - 2000P}{10000} = 2641$

$\Rightarrow \frac{2641P}{10000} = 2641$

$\Rightarrow P = \text{Rs. } 10000$

26. (2) Principal = $\frac{\text{S.I.}\times 100}{\text{Time}\times\text{Rate}}$

$= \frac{50\times 100}{2\times 5}$ = Rs. 500

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

$= 500\left[\left(1+\frac{5}{100}\right)^{2}-1\right]$

$= 500\left[\left(1+\frac{1}{20}\right)^{2}-1\right]$

$= 500\left[\left(\frac{21}{20}\right)^{2}-1\right]$

$= 500\left(\frac{441}{400}-1\right)$

$= \frac{500\times 41}{400}$ = Rs. 51.25

27. (4) According to the question,
If principal
= Rs. 100 then interest
= Rs. 40.

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

$= \frac{40\times 100}{100\times 8}$ = 5% per annum

Case II.

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

$= 30000\left(1+\frac{5}{100}\right)^{2}$

$= 30000\left(1+\frac{1}{20}\right)^{2}$

$= 30000\left(\frac{20+1}{20}\right)^{2}$

$= 30000\times\frac{21}{20}\times\frac{21}{20}$

= Rs. 33075

$\therefore$ C. I. = Rs. (33075 – 30000)
= Rs. 3075

TYPE-III

1. (1) **TRICK**
As the interest was compounded half-yearly, we changed r to $\frac{r}{2}$ and t to 2t.
$\therefore$ T = 1 year & R 6%
Sum

$= \frac{36\times 100\times 100}{6\times 6}$

= ₹10000

2. (2) Compound Interest (when compounded yearly)

$= 5000\left(1+\frac{4}{100}\right)^{1.5}-5000$

$= 5000\left(\frac{26}{25}\right)^{1.5}-5000$

= 5302.9805 – 5000 = ₹ 302.9805
C.I. (When compounded half-yearly).

$= 5000\left(1+\frac{2}{100}\right)^{3}-50000$

= 5306.04 – 5000 = ₹ 306.04
Required difference
= ₹ (306.04 – 302.9805)
= ₹ 3.059 = ₹ 3.06

3. (3) Let the sum ₹ x. Then,

C.I. = $x\left(1+\frac{5}{100}\right)^{2}-x$

$= \frac{441x}{400}-x = \frac{441x-400x}{400}$

$= \frac{41}{400}x$

Now,

S.I. = $\frac{x\times 5\times 2}{100} = \frac{x}{10}$

$\therefore$ (C.I.) – (S.I.) = $\frac{41x}{400}-\frac{x}{10}$

$= \frac{41x-40x}{400} = \frac{x}{400}$

$\therefore \frac{x}{400} = 15$

$\Rightarrow$ x = 15 × 400 = 6000
Hence, the sum is ₹ 6000
Aliter : Using Rule 6,
C.I. – S.I. = ₹ 15, R = 5%, T = 2 years, P =?

C.I. – S.I. = $P\left(\frac{R}{100}\right)^{2}$

$15 = P\left(\frac{5}{100}\right)^{2}$

P = 15 × 400
P = ₹ 6000

4. (4) **Tricky Approach**
Difference of SI and CI for 3 years

$= \frac{PR(300+R)}{100^{3}}$

$\because \frac{P\times 25\times 305}{100\times 100\times 100} = 36.60$

$\Rightarrow P = \frac{36.60\times 100\times 100\times 100}{25\times 305}$

= ₹ 4800
Aliter : Using Rule 6,
C.I.–S.I. = ₹ 36.60, R = 5%, P =?, T = 3yrs.

C.I. – S.I.= $P\left(\frac{R}{100}\right)^{2}\times\left(3+\frac{R}{100}\right)$

$36.60 = P\left(\frac{5}{100}\right)^{2}\times\left(3+\frac{5}{100}\right)$

$36.60 = P\times\frac{25}{100^{2}}\times\frac{305}{100}$

$P = \frac{36.60\times 100\times 100\times 100}{25\times 305}$

$P = \frac{36600000}{25\times 305}$ = ₹ 4800

5. (4) S.I. = ₹ $\frac{2500\times 2\times 4}{100}$ = ₹ 200

C.I. = ₹ $2500\left[\left(1+\frac{4}{100}\right)^{2}-1\right]$

= ₹ $2500\left[\left(\frac{26}{25}\right)^{2}-1\right]$

= ₹ $\frac{(676-625)}{625}\times 2500$

= ₹ $\frac{51}{625}\times 2500$ = ₹ 204

$\therefore$ The required difference
= C.I. – S.I. = ₹ (204 – 200) = ₹ 4
Aliter : Using Rule 6,
Here, C.I. – S.I.= ?, P = ₹ 2500
R = 4%, T = 2

C.I. – S.I.= $P\left(\frac{R}{100}\right)^2$

$= 2500\left(\frac{4}{100}\right)^2$

$= 2500 \times \frac{1}{25} \times \frac{1}{25}$

C.I.–S.I. = ₹ 4

6. (4) Let the sum be x. Then,

C.I. $= x\left(1+\frac{10}{100}\right)^2 - x = \frac{21x}{100}$

S.I. $= \frac{x \times 10 \times 2}{100} = \frac{x}{5}$

$\therefore$ C.I. – S.I. $= \frac{21x}{100} - \frac{x}{5} = \frac{x}{100}$

Given that, $\frac{x}{100} = 65$

$\therefore x = 6500$

Hence, the sum is ₹ 6500.

Aliter : Using Rule 6,

Here, C.I. – S.I. = ₹ 65,

R = 10%, T = 2 years, P = ?

C.I. – S.I. = $P\left(\frac{R}{100}\right)^2$

$65 = P\left(\frac{10}{100}\right)^2$

P = ₹ 6500

7. (3) When difference between the compound interest and simple interest on a certain sum of money for 2 years at r% rate is x, then

x = Sum $\left(\frac{r}{100}\right)^2$

$\Rightarrow 10 = 1000\left(\frac{r}{100}\right)^2$

$\Rightarrow \left(\frac{r}{100}\right)^2 = \frac{10}{1000}$

$\Rightarrow \frac{r}{100} = \sqrt{\frac{1}{100}} = \frac{1}{10}$

$\Rightarrow r = \frac{100}{10} = 10\%$

Aliter : Using Rule 6,

Here, C.I. – S.I. = Rs. 10

R = ?, T= 2 years, P = Rs. 1000

C.I. – S.I. = $P\left(\frac{R}{100}\right)^2$

$10 = 1000\left(\frac{R}{100}\right)^2$

$10 = 1000 \times \frac{R}{100} \times \frac{R}{100}$

$\Rightarrow R^2 = 100$

$\Rightarrow R = \sqrt{100} = 10\%$

8. (2) Using Rule 6,

When difference between the compound interest and simple interest on a certain sum of money for 2 years at r % rate is x, then the sum is given by

$x\left(\frac{100}{r}\right)^2$ Here x = ₹ 80,

r = 40%

$\therefore$ Required sum = $80\left(\frac{100}{4}\right)^2$

= 80 × 25 × 25 = ₹ 50000

9. (2) Using Rule 6,

When difference between the CI and SI on a certain sum of money for 2 years at r % rate is x, then

Sum = $x \times \left(\frac{100}{r}\right)^2$

$= 1 \times \left(\frac{100}{4}\right)^2$ = ₹ 625

10. (1) Using Rule 6,

Sum = Difference $\left(\frac{100}{r}\right)^2$

$= 4 \times \left(\frac{100}{4}\right)^2$ = ₹ 2500

11. (1) Using Rule 6,

Difference between C.I. and S.I for 3 years

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

$\Rightarrow 15.25 = \frac{P \times 25}{10000}\left(\frac{5}{100}+3\right)$

$\Rightarrow 15.25 = \frac{P \times 305}{400 \times 100}$

$\Rightarrow P = \frac{15.25 \times 400 \times 100}{305}$

= ₹ 2000

12. (3) Using Rule 6,

Tricky Approach

Sum = (CI – SI) $\left(\frac{100}{r}\right)^2$

$= 768 \times \left(\frac{100}{8}\right)^2$ = ₹ 1,20,000

13. (3) Using Rule 6 and 1,

If the difference between compound interest and simple interest at the rate of r% per annum for 2 years be x, then

Principal = $x\left(\frac{100}{r}\right)^2$

$= 28\left(\frac{100}{10}\right)^2$ = ₹ 2800

If the interest is compounded half yearly, then

$r = \frac{10}{2} = 5\%$,

Time = 4 half years

Simple interest $= \frac{2800 \times 5 \times 4}{100}$

= ₹ 560

Compound interest

$= 2800\left[\left(1+\frac{5}{100}\right)^4 - 1\right]$

= 2800 [1.2155 – 1]

= 2800 × 0.2155 = 603.41

$\therefore$ Difference = ₹ (603.41–560)

= ₹ 43.41

14. (3) Using Rule 1,

C.I. after 3 years

$= 6000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$

$= 6000\left(\frac{9261-8000}{8000}\right)$

$= 6000 \times \frac{1261}{8000}$ = ₹ 945.75

CI after 2 years

$= 6000\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$

$= 6000\left(\frac{441-400}{400}\right)$

$= 6000 \times \frac{41}{400}$ = ₹ 615

Required difference

= ₹ (945.75 – 615) = ₹ 330.75

15. (1) Let the principal be x.
Compound interest

$$= P\left[\left(1+\frac{R}{100}\right)^{t}-1\right]$$

$$= x\left[\left(1+\frac{10}{100}\right)^{2}-1\right]$$

$= x[(1.1)^2 - 1]$
$= x(1.21 - 1) = 0.21x$

$$SI = \frac{x\times 2\times 10}{100} = \frac{x}{5} = 0.2x$$

According to the question,
$0.21x - 0.2x = 40$
$\Rightarrow 0.01x = 40$

$$\Rightarrow x = \frac{40}{0.01} = ₹\ 4000$$

Aliter : Using Rule 6,
Here, C.I. – S.I. = ₹ 40
R = 10%, T = 2 years, P = ?

$$C.I. - S.I. = P\left(\frac{R}{100}\right)^2$$

$$40 = P\left(\frac{10}{100}\right)^2$$

P = ₹ 4000

16. (1) Using Rule 6,
Let the difference between CI and SI on a certain sum for 3 years at r % be x,
then the sum

$$= \frac{\text{Difference}\times(100)^3}{r^2(300+r)}$$

$$= \frac{122\times 100^3}{25(300+5)}$$

$$= \frac{122000000}{25\times 305} = ₹16000$$

17. (2) Using Rule 6,
Difference of two years

$$= P\left(\frac{r^2}{10000}\right)$$

$$\Rightarrow 48 = P\left(\frac{400}{10000}\right)$$

$$\Rightarrow 48 = \frac{P}{25}$$

$\Rightarrow$ P = 48 × 25 = ₹ 1200

18. (1) Using Rule 6,

$$\text{Difference} = \frac{PR^2}{10000}$$

$$\Rightarrow 25 = \frac{10000\times R^2}{10000}$$

$\Rightarrow$ R = 5%

19. (2) Using Rule 6,

$$\text{Difference} = \frac{Pr^2}{10000}$$

$$\Rightarrow 6 = \frac{P\times 5\times 5}{10000}$$

$\Rightarrow$ P = 6 × 400 = ₹ 2400

20. (3) Using Rule 6,
Rate of interest = 8% per half-year
Time = 2 half years

$$\text{Difference of interests} = \frac{PR^2}{100}$$

$$\Rightarrow 56 = \frac{P\times(8)^2}{(100)^2}$$

$$\Rightarrow P = \frac{56\times 10000}{64} = ₹\ 8750$$

21. (4) Let the sum be x
r = 10%, n = 3 years

$$S.I. = \frac{x\times r\times n}{100}$$

$$S.I. = \frac{x\times 10\times 3}{100} = \frac{3}{10}x$$

$$C.I. = \left[\left(1+\frac{r}{100}\right)^{n}-1\right]x$$

$$= \left[\left(1+\frac{10}{100}\right)^{3}-1\right]x$$

$$= \left[\left(\frac{11}{10}\right)^{3}-1\right]x$$

$$= \left(\frac{1331}{1000}-1\right)x = \frac{331}{1000}x$$

$$\frac{331}{1000}x - \frac{3}{10}x = 31$$

$$\text{or } \frac{(331-300)}{1000}x = 31$$

$$\text{or } \frac{31}{1000}x = 31$$

or x = 1000
$\therefore$ Sum = ₹ 1000

Aliter : Using Rule 6,
Here, C.I. – S.I. = ₹ 31
R = 10%, T = 3 years, P = ?
C.I. – S.I.

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

$$31 = P\times\left(\frac{10}{100}\right)^2\left(3+\frac{10}{100}\right)$$

$$31 = P\times\frac{1}{100}\times\frac{31}{10}$$

P = ₹ 1000

22. (4) Using Rule 6,
Let the sum be x.
When difference between the compound interest and simple interest on a certain sum of money for 2 years at r% rate is x, then the sum is given by:

$$\text{Sum} = \text{Difference}\times\left(\frac{100}{\text{Rate}}\right)^2$$

$$= ₹\ 8\times\left(\frac{100}{4}\right)^2$$

$= ₹\ 8 \times 25 \times 25 = ₹\ 5000$

23. (2) If the interest is compounded half yearly,

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

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

$$= P\left[\left(\frac{21}{20}\right)^{2}-1\right] = \frac{41P}{400}$$

$$S.I. = \frac{P\times R\times T}{100} = \frac{P\times 10}{100} = \frac{P}{10}$$

$$\therefore \frac{41P}{400} - \frac{P}{10} = 180$$

$$\Rightarrow \frac{41P - 40P}{400} = 180$$

$$\Rightarrow \frac{P}{400} = 180$$

$\Rightarrow$ P = ₹ 72000

Aliter : Using Rule 6,
Here, C.I. – S.I. = ₹ 180
Interest is compounded half yearly

$$R = \frac{10}{5} = 5\%,$$

T = 2 years

$$C.I. - S.I. = P\left(\frac{R}{100}\right)^2$$

$\Rightarrow 180 = P\left(\frac{5}{100}\right)^2$

$\Rightarrow P = 180 \times 20 \times 20$

$P = ₹\ 72000$

24.(1) Using Rule 6,

$\text{Difference} = \frac{PR^2}{(100)^2}$

$\Rightarrow 1.50 = \frac{P \times 5 \times 5}{(100)^2}$

$\Rightarrow P = 400 \times 1.5 = ₹\ 600$

25. (3) Using Rule 6,

$\text{Time} = \frac{3}{2} \times 2 = 3$ half years

$\text{Rate} = \frac{10}{2} = 5\%$ per half year

[$\because$ when $r \to r/2$, then $t \to 2t$]

Difference

$= P\left(\frac{r^3}{1000000} + \frac{3r^2}{10000}\right)$

$\Rightarrow 244 = P\left(\frac{125}{1000000} + \frac{75}{10000}\right)$

$\Rightarrow 244 = P\left(\frac{7625}{1000000}\right)$

$\Rightarrow P = \frac{244 \times 1000000}{7625}$

$= ₹\ 32000$

26. (3) Using Rule 6,

The difference between compound interest and simple interest for two years

$= \frac{\text{Principal} \times (\text{Rate})^2}{100 \times 100}$

$\therefore \quad 1 = \frac{\text{Principal} \times (4)^2}{10000}$

$\Rightarrow \quad \text{Principal} = \frac{10000}{16} = ₹\ 625$

27. (2) Using Rule 6,

Difference of 2 years

$= \frac{p \times r^2}{10000}$

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

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

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

28. (1) Using Rule 6,

$\text{Difference} = \frac{PR^2}{10000}$

$\Rightarrow 25 = \frac{P \times 5 \times 5}{10000}$

$\Rightarrow P = ₹\ 10000$

29. (3) Using Rule 6,

$\text{Difference} = \frac{PR^2}{10000}$

$\Rightarrow 300 = \frac{P \times 10 \times 10}{10000}$

$\Rightarrow P = 300 \times 100 = ₹\ 30000$

30. (1) Using Rule 1,

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

$= \frac{32000 \times 4 \times 10}{100} = ₹\ 12800$

$\text{C.I.} = P\left[\left(1 + \frac{R}{100}\right)^4 - 1\right]$

$= 32000\left[\left(1 + \frac{10}{100}\right)^4 - 1\right]$

$= 32000\ [(1.1)^4 - 1]$

$= 32000\ (1.4641 - 1)$

$= 32000 \times 0.4641 = ₹\ 14851.2$

$\therefore$ Required difference

$= 14851.2 - 12800 = ₹\ 2051.2$

31. (3) Using Rule 6,

$\text{Difference} = \frac{PR^2}{10000}$

$\Rightarrow 63 = \frac{P \times 5 \times 5}{10000}$

$\Rightarrow P = 400 \times 63 = ₹\ 25200$

32. (4) Let the principal be Rs. P.

For 2 years

$\text{C.I.} - \text{S.I.} = \frac{PR^2}{10000}$

$\Rightarrow 1 = \frac{P \times 4 \times 4}{10000}$

$\Rightarrow P = \frac{10000}{4 \times 4} = \text{Rs. } 625$

33. (1) $\text{Difference} = \frac{PR^2}{10000}$

$\Rightarrow 4 = \frac{P \times 10 \times 10}{10000}$

$\Rightarrow P = \text{Rs. } 400$

34. (1) Difference between C.I. and S.I. for 3 years

$= \frac{Pr^2(r + 300)}{1000000}$

$\Rightarrow 93 = \frac{P \times 100(10 + 300)}{1000000}$

$\Rightarrow 93 = \frac{P \times 100 \times 310}{1000000}$

$\Rightarrow \frac{31P}{1000} = 93$

$\Rightarrow P = \frac{93000}{31} = \text{Rs. } 3000$

35. (3) Difference

$= \frac{PR^2}{10000}$

$\Rightarrow 41 = \frac{P \times 5 \times 5}{10000}$

$\Rightarrow 41 = \frac{P}{400}$

$\Rightarrow P = 41 \times 400 = \text{Rs. } 16400$

36. (4) For 3 years,

C.I. – S.I.

$= P\left(\frac{r}{100}\right)^2\left(\frac{r}{100} + 3\right)$

$\Rightarrow P\left(\frac{10}{100}\right)^2\left(\frac{10}{100} + 3\right) = 186$

$\Rightarrow P\left(\frac{1}{100}\right) \times \frac{31}{10} = 186$

$\Rightarrow P = \frac{186 \times 1000}{31} = \text{Rs. } 6000$

37. (2) Difference between C.I. and S.I. for 3 years

$= P\left(\frac{r}{100}\right)^2\left(\frac{r}{100} + 3\right)$

$= 40000\left(\frac{8}{100}\right)^2\left(\frac{8}{100} + 3\right)$

$= 40000 \times \frac{64}{10000}\left(\frac{8+300}{100}\right)$

$= 4 \times 64 \times \frac{308}{100} = \frac{78848}{100}$

= Rs. 788.48

38. (3) For 2 years,

$C.I. - S.I. = \frac{PR^2}{10000}$

$\Rightarrow 96 = \frac{15000 \times R^2}{10000}$

$\Rightarrow 15\ R^2 = 960$

$\Rightarrow R^2 = \frac{960}{15} = 64$

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

39. (4) For 2 years,

$C.I. - S.I. = \frac{PR^2}{10000}$

$= \frac{5000 \times 8 \times 8}{10000}$ = Rs. 32

40. (4) For 2 years,

$C.I. - S.I. = \frac{PR^2}{10000}$

$\Rightarrow 20 = \frac{P \times 5 \times 5}{10000}$

$\Rightarrow \frac{P}{400} = 20$

$\Rightarrow$ P = Rs. (20 × 400)
= Rs. 8000

TYPE-IV

1. (4) Suppose P = ₹ 100
and amount A = ₹ 225

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

or $225 = 100\left(1+\frac{r}{100}\right)^2$

or $\frac{225}{100} = \left[1+\frac{r}{100}\right]^2$

or $1+\frac{r}{100} = \frac{15}{10}$

or $\frac{100+r}{100} = \frac{15}{10}$

or 100 + r = 150
or r = 50%

Aliter : Using Rule 8,
Here, n = 2.25, t = 2 years

$R\% = \left(n^{\frac{1}{t}} - 1\right) \times 100\%$

$R\% = \left[(2.25)^{\frac{1}{2}} - 1\right] \times 100\%$

$= [1.5 - 1] \times 100\%$

$= 0.5 \times 100\%$

= 50%

2. (2) A sum of ₹ x becomes ₹ 2x in 4 years.
Similarly, ₹ 2x will become 2 × 2x = ₹ 4x in next 4 years and ₹ 4x will become 2 × 4x = ₹ 8x in yet another 4 years. So, the total time = 4 + 4 + 4 = 12 years

Aliter : Using Rule 5,
Here, m = 2, t = 4
Time taken to become
2^3 = n × t years
= 3 × 4 = 12 years

Note : If a sum of money becomes n times in t years, it will become $t^1 = n^x$ times at the same rate of interest in t^1 years given by,

$\boxed{t^1 = xt}$

3. (2) Let the sum be x which becomes 2x in 10 years. Hence, 4x in 20 years

Method 2 :
Unitary Method can also be used.

Aliter : Using Rule 5,
Here, m = 2, t = 10
Time taken to become 4 times = 2^2 times
= t × n = 10 × 2 = 20 years

4. (1) Let the principal be *x* and the rate of compound interest be *r*% per annum. Then,

$8x = x\left(1+\frac{r}{100}\right)^3$

$\Rightarrow 8 = \left(1+\frac{r}{100}\right)^3 \Rightarrow 2^3 = \left(1+\frac{r}{100}\right)^3$

$\Rightarrow 2 = 1+\frac{r}{100}$

$\Rightarrow \frac{r}{100} = 1 \Rightarrow r = 100\%$

Aliter : Using Rule 8,
Here, n = 8, t = 3 years.

$R\% = \left(n^{\frac{1}{t}} - 1\right) \times 100\%$

$= \left[(8)^{\frac{1}{3}} - 1\right] \times 100\%$

$= \left[(2^3)^{\frac{1}{3}} - 1\right] \times 100\%$

= 100%

5. (3) Let the sum be *x*.
Then,

$2x = x\left(1+\frac{r}{100}\right)^6$

$\Rightarrow 2 = \left(1+\frac{r}{100}\right)^6$

Cubing both sides,

$8 = \left\{\left(1+\frac{r}{100}\right)^6\right\}^3$

$\Rightarrow 8 = \left(1+\frac{r}{100}\right)^{18}$

$\Rightarrow 8x = x\left(1+\frac{r}{100}\right)^{18}$

∴ The sum will be 8 times in 18 years. i.e., Time = 18 years

Aliter : Using Rule 5,
Here, m = 2, t = 6 years
It will becomes 8 times of itself
= 2^3 times of it self
in t × n years = 6 × 3 = 18 years

6. (2) Let the Principal be P and rate of interest be *r*%.

$\therefore 2P = P\left(1+\frac{r}{100}\right)^2$

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

On cubing both sides,

$8 = \left(1+\frac{r}{100}\right)^{15}$

∴ Time = 15 years

Aliter : Using Rule 5,
Here, m = 2, t = 5 years
It becomes 8 times = 2^3 times
in t × n = 5 × 3 = 15 years

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

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

Cubing on both sides, we have

$8 = 1\left(1+\frac{R}{100}\right)^{45}$

Required time = 45 years

Aliter : Using Rule 5,

Here, m = 2, t = 15 years

It becomes 8 times = 2^3 times

in t × n years= 15 × 3 = 45 years

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

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

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

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

i.e. The sum amounts to ₹ 192000 after 20 years.

Aliter : Using Rule 11

Here, x = 2, n_1 = 5

y = ?, n_2 = 20

$x^{\frac{1}{n_1}} = y^{\frac{1}{n}}$

$2^{\frac{1}{5}} = y^{\frac{1}{20}}$

$\Rightarrow y = \left(2^{\frac{1}{5}}\right)^{20}$

$y = 2^4$

y = 16 times

$\therefore$ Sum = 16 × 12000

= ₹ 1,92,000

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

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

$\Rightarrow 1 + \frac{R}{100} = 2$

$\Rightarrow \frac{R}{100} = 1$

$\Rightarrow$ R = 100%

Aliter : Using Rule 8,

Here, n = 4, t = 2 years

$R\% = \left(n^{\frac{1}{t}} - 1\right)\times 100\%$

$= \left[(4)^{\frac{1}{2}} - 1\right]\times 100\%$

= 100%

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

Let P. ₹, A = ₹ 2

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

On squaring both sides.

$4 = 1\left(1+\frac{R}{100}\right)^6$

$\therefore$ Time = 6 years

Aliter : Using Rule 11,

Here, x = 2, n_1 = 3

y = 4, n_2 = ?

$x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

$2^{\frac{1}{3}} = 4^{\frac{1}{n_2}}$

$2^{\frac{1}{3}} = (2^2)^{\frac{1}{n_2}}$

$\Rightarrow 2^{\frac{1}{3}} = 2^{\frac{2}{n_2}}$

$\frac{1}{3} = \frac{2}{n_2}$

$\therefore n_2$ = 6 Years

11. (2) Let the principal be ₹ 1.

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

$\Rightarrow 8 = 1\left(1+\frac{R}{100}\right)^3$

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

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

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

$\therefore$ Time = 4 years

Aliter : Using Rule 11,

Here, x = 8, n_1 = 3

y = 16, n_2 = ?

Using $x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

$(8)^{\frac{1}{3}} = (16)^{\frac{1}{n_2}}$

$\left(2^3\right)^{\frac{1}{3}} = \left(2^4\right)^{\frac{1}{n_2}}$

$2^1 = 2^{\frac{4}{n_2}}$

$\Rightarrow 1 = \frac{4}{n_2}$

n_2 = 4 years

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

Let P be ₹ 1, then A = ₹ 2

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

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

$\therefore$ Time = 8 years

Aliter : Using Rule 11,

Here, x = 2, n_1 = 4

y = 4, n_2 = ?

Using $x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

$(2)^{\frac{1}{4}} = (4)^{\frac{1}{n_2}}$

$2^{\frac{1}{4}} = (2^2)^{\frac{1}{n_2}}$

$2^{\frac{1}{4}} = 2^{\frac{1}{n_2}}$

$\Rightarrow \frac{1}{4} = \frac{2}{n_2}$

n_2 = 8 years

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

Let P = ₹ 1, then A = ₹ 3

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

On squaring both sides,

$9 = 1\left(1+\frac{R}{100}\right)^6$

$\therefore$ Time = 6 years

Aliter : Using Rule 11,

Here, x = 3, n_1 = 3

y = 9, n_2 = ?

Using, $x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

$(3)^{\frac{1}{3}} = (9)^{\frac{1}{n_2}}$

$3^{\frac{1}{3}} = \left(3^2\right)^{\frac{1}{n_2}}$

$3^{\frac{1}{3}} = 3^{\frac{2}{n_2}}$

$\Rightarrow \frac{1}{3} = \frac{2}{n_2}$

$\Rightarrow n_2 = 6$ years

14. (3) If principal = ₹ 1000, amount = ₹ 1331

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

$\Rightarrow \frac{1331}{1000} = \left(1+\frac{R}{100}\right)^3$

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

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

$\Rightarrow \frac{R}{100} = \frac{1}{10}$

$\Rightarrow R = \frac{1}{10}\times 100 = 10\%$

Aliter : Using Rule 8,

Here, n = 1.331, t = 3 years

$R\% = \left(n^{\frac{1}{t}} - 1\right)\times 100\%$

$= \left[(1.331)^{\frac{1}{3}} - 1\right]\times 100\%$

$= [1.1 - 1] \times 100\%$

$= 0.1 \times 100\%$

$= 10\%$

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

$\Rightarrow 1.44P = P\left(1+\frac{R}{100}\right)^2$

$\Rightarrow (1.2)^2 = \left(1+\frac{R}{100}\right)^2$

$\Rightarrow 1+\frac{R}{100} = 1.2$

$\Rightarrow R = 0.2 \times 100 = 20\%$

Aliter : Using Rule 8,

Here, n = 1.44, t = 2 years

$R\% = \left(n^{\frac{1}{6}} - 1\right)\times 100\%$

$= \left[(1.44)^{\frac{1}{2}} - 1\right]\times 100\%$

$= [(1.2) - 1] \times 100\%$

$= 0.2 \times 100\%$

$= 20\%$

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

$\Rightarrow \frac{27}{8}x = x\left(1+\frac{R}{100}\right)^3$

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

$\Rightarrow 1+\frac{R}{100} = \frac{3}{2}$

$\Rightarrow \frac{R}{100} = \frac{3}{2} - 1 = \frac{1}{2}$

$\Rightarrow R = \frac{1}{2}\times 100$

$\therefore R = 50\%$

Aliter :

$n = \frac{27}{8}$, t = 3 years

$R\% = \left(n^{\frac{1}{n}} - 1\right)\times 100\%$

$= \left[\left(\frac{27}{8}\right)^{\frac{1}{3}} - 1\right]\times 100\%$

$= \left[\left(\frac{3}{2}\right) - 1\right]\times 100\%$

$= 50\%$

TYPE-V

1. (1) Let the rate of interest be r% per annum,

According to the question,

$4840 = P\left(1+\frac{r}{100}\right)^2$ ..... (i)

and $5324 = P\left(1+\frac{r}{100}\right)^3$ ....(ii)

On dividing equation (ii) by equation (i), we have,

$1 + \frac{r}{100} = \frac{5324}{4840} = 1+\frac{484}{4840}$

$\Rightarrow \frac{r}{100} = \frac{484}{4840}$

$\Rightarrow r = 10\%$

Aliter : Using Rule 7 (i),

Here, b – a = 3 – 2 = 1

B = Rs 5,324, A = 4,840

$R\% = \left(\frac{B}{A} - 1\right)\times 100\%$

$= \left(\frac{5324}{4840} - 1\right)\times 100\%$

$= \left(\frac{5324 - 4840}{4840}\right)\times 100\%$

$= \frac{484}{4840}\times 100\% = 10\%$

2. (4) Let the rate of interest = R% per annum.

We know that

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

$2420 = P\left(1+\frac{R}{100}\right)^2$ ....(i)

$2662 = P\left(1+\frac{R}{100}\right)^3$ ...(ii)

Dividing equation (ii) by (i),

$$1+\frac{R}{100}=\frac{2662}{2420}$$

$$\Rightarrow \frac{R}{100}=\frac{2662}{2420}-1$$

$$\Rightarrow \frac{R}{100}=\frac{2662-2420}{2420}=\frac{242}{2420}=\frac{1}{10}$$

$$\Rightarrow R=\frac{1}{10}\times 100=10\%$$

Aliter : Using Rule 7(i),
Here, b – a = 3 – 2 = 1
B = Rs. 2,662, A= Rs,2,420

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left(\frac{2662}{2420}-1\right)\times 100\%$$

$$= \left[\frac{2662-2420}{2420}\right]\times 100\%$$

$$= \frac{242}{2420}\times 100\%$$

$$= 10\%$$

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

$$\therefore \quad 3840 = P\left(1+\frac{R}{100}\right)^4 \quad ....(i)$$

$$3936 = P\left(1+\frac{R}{100}\right)^5 \quad ...(ii)$$

Dividing equation (ii) by equation (i),

$$\frac{3936}{3840}=1+\frac{R}{100}$$

$$\Rightarrow \frac{R}{100}=\frac{3936}{3840}-1$$

$$= \frac{3936-3840}{3840}=\frac{96}{3840}$$

$$\Rightarrow R=\frac{96}{3840}\times 100=2.5\%$$

Aliter : Using Rule 7(i),
Here, b – a = 5 – 4 = 1
B = Rs. 3,936, A = Rs. 3,840

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left(\frac{3936}{3840}-1\right)\times 100\%$$

$$= \left(\frac{3936-3840}{3840}\right)\times 100\%$$

$$= \frac{96}{3840}\times 100\%$$

$$= \frac{10}{4}\% = 2.5\%$$

4. (4) If the principal be ₹ P, then

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

$$\Rightarrow 1440 = P\left(1+\frac{r}{100}\right)^2 \quad ...(i)$$

and $1728 = P\left(1+\frac{r}{100}\right)^3$ ...(ii)

On dividing equation (ii) by (i),

$$\frac{1728}{1440} = 1 + \frac{r}{100}$$

$$\therefore \quad \frac{r}{100}=\frac{1728}{1440}-1$$

$$= \frac{1728-1440}{1440}=\frac{288}{1440}$$

$$\Rightarrow r=\frac{288\times 100}{1440}$$

$\therefore r$ = 20% per annum

Aliter : Using Rule 7(i),
Here, b – a = 3 – 2 = 1
B = Rs 1728, A = Rs,1440

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left(\frac{1728}{1440}-1\right)\times 100\%$$

$$= \left(\frac{1728-1440}{1440}\right)\times 100\%$$

$$= \left[\frac{288}{1440}\right]\times 100\% = 20\%$$

5. (4) Difference = 238.50 – 225
= ₹ 13.50
= S.I. on ₹ 225 for 1 year

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

$$= \frac{13.50\times 100}{225\times 1} = 6\% \text{ per annum}$$

Aliter : Using Rule 7(i),
Here, b – a = 1
B = Rs 238.50, A = Rs,225

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left(\frac{238.50}{225}-1\right)\times 100\%$$

$$= \left(\frac{238.50-225}{225}\right)\times 100\%$$

$$= \left[\frac{13.5}{225}\right]\times 100\% = 6\%$$

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

$$\Rightarrow 7000 = P\left(1+\frac{R}{100}\right)^4 \quad ....(i)$$

$$10000 = P\left(1+\frac{R}{100}\right)^8 \quad .....(ii)$$

Dividing equation (ii) by (i)

$$\frac{10000}{7000} = \left(1+\frac{R}{100}\right)^4$$

$$\Rightarrow \frac{10}{7} = \left(1+\frac{R}{100}\right)^4$$

From equation (i),

$$7000 = P\times\frac{10}{7}$$

$\Rightarrow$ P = ₹ 4900

Aliter : Using Rule 7(iii),
Here, b – a = 8 – 4 = 4
B = Rs 10,000, A = Rs,7000

$$R\% = \left[\left(\frac{B}{A}\right)^{\frac{1}{n}}-1\right]\times 100\%$$

$$R\% = \left[\left(\frac{10000}{7000}\right)^{\frac{1}{4}}-1\right]$$

$$= \left[\left(\frac{10}{7}\right)^{\frac{1}{4}}-1\right]$$

$$\Rightarrow 1+\frac{R}{100} = \left(\frac{10}{7}\right)^{\frac{1}{4}}$$

$$\left(1+\frac{R}{100}\right)^4 = \frac{10}{7}$$

$$7000 = P \times \frac{10}{7}$$

$\because$ Amount $= P\left(1+\frac{R}{100}\right)^4$

P = Rs. 4900

7. (3) Interest on ₹ 650 for 1 year
= 676 – 650 = ₹ 26

So, $r = \frac{26}{650} \times 100$

$\Rightarrow$ r = 4% per annum

$$P = \frac{A}{\left[1+\frac{r}{100}\right]^t} = \frac{650}{\left[1+\frac{4}{100}\right]^1}$$

$$= \frac{650}{\frac{26}{25}} = 650 \times \frac{25}{26} = ₹\ 625$$

Aliter : Using Rule 7(i),
Here, b – a = 1
B = Rs 676, A = ₹ 650

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left[\frac{676}{650}-1\right]\times 100\%$$

$$= \left[\frac{676-650}{650}\right]\times 100\%$$

$$= \frac{26}{650}\times 100\%$$

$$= \frac{100}{25} = 4\%$$

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

$$650 = P\left(1+\frac{4}{100}\right)$$

$$\Rightarrow P = \frac{650\times 100}{104} = ₹\ 625$$

Note : A sum at a rate of interest compounded yearly becomes ₹ A, in n years and ₹ A_2 in (n + 1) years,

then $P = A_1\left(\frac{A_1}{A_2}\right)^n$

8. (1) S.I. on ₹ 2400 for 1 year
= ₹ (2, 520 – 2, 400) = ₹ 120

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

$$= \frac{120\times 100}{2400\times 1} = 5\%$$

Aliter : Using Rule 7(i),
Here, b – a = 4 – 3 = 1
B = Rs 2520, A = ₹ 2400

$$R\% = \left(\frac{B}{A}-1\right)\times 100\%$$

$$= \left[\frac{2520}{2400}-1\right]\times 100\%$$

$$= \left[\frac{2520-2400}{2400}\right]\times 100\%$$

$$= \frac{120}{2400}\times 100\%$$

= 5%

9. (3) $P\left(1+\frac{r}{100}\right)^2 = 4500$ ...(i)

$P\left(1+\frac{r}{100}\right)^4 = 6750$ .....(ii)

On dividing equation (ii) by equation (i), we get

$$\left(1+\frac{r}{100}\right)^2 = \frac{6750}{4500}$$

From equation (i),

$$P \times \frac{6750}{4500} = 4500$$

$$\Rightarrow P = \frac{4500\times 4500}{6750} = ₹\ 3{,}000$$

Aliter : Using Rule 7(ii),
Here, b – a = 4 – 2 = 2
B = ₹ 6750, A = ₹ 4500

$$R\% = \left[\left(\frac{B}{A}\right)^{\frac{1}{2}}-1\right]\times 100\%$$

$$= \left[\left(\frac{6750}{4500}\right)^{\frac{1}{2}}-1\right]\times 100\%$$

$$= \left[\left(\frac{3}{2}\right)^{\frac{1}{2}}-1\right]\times 100\%$$

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

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

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

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

P = ₹ 3000

10. (4) Principal = ₹ P (let)
Rate = R% per annum

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

$$\Rightarrow 650 = P\left(1+\frac{R}{100}\right)$$

$$\Rightarrow \frac{650}{P} = \left(1+\frac{R}{100}\right) \quad ...(i)$$

Again, $676 = P\left(1+\frac{R}{100}\right)^2$

$$\Rightarrow 676 = P\left(\frac{650}{P}\right)^2$$

$$= \frac{P\times 650\times 650}{P^2}$$

$$\Rightarrow P = \frac{650\times 650}{676} = ₹\ 625$$

11. (2) Principal $= \frac{\text{S.I.}\times 100}{\text{Time} \times \text{Rate}}$

$$= \frac{350\times 100}{2\times 4} = \text{Rs. } 4375$$

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

$$= 4375\left[\left(1+\frac{4}{100}\right)^2-1\right]$$

$$= 4375\left[\left(1+\frac{1}{25}\right)^2-1\right]$$

$$= 4375\left[\left(\frac{26}{25}\right)^2-1\right]$$

$$= 4375\left(\frac{676}{625}-1\right)$$

$$= \frac{4375\times 51}{625}$$

= Rs. 357
Required difference
= Rs. (357 – 350) = Rs. 7

12. (1) Rate of interest = 12% p.a.
= 1% per month
Time = 12y months

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

$$\Rightarrow 64 = 1\left(1+\frac{1}{100}\right)^{12y}$$

$$\Rightarrow 64 = 1(1.01)^{12y}$$

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

$\Rightarrow 525 = P\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$

$\Rightarrow 525 = P\left(\frac{121}{100} - 1\right)$

$\Rightarrow 525 = \frac{P \times 21}{100}$

$\Rightarrow P = \frac{525 \times 100}{21}$ = Rs. 2500

Again, new rate = 5% per annum

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

$= \frac{2500 \times 5 \times 4}{100}$ = Rs. 500

14. (2) Let the principal be Rs. *x*.

When the interest is compounded annually,

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

$= P\left[\left(1+\frac{20}{100}\right)^2 - 1\right]$

$= P\left[\left(\frac{6}{5}\right)^2 - 1\right]$

$= P\left(\frac{36}{25} - 1\right) = \text{Rs. } \frac{11P}{25}$

When the interest is compounded half-yearly,

C.I. $= P\left[\left(1+\frac{10}{100}\right)^4 - 1\right]$

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

$= P\left(\frac{14641}{10000} - 1\right)$

$= \text{Rs. } \frac{4641P}{10000}$

$\therefore \frac{4641P}{10000} - \frac{11P}{25} = 723$

$\Rightarrow \frac{4641P - 4400P}{10000} = 723$

$\Rightarrow \frac{241P}{10000} = 723$

$\Rightarrow P = \frac{723 \times 10000}{241}$

= Rs. 30000

TYPE-VI

1. (1) A = ₹ 2550

R = 4% per annum

n = 2 years

Let each of the two equal instalments be x

Present worth

$= \frac{\text{Instalment}}{\left(1+\frac{r}{100}\right)^n}$

$P_1 = \frac{x}{\left(1+\frac{4}{100}\right)^1} = \frac{x}{1+\frac{1}{25}} = \frac{x}{\frac{26}{25}}$

or $P_1 = \frac{25}{26}x$

Similarly,

$P_2 = \left(\frac{25}{26}\right)^2 x = \frac{625}{676}x$

$P_1 + P_2 = A$

$\therefore \frac{25}{26}x + \frac{625}{676}x = 2550$

$\Rightarrow \frac{(650+625)x}{676} = 2550$

$\Rightarrow \frac{1275}{676}x = 2550$

$\Rightarrow x = 2550 \times \frac{676}{1275}$

x = ₹ 1352

Aliter : Using Rule 9(i),

Here, P = ₹ 2550, n = 2, r = 4%

Each instalment

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

$= \frac{2550}{\left(\frac{100}{100+4}\right) + \left(\frac{100}{100+4}\right)^2}$

$= \frac{2550}{\frac{100}{104} + \left(\frac{100}{104}\right)^2}$

$= \frac{2550}{\frac{100}{104}\left(1+\frac{100}{104}\right)}$

$= \frac{2550}{\frac{100}{104}\left(\frac{204}{104}\right)}$

$= \frac{2550 \times 104 \times 104}{20400}$ = ₹ 1352

2. (2) Using Rule 1,

Let principal (present worth) for first year be P_1 and that for two years be P_2.

$\therefore 16224 = P_1\left(1+\frac{4}{100}\right)$

$\Rightarrow 16224 = P_1\left(1+\frac{1}{25}\right) = \frac{26P_1}{25}$

$\Rightarrow P_1 = \frac{16224 \times 25}{26}$ = ₹ 15600

Again,

$16224 = P_2\left(1+\frac{4}{100}\right)^2$

$\Rightarrow 16224 = P_2\left(\frac{26}{25}\right)^2 = \frac{676\,P_2}{625}$

$\Rightarrow P_2 = \frac{16224 \times 625}{676}$ = ₹ 15000

$\therefore$ Cash value of the scooter

= ₹ (16224 + 15600 + 15000)

= ₹ 46824

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

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

$x = P_1\left(1+\frac{25}{200}\right)$

$\Rightarrow x = P_1 \times \frac{9}{8}$

$\Rightarrow P_1 = \frac{8}{9}x$

Similarly, $P_2 = \frac{64}{81}x$

$P_1 + P_2 = 6800$

$\Rightarrow \frac{8}{9}x + \frac{64}{81}x = 6800$

$\Rightarrow \frac{72x + 64x}{81} = 6800$

$\Rightarrow \frac{136x}{81} = 6800$

$\Rightarrow x = \frac{6800 \times 81}{136}$ = ₹ 4050

Aliter : Using Rule 9(i),

Here, P = ₹ 6800, R = $\frac{25}{2}$%

n = 2

Each instalment

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

$$= \frac{6800}{\left(\frac{100}{100+\frac{25}{2}}\right)+\left(\frac{100}{100+\frac{25}{2}}\right)^2}$$

$$= \frac{6800}{\frac{200}{225}+\left(\frac{200}{225}\right)^2}$$

$$= \frac{6800}{\frac{200}{225}\left(1+\frac{200}{225}\right)}$$

$$= \frac{6800\times 225\times 225}{200\times 425} = ₹\ 4050$$

4. (2) Using Rule 9(i),
Let each instalment be x.

$$\therefore \frac{x}{\left(1+\frac{5}{100}\right)}+\frac{x}{\left(1+\frac{5}{100}\right)^2}=12300$$

$$\Rightarrow \frac{20x}{21}+\left(\frac{20}{21}\right)^2 x = 12300$$

$$\Rightarrow \frac{20x}{21}\left(1+\frac{20}{21}\right)=12300$$

$$\Rightarrow \frac{20x}{21}\times\frac{41}{21}\times x = 12300$$

$$\Rightarrow x = \frac{12300\times 21\times 21}{20\times 41}$$

$\therefore x = ₹\ 6615$

5. (2) Using Rule 9(i),
Let the value of each instalment be ₹ x
$\therefore$ Principal = Present worth of ₹ x due 1 year hence, present worth of Rs. x due 2 years hence

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

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

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

$$\Rightarrow 210 = \frac{x}{\frac{11}{10}}+\frac{x}{\left(\frac{11}{10}\right)^2}$$

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

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

$$\Rightarrow 210\times 121 = 210\,x$$

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

6. (3) Using Rule 1,
Share of elder brother
= Rs. x (let)
$\therefore$ Share of younger brother
= Rs. $(16820 - x)$

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

According to the question,

$$x\left(1+\frac{5}{100}\right)^{13}$$

$$= (16820 - x)\left(1+\frac{5}{100}\right)^{15}$$

$$\Rightarrow x = (16820 - x)\left(1+\frac{1}{20}\right)^2$$

$$\Rightarrow x = (16820 - x)\left(\frac{21}{20}\right)^2$$

$$\Rightarrow \left(\frac{20}{21}\right)^2 x = 16820 - x$$

$$\Rightarrow \frac{400x}{441} + x = 16820$$

$$\Rightarrow \frac{400x+441x}{441} = 16820$$

$$\Rightarrow 841x = 16820\times 441$$

$$\Rightarrow x = \frac{16820\times 441}{841} = \text{Rs. } 8820$$

7. (1) Using Rule 9(i),
Sum borrowed = Present worth of Rs. 17640 due 1 year hence + Present worth of Rs. 17640 due 2 years hence

$$= \text{Rs.}\left(\frac{17640}{\left(1+\frac{5}{100}\right)}+\frac{17640}{\left(1+\frac{5}{100}\right)^2}\right)$$

$$= \text{Rs.}\left(17640\times\frac{20}{21}+17640\times\frac{20}{21}\times\frac{20}{21}\right)$$

= Rs. (16800 + 16000)
= Rs. 32800

8. (3) Using Rule 1,
Let the amount deposited in Post Office be Rs. x lakhs.
$\therefore$ Amount deposited in bank = Rs. $(3 - x)$ lakhs
According to the question,

$$\frac{x\times 10\times 1}{100\times 12}+\frac{(3-x)\times 6\times 1}{100\times 12}$$

$$= \frac{2000}{100000} = \frac{1}{50}$$

$$\Rightarrow 10x + 18 - 6x = \frac{1}{50}\times 1200$$

$= 24$

$\Rightarrow 4x = 24 - 18 = 6$

$$\Rightarrow x = \frac{6}{4} = \text{Rs. } \frac{3}{2} \text{ lakhs}$$

$\therefore$ Required difference = 0

9. (2) Using Rule 1,
Let the income of company in 2010 be Rs. P
According to the question,

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

$$\Rightarrow 2664000 = P\left(1+\frac{20}{100}\right)^2$$

$$\Rightarrow 2664000 = P\left(1+\frac{1}{5}\right)^2$$

$$\Rightarrow 2664000 = P\times\left(\frac{6}{5}\right)^2$$

$$\Rightarrow P = \frac{2664000\times 5\times 5}{6\times 6}$$

= Rs. 1850000

TYPE-VII

1. (2) Using Rule 1,

$$\text{S.I.} = \frac{6000\times 5\times 2}{100} = ₹\ 600$$

$$\text{C.I.} = 5000\left[\left(1+\frac{8}{100}\right)^2 - 1\right]$$

$$= 5000\left[\left(\frac{27}{25}\right)^2 - 1\right]$$

$$= 5000\left[\left(\frac{729-625}{625}\right)\right]$$

$$= 5000\times\frac{104}{625} = ₹\ 832$$

$\therefore$ Required difference
= ₹ (832–600) = ₹ 232

2. (3) Using Rule 1,
Let the borrowed amount be x
According to the question,

$$x\left[\left(1+\frac{3}{100}\right)^2-1\right]-\frac{x\times4\times1}{100}$$

$= 104.50$

[$\because$ Interest is compounded half yearly]

$\Rightarrow x\,[(1.03)^2 - 1] - 0.04x$

$= 104.50$

$\Rightarrow 0.0609x - 0.04x = 104.50$

$\Rightarrow 0.0209x = 104.5$

$$\Rightarrow x = \frac{104.5}{0.0209} = ₹\ 5000$$

3. (2) Using Rule 9(i),
Let each instalment be x.

$$\frac{x}{\left(1+\frac{35}{400}\right)^2}+\frac{x}{\left(1+\frac{35}{400}\right)}=13360$$

$$\Rightarrow \frac{x}{\left(1+\frac{7}{80}\right)^2}+\frac{x}{\left(1+\frac{7}{80}\right)}=13360$$

$$\Rightarrow \frac{6400\,x}{7569}+\frac{80\,x}{87}=13360$$

$$\Rightarrow \frac{6400\,x+6960\,x}{7569}=13360$$

$\Rightarrow 13360\,x = 13360 \times 7569$

$\Rightarrow x = ₹\ 7569$

4. (3) Using Rule 1,
Rate = 5%, Time
= 4 half years
P = ₹ 5000

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

$$= 5000\left[\left(1+\frac{5}{100}\right)^4-1\right]$$

$$= 5000\left(\frac{194481}{160000}-1\right)$$

$$= \frac{5000\times34481}{160000} = ₹\ 1077.5$$

$$\text{S.I.} = \frac{5000\times10\times2}{100} = ₹\ 1000$$

Difference = 1077.5 – 1000
= ₹ 77.5

5. (2) Using Rule 3,

$$A = P\left(1+\frac{R_1}{100}\right)^{T_1}\left(1+\frac{R_2}{100}\right)^{T_2}$$

$$= 250\left(1+\frac{4}{100}\right)\left(1+\frac{8}{100}\right)$$

$$= 250\times\frac{104}{100}\times\frac{108}{100}$$

$\therefore$ A = ₹ 280.80

6. (1) Using Rule 1,
Amount given to sons

$$= 84100\times\frac{1}{2} = ₹\ 42050$$

Amount given to B = ₹ x (let)
$\therefore$ Amount given to A
= ₹ (42050 – x)

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

$$\Rightarrow (42050-x)\left(1+\frac{R}{100}\right)^3$$

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

$$\Rightarrow (42050-x) = x\left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow (42050-x) = x\left(1+\frac{5}{100}\right)^2$$

$$\Rightarrow (42050-x) = x\left(1+\frac{1}{20}\right)^2$$

$$\Rightarrow 42050-x = x\left(\frac{21}{20}\right)^2$$

$$\Rightarrow 42050-x = \frac{441x}{400}$$

$$\Rightarrow 42050 = \frac{441x}{400}+x$$

$$\Rightarrow 42050 = \frac{441x+400x}{400}$$

$$= \frac{841x}{400}$$

$\Rightarrow 841\,x = 42050 \times 400$

$$\Rightarrow x = \frac{42050\times400}{841}$$

= ₹ 20,000

7. (2) Using Rule 1,

$$\text{Time} = \frac{3}{2}\text{ years}$$

= 3 half years
Rate = 2R% per annum
= R% per half year
$\therefore$ Amount

$$= \text{Principal} - \left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$\Rightarrow 2315.25 = 2000\left(1+\frac{R}{100}\right)^3$$

$$\Rightarrow \frac{231525}{200000} = \left(1+\frac{R}{100}\right)^3$$

$$\Rightarrow \frac{9261}{8000} = \left(1+\frac{R}{100}\right)^3$$

$$\Rightarrow \left(\frac{21}{20}\right)^3 = \left(1+\frac{R}{100}\right)^3$$

$$\Rightarrow \left(1+\frac{1}{20}\right)^3 = \left(1+\frac{R}{100}\right)^3$$

$$\Rightarrow 1+\frac{1}{20} = 1+\frac{R}{100}$$

$$\Rightarrow \frac{R}{100} = \frac{1}{20}$$

$$\Rightarrow R = \frac{100}{20}$$

= 5% per half year
$\therefore$ Required rate
= 10% per annum

8. (4) $A = P\left(1+\frac{R}{100}\right)^n$

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

On cubing both sides,

$$2^3 = \left(1+\frac{R}{100}\right)^{5\times3}$$

$$\Rightarrow 8 = 1\left(1+\frac{R}{100}\right)^{15}$$

$\therefore$ Required time = 15 years
Aliter : Using Rule 11,
$x = 2$, $n_1 = 5$, $y = 8$, $n_2 = ?$

Here, $x^{\frac{1}{n_1}} = y^{\frac{1}{n_2}}$

$$(2)^{\frac{1}{5}} = (8)^{\frac{1}{n_2}}$$

$$2^{\frac{1}{5}} = (2)^{\frac{3}{n_2}}$$

$$\Rightarrow \quad \frac{1}{5} = \frac{3}{n_2}$$

$$\therefore \quad n_2 = 15$$

9. (4) Using Rule 1,
When the interest is payable half yearly,
= 9% per half annum
Time = 4 half years
Let the principal be Rs. P.

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

$$= P\left[\left(1+\frac{9}{100}\right)^4 - 1\right]$$

$$= P\left[(1.09)^4 - 1\right]$$

= P [1.4116 – 1] = Rs. 0.4116 P
According to the question,

$$= P\left[\left(1+\frac{18}{100}\right)^2 - 1\right]$$

$$= P\left[(1.18)^2 - 1\right]$$

= P (1.3924 – 1) = Rs. 0.3924 P
According to the question,
0.4116P – 0.3924P = 960
$\Rightarrow$ 0.0192P = 960

$$\Rightarrow P = \frac{960}{0.0192}$$

$$= \frac{960 \times 10000}{192}$$

= Rs. 50000

10. (3) Using Rule 3,
Amount

$$= P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)$$

$$= 25000\left(1+\frac{4}{100}\right)\left(1+\frac{5}{100}\right)$$

$$= 25000 \times \frac{104}{100} \times \frac{105}{100}$$

= Rs. 27300

11. (3) $A = P\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)$

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

$$= 10000 \times \frac{110}{100} \times \frac{112}{100}$$

= Rs. 12320

12. (1) Let the principal be Rs. P and rate of interest be R% per annum.

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

$$\Rightarrow 1400 = \frac{PR \times 2}{100}$$

$\Rightarrow$ PR = 1400 × 50
= 70000 ..... (i)
Again, for 2 years,

$$\text{C.I.} - \text{S.I.} = \frac{PR^2}{10000}$$

$$\Rightarrow 1449 - 1400 = \frac{PR^2}{10000}$$

$$\Rightarrow 49 = \frac{PR \times R}{10000}$$

$$\Rightarrow 49 = \frac{70000 \times R}{10000}$$

[From equation (i)]

$\Rightarrow$ 7R = 49

$$\Rightarrow R = \frac{49}{7} = 7\% \text{ per annum}$$

13. (3) $P = \frac{x_1}{1+\frac{R}{100}} + \frac{x_2}{\left(1+\frac{R}{100}\right)^2}$

$$= \text{Rs.}\left(\frac{3150}{1+\frac{5}{100}} + \frac{4410}{\left(1+\frac{5}{100}\right)^2}\right)$$

$$= \text{Rs.}\left(\frac{3150}{1+\frac{1}{20}} + \frac{4410}{\left(1+\frac{1}{20}\right)^2}\right)$$

$$= \text{Rs.}\left(\frac{3150}{\frac{21}{20}} + \frac{4410}{\left(\frac{21}{20}\right)^2}\right)$$

$$= \text{Rs.}\left(\frac{3150 \times 20}{21} + \frac{4410 \times 400}{441}\right)$$

= Rs. (3000 + 4000)
= Rs. 7000

14. (2) Let Ram's share be Rs. x.
$\therefore$ Shyam's share
= Rs. (260200 – x)

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

$$\Rightarrow x\left(1+\frac{R}{100}\right)^4$$

$$= (260200 - x)\left(1+\frac{R}{100}\right)^6$$

$$\Rightarrow x = (260200 - x)\left(1+\frac{4}{100}\right)^2$$

$$\Rightarrow x = (260200 - x)\left(1+\frac{1}{25}\right)^2$$

$$\Rightarrow x = (260200 - x)\left(\frac{26}{25}\right)^2$$

$$\Rightarrow x = (260200 - x)\frac{676}{625}$$

$$\Rightarrow \frac{625x}{676} + x = 260200$$

$$\Rightarrow \frac{625x + 676x}{676} = 260200$$

$$\Rightarrow \frac{1301x}{676} = 260200$$

$$\Rightarrow x = \frac{260200 \times 676}{1301}$$

= Rs. 135200

15. (3) Interest got by A

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

$$= \frac{5000 \times 2 \times 6}{100} = \text{Rs. } 600$$

C.I. received by B

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

$$= 5000\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$= 5000\left[\left(\frac{11}{10}\right)^2 - 1\right]$$

$$= 5000\left(\frac{121}{100} - 1\right)$$

$$= \frac{5000 \times 21}{100} = \text{Rs. } 1050$$

$\therefore$ B's profit
= Rs. (1050 – 600)
= Rs. 450

TEST YOURSELF

1. At what rate per annum will ₹ 32000 yield a compound interest of ₹ 5044 in 9 months interest being compounded quarterly ?
(1) 20% (2) 32%
(3) 50% (4) 80%

2. If the difference between simple and compound interest on some principal amount at 20% per annum for three years is ₹48, then the principal amount is:
(1) ₹450 (2) ₹375
(3) ₹390 (4) None of these

3. Find compound interest on ₹ 5000 for 2 years at 10% per annum, compounded half-yearly.
(1) ₹ 1077.5 (2) ₹ 1072.5
(3) ₹ 1000 (4) ₹ 1100

4. Find compound interest on ₹ 10,000 for $3\frac{1}{2}$ years at 10% per annum, compounded yearly.
(1) ₹ 3675.50 (2) ₹ 3775.50
(3) ₹ 3875. 50 (4) ₹ 3975.50

5. Find the present worth of ₹ 9261 due 3 years hence at 5% per annum compounded yearly.
(1) ₹ 8000 (2) ₹ 8200
(3) ₹ 8500 (4) ₹ 8700

6. Find the ratio of simple interest to compound interest for 2 years at 4% per annum, compounded yearly in case of compound interest.
(1) 50 : 53 (2) 50 : 51
(3) 49 : 50 (4) 48 : 53

7. In what time will ₹15625 amount to ₹17576 at 4% per annum, compounded yearly?
(1) 4 years (2) 2.5 years
(3) 3 years (4) 3.5 years

8. If SI on a certain sum of money at 4% per annum for 2 years be ₹ 125, what would be the interest if it was to be compounded annually at the same rate and for the same time period?
(1) ₹ 127.50 (2) ₹ 125.50
(3) ₹ 135.50 (4) ₹ 138

9. The compound interest on a sum of money at 5% per annum for 3 years is ₹ 2522. What would be the simple interest on this sum at the same rate and for the same period ?
(1) ₹ 2500 (2) ₹ 2400
(3) ₹ 2450 (4) ₹ 2350

10. The simple interest on a certain sum for 2 years is ₹ 50 and the compound interest is ₹ 55. Find the rate of interest per annum and the sum.
(1) 16% P.a. ; ₹ 200
(2) 15% P.a. ; ₹ 150
(3) 20% P.a. ; ₹ 125
(4) 18% P.a. ; ₹ 175

11. If the difference between CI and SI on a certain sum at *r*% per annum for 2 years is ₹ *x*, find the expression for principal sum. If the difference between CI and SI on a certain sum at 4% per annum for 2 years is ₹ 25, find the sum.
(1) ₹ 18625 (2) ₹ 16625
(3) ₹ 14625 (4) ₹ 15625

12. If the difference between *CI* and *SI* on a certain sum at *r*% per annum for 3 years is Rs *x*, find the expression for the principal sum. If the difference between *CI* and *SI* on a certain sum at 4% for 3 years is Rs. 608. Find the sum.
(1) ₹ 125000 (2) ₹ 120000
(3) ₹ 130000 (4) ₹ 122250

13. A sum amounts to ₹ 9680 in 2 years and to ₹ 10648 in 3 years compounded annually. Find the principal and the rate of interest per annum.
(1) 12% ; ₹ 7500
(2) 10% ; ₹ 8000
(3) 11% : ₹ 11000
(4) None of these

14. Divide ₹ 10230 into two parts such that the first part after 10 years is equal to the second part after 7 years, compound interest being 20% per annum compounded yearly.
(1) ₹ 4150 ; ₹ 6080
(2) ₹ 3950 ; ₹ 6280
(3) ₹ 3750 ; ₹ 6480
(4) ₹ 3550 ; ₹ 6680

15. A sum of ₹1682 is to be divided between *A* and *B* who are respectively 20 years and 22 years old. They invest their shares at 5% per annum, compounded annually. At the age of 25 years both receive equal amounts. Find the share of each.
(1) ₹ 730 ; ₹ 952
(2) ₹ 750 ; ₹ 932
(3) ₹ 700 ; ₹ 982
(4) ₹ 800 ; ₹ 882

16. A sum of money was lent at 10% per annum, compounded annually, for 2 years. If the interest was compounded half-yearly, he would have received ₹ 220.25 more. Find the sum.
(1) ₹ 40000 (2) ₹ 45000
(3) ₹ 48000 (4) ₹ 50000

17. Ram invests ₹ 5000 in a bond which gives interest at 4% per annum during the first year, 5% during the second year and 10% during the third year. How much does he get at the end of third year ?
(1) ₹ 7000 (2) ₹ 5006
(3) ₹ 6006 (4) ₹ 5506

SHORT ANSWERS

1. (1)	**2.** (2)	**3.** (1)	**4.** (4)
5. (1)	**6.** (2)	**7.** (3)	**8.** (1)
9. (2)	**10.** (3)	**11.** (4)	**12.** (1)
13. (2)	**14.** (3)	**15.** (4)	**16.** (1)
17. (3)			

EXPLANATIONS

1. (1) Using Rule 1,
Let the rate of CI be R per cent per annum.

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

$$\Rightarrow 5044$$

$$= 32000\left[\left(1+\frac{R}{400}\right)^{3}-1\right]$$

[$\because$ Interest is compounded quarterly]

$$\Rightarrow \frac{5044}{32000} = \left(1+\frac{R}{400}\right)^{3}-1$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^{3}-1 = \frac{1261}{8000}$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^3 = 1+\frac{1261}{8000}$$

$$\Rightarrow \left(1+\frac{R}{400}\right)^3 = \frac{9261}{8000} = \left(\frac{21}{20}\right)^3$$

$$\Rightarrow 1+\frac{R}{400} = \frac{21}{20} \Rightarrow \frac{R}{400} = \frac{21}{20} - 1 = \frac{1}{20}$$

$$\Rightarrow R = \frac{400}{20} = 20\ \%\ \text{per annum}$$

2. (2) Using Rule 6,

$$P = \frac{D \times 100^3}{r^2(r+300)}$$

$$= \frac{48 \times 100^3}{400(20+300)} = \text{Rs. } 375$$

3. (1) Using Rule 1,

$$A = P\left(1+\frac{r}{200}\right)^{2t}$$

Here, P = ₹ 5000
r = 10% per annum
t = 2 years

$$\text{So, } A = 5000\left(1+\frac{10}{200}\right)^4$$

$$= 5000\left(1+\frac{5}{100}\right)^4$$

$$= 5000 \times \frac{194481}{160000} = \frac{194481}{32}$$

A = ₹ 6077.5
CI = ₹ (6077.5 – 5000)
= ₹ 1077.5.

4. (4) Using Rule 4,

$$A = P\left(1+\frac{r}{100}\right)^3\left(1+\frac{\frac{r}{2}}{100}\right)$$

$$= 10{,}000\left(1+\frac{10}{100}\right)^3\left(1+\frac{5}{100}\right)$$

$$= 10{,}000 \times \frac{1331}{1000} \times \frac{21}{20}$$

A = ₹ 13975.5
CI = ₹ (13975.5 – 10,000)
CI = ₹ 3975.5.

5. (1) Using Rule 1,

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

Here, A = ₹ 9261
r = 5% per annum
t = 3 years

$$P = \frac{9261}{\left(1+\frac{5}{100}\right)^3} = \frac{9261}{\frac{9261}{8000}}$$

P = ₹ 8000.

6. (2) $\dfrac{SI}{CI} = \dfrac{rt}{100\left[\left(1+\frac{r}{100}\right)^t - 1\right]}$

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

$$= \frac{2}{25\left(\frac{676}{625} - 1\right)} = \frac{2 \times 625}{25 \times 51}$$

$$\frac{SI}{CI} = \frac{50}{51} = 50 : 51$$

7. (3) Using Rule 1,
A = ₹ 17576
P = ₹ 15625
r = 4% per annum

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

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

$$\left(1+\frac{4}{100}\right)^t = \frac{17576}{15625}$$

$$\left(\frac{26}{25}\right)^t = \frac{17576}{15625} = \left(\frac{26}{25}\right)^3$$

$\therefore$ t = 3 years.

8. (1) $\dfrac{CI}{SI} = \dfrac{100\left[\left(1+\frac{r}{100}\right)^t - 1\right]}{rt}$

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

$$= \frac{100 \times \left(\frac{676}{625} - 1\right)}{4 \times 2}$$

$$\frac{CI}{125} = \frac{100 \times 51}{4 \times 2 \times 625}$$

$$CI = \frac{100 \times 51 \times 125}{4 \times 2 \times 625}$$

CI = ₹ 127.5.

9. (2)

$$SI = CI \times \frac{rt}{100\left[\left(1+\frac{r}{100}\right)^t - 1\right]}$$

$$= \frac{2522 \times 5 \times 3}{100\left[\left(1+\frac{5}{100}\right)^3 - 1\right]}$$

$$SI = \frac{2522 \times 5 \times 3}{100\left[\frac{9261}{8000} - 1\right]}$$

$$= \frac{2522 \times 5 \times 3}{100 \times 1261} \times 8000$$

SI = ₹ 2400.

10. (3) The difference between CI and SI for 2 years period is because CI also includes interest for the second year on the first year's interest.
CI – SI = ₹ (55 – 50) = ₹ 5

$$\text{First year's SI} = \frac{50}{2} = ₹\ 25$$

So, ₹ 5 is the interest on ₹ 25 for 1 year.

$$r = \frac{100\,I}{pt}$$

Here, I = ₹ 5
P = ₹ 25
t = 1 year

$$\therefore r = \frac{100 \times 5}{25 \times 1}$$

r = 20% per annum.

$$\text{Now, } P = \frac{100\,I}{rt}$$

Here, I = ₹ 50
r = 20% per annum
t = 2 years.

$$P = \frac{100 \times 50}{20 \times 2}$$

P = ₹ 125.

Note : **Derivation** for 2 years problems :

$$\text{Rate} = \frac{2 \times (CI - SI)}{SI} \times 100$$

$$\text{Sum} = \frac{SI \times 100}{\text{Rate} \times 2}$$

11. (4) Let the sum be ₹ P

$$SI = \frac{Pr \times 2}{100} = \frac{2Pr}{100}$$

$$CI = P\left[\left(1+\frac{r}{100}\right)^2 - 1\right]$$

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

$$CI = P\left[\frac{r^2}{100^2}+\frac{2r}{100}\right]$$

$$CI - SI = P\left[\frac{r^2}{100^2}+\frac{2r}{100}\right]-\frac{2Pr}{100}$$

Let, CI – SI = x

$$x = \frac{Pr^2}{100^2}P = x\left(\frac{100}{r}\right)^2$$

Here, x = ₹ 25

r = 4% per annum

$$P = 25\left(\frac{100}{4}\right)^2$$

P = 25× 625

P = ₹15625.

12. (1) Using Rule 6,

Let the sum be ₹ P

$$SI = \frac{Pr\times 3}{100} = \frac{3Pr}{100}$$

$$CI = P\left[\left(1+\frac{r}{100}\right)^3 - 1\right]$$

$$CI = P\left[1+\frac{r^3}{100^3}+\frac{3r^2}{100^2}+\frac{3r}{100}-1\right]$$

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

$$\Rightarrow CI - SI(x) =$$

$$= P\left[\frac{r^3}{100^3}+\frac{3r^2}{100^2}+\frac{3r}{100}\right]-\frac{3Pr}{100}$$

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

$$x = P\left(\frac{r^2}{100^3}\right)[r+300]$$

$$\boxed{P = \frac{x(100)^3}{r^2(r+300)}}$$

Here, x = ₹ 608 (given) and

r = 4% per annum

$$P = \frac{608\times 100\times 100\times 100}{4\times 4\times(4+300)}$$

P = Rs. 1,25,000.

13. (2) Using Rule 1,

Let P = x

r = r% p.a.

A_1 = ₹ 9680

t_1 = 2 years

A_2 = ₹ 10648

t_2 = 3 years

Interest on ₹ 9680 for 1 year

= 10648 – 9680 = ₹ 968

$$\therefore\ r = \frac{968\times 100}{9680} = 10\%$$

Using A = $P\left(1+\frac{r}{100}\right)^t$ we get

$$9680 = x\left(1+\frac{10}{100}\right)^2 = x\left(\frac{11}{10}\right)^2$$

$$\Rightarrow x = 9680\times\frac{10}{11}\times\frac{10}{11} = 8000$$

∴ Principal = ₹ 8000.

14. (3) Using Rule 1,

Let the first part be x and the second part y.

The first part after 10 years

$$= x\left[1+\frac{20}{100}\right]^{10}$$

The second part after 7 years

$$= y\left[1+\frac{20}{100}\right]^{7}$$

As given in the problem these two amounts are equal.

So,

$$y\left(1+\frac{20}{100}\right)^7 = x\left(1+\frac{20}{100}\right)^{10}$$

or $\frac{y}{x} = \left(1+\frac{20}{100}\right)^3$

or $\frac{y}{x} = \frac{216}{125}$

and we have $y + x$ = ₹ 10230

Using the ratio formula

$$y = \frac{216}{216+125}\times 10230 = ₹\ 6480$$

$$x = \frac{125}{216+125}\times 10230 = ₹\ 3750$$

15. (4) Using Rule 1,

For A, time = 5 years

For B, time = 3 years

r = 5% per annum

$$A\left(1+\frac{5}{100}\right)^5 = B\left(1+\frac{5}{100}\right)^3$$

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

$$\frac{B}{A} = \frac{441}{400}$$

As given, $A + B$ = ₹ 1682

So, $A = \frac{400}{400+441}\times 1682$

= ₹ 800

and $B = \frac{441}{400+441}\times 1682$

= ₹ 882

16. (1) Using Rule 1,

Let the sum be ₹ P.

When compounded yearly, amount

$$= P\left[1+\frac{10}{100}\right]^2 = \frac{121}{100}P$$

When compounded half-yearly, amount

$$= P\left[1+\frac{5}{100}\right]^4 = \frac{194481}{160000}P$$

So, $\left[\frac{194481}{160000}-\frac{121}{100}\right]P = 220.25$

(Given difference)

or $\frac{194481-193600}{160000}P = 220.25$

or $\frac{881}{160000}P$ = 220.25

or $P = \frac{160000}{881}\times 220.25$

or P = ₹ 40,000.

17. (3) Using Rule 3,

$$A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)\left(1+\frac{r_3}{100}\right)$$

Here, P = ₹ 5000

$r_1$7 = 4%

r_2 = 5%

r_3 = 10%

$$A = 5000\left(1+\frac{4}{100}\right)\left(1+\frac{5}{100}\right)\left(1+\frac{10}{100}\right)$$

$$= 5000\times\frac{26}{25}\times\frac{21}{20}\times\frac{11}{10}$$

A = ₹ 6006.