Fraction	Percentage	In Decimal
1	100%	
1/2	50%	
1/3	$33\frac{1}{3}\%$	33.33%
1/4	25%	
1/5	20%	
1/6	$16\frac{2}{3}\%$	16.67%
1/7	$14\frac{2}{7}\%$	14.28%
1/8	$12\frac{1}{2}\%$	12.5%
1/9	$11\frac{1}{9}\%$	11.11%
1/10	10%	
1/11	$9\frac{1}{11}\%$	9.09%
1/12	$8\frac{1}{3}\%$	8.33%
1/13	$7\frac{9}{13}\%$	7.69%
1/14	$7\frac{1}{7}\%$	7.14%
1/15	$6\frac{2}{3}\%$	6.67%
1/16	$6\frac{1}{4}\%$	6.25%
1/17	$5\frac{15}{17}\%$	5.88%
1/18	$5\frac{5}{9}\%$	5.56%
1/19	$5\frac{5}{19}\%$	5.26%
1/20	5%	
1/24	$4\frac{1}{6}\%$	4.16%
1/25	4%	
1/40	$2\frac{1}{2}\%$	2.5%

Conversion of Fraction into Percentage

1. $\frac{3}{7} = 3 \times \frac{1}{7} = 3 \times 14.28 = 42.85\%$
2. $\frac{3}{8} = 3 \times \frac{1}{8} = 3 \times 12.5 = 37.5\%$
3. $\frac{7}{11} = 7 \times \frac{1}{11} = 7 \times 9.09 = 63.63\%$
4. $\frac{7}{16} = 7 \times \frac{1}{16} = 7 \times 6.25 = 43.75\%$
5. $\frac{41}{12} = 3 + \frac{5}{12} = 3 + 5 \times \frac{1}{12}$
   $= 300\% + 5 \times 8.33 = 341.66\%$

Conversion of Percentage into fraction

1. $85.71\% = 100\% - 14.28\% = 1 - \frac{1}{7} = \frac{6}{7}$
2. $73.33\% = 100\% - 20\% - 6.66\%$
   $= 1 - \frac{1}{5} - \frac{1}{15} = \frac{11}{15}$
3. $399.33\% = 400\% - 6.66\% = 4 - \frac{1}{15} = \frac{59}{15}$
4. $528.56\% = 500\% + 2 \times 14.28\%$
   $= 5 + \frac{2}{7} = \frac{37}{7}$
5. $462.5\% = 400\% + 5 \times 12.5 = 5 + \frac{5}{8} = \frac{37}{8}$

#1. $\boldsymbol{x\%\ of\ y = y\%\ of\ x = \frac{xy}{100}}$

e.g. 66.28% of 25 = 25% of 62.28

$= \frac{1}{4} \times 66.28 = 16.57$

#2. x is what percent of y.

$$\boldsymbol{\frac{x}{y} \times 100}$$

e.g. 42 is what percent of 105.

Soln: $\frac{42}{105} \times 100 = \frac{2}{5} \times 100 = 40\%$

#3. $x = \frac{x}{100}$ — **Increased or Decreased value** / **Original or Initial value**

Initial = x **Final = $(100 \pm x)$**

e.g. When a number is increased by 24, it becomes 115% itself. What is the number?

Soln: $15\% = \frac{3}{20}$

ATQ, Increased value: 3 units = 24

Number: 20 units = 20 × 8 = 160

Some important Result

1. Percentage change
   $= \frac{Final\ value - Original\ value}{Original\ value} \times 100$
2. If the price of a article increases by p%, then in order to keep expenditure same, percentage reduction in consumption
   $= \left(\frac{p}{100-p}\right) \times 100$
3. If the price of a article decreases by p%, then in order to keep expenditure same, percentage increase in consumption
   $= \left(\frac{p}{100+p}\right) \times 100$
4. If a number is first increased or decreased by x% and then increased or decreased by y%, the effective percentage change
   $= \pm x \pm y + \frac{xy}{100}$
   Use + sign for increased & - for decreased
5. Three successive percentage change
   $= \pm x \pm y \pm z \pm \frac{xy \pm yz \pm zx}{100} \pm \frac{xyz}{10000}$

EXERCISE

1. What percent is 463 of 1852?
   (a) 20 (b) 35 (c) 30 (d) 25
   (OSSC Investigator 2023)
2. What percent of 7.3 kg is 2044 gms?
   (a) 48% (b) 28% (c) 38% (d) 18%
   (OSSC CGL 2021)
3. Find 43% of 101400.
   (a) 42602 (b) 41602 (c) 43602 (d) 44602
   (OSSC Investigator 2023)
4. What is 20% of 40% of 30% of 75% of 3400?
   (a) 61.5 (b) 61.1 (c) 61.4 (d) 61.2
   (OSSC CGL 2021)
5. What is 30% of 40% of 150% of 200% of 360?
   (a) 12.96 (b) 1296 (c) 129.6 (d) 1.296
   (OSSC CGL 2021)
6. If 760% of x = 837% of 760, what is the value of x?
   (a) 847 (b) 827 (c) 857 (d) 837
   (OSSC CGL 2021)
7. If 20% of 340 is x less than 40% of 480, find x.
   (a) 124 (b) 128 (c) 126 (d) 130
   (OSSC CGL 2021)
8. If 25% of 360 is x% less than 40% of 490, find x (up to two decimals).
   (a) 65.65% (b) 76.13% (c) 54.08% (d) 120%
   (OSSC CGL 2021)
9. If 35% of a certain number is 2240, then what is 75% of that number?
   (a) 6400 (b) 6500 (c) 6300 (d) 6200
   (OSSC CGL 2021)
10. If 26% of a certain number is 962, then what is 39% of that number?
    (a) 1553 (b) 1773 (c) 1663 (d) 1443
    (OSSC Investigator 2023)
11. 1800 candidates appeared for an examination, of which 1350 passed. Find the pass percentage.
    (a) 80% (b) 75% (c) 70% (d) 85%
    (OSSC CGL 2021)
12. Sachin scored a century which included 3 fours and 8 sixes. As a result, what percentage of his total score did Sachin score by running between the wickets?
    (a) 40 (b) 45 (c) 50 (d) 55
    (OSSC CGL 2023)
13. A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had:
    (a) 588 apples (b) 600 apples
    (c) 672 apples (d) 700 apples
    (OSSC CHSL 2013)
14. In an examination, 96% of the candidates passed and 50 failed. How many candidates appeared?
    (a) 1000 (b) 1200 (c) 1250 (d) 1300
    (OSSC CHSL 2025)
15. An alloy contains 14 parts of tin and 100 parts of copper. What is the percentage of tin in the alloy?
    (a) 10% (b) 11% (c) 11.75% (d) 12.3%
    (OSSC CTSRE 2024)
16. If 74% of a number is added to 364, then the result is the number itself. Find the number.
    (a) 1500 (b) 1400 (c) 1600 (d) 1300
    (OSSC CGL 2021)

17. Two numbers are respectively 20% and 50% more than the third number. What percentage is the first of the second?
(a) 60% (b) 80% (c) 40% (d) 90%
(OSSC CPGL 2023)

18. Two students appeared in an examination. One of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. The marks obtained by them are:
(a) 33, 44 (b) 35, 42
(c) 33, 44 (d) 33, 42
(OSSC Amin 2023 and VSC 2023)

19. Three numbers A, B and C are such that 'B' is 30% more than 'A' and 'C' is 20% more than 'B'. What is the ratio of the numbers A and C?
(a) 2:3 (b) 16:25 (c) 25:39 (d) 13:19
(Jr Clerk Mains 2022)

20. Rani's weight is 25% that of Meena's and 40% of that of Tara's. What percentage of Tara's weight is Meena's weight?
(a) 120% (b) 140% (c) 150% (d) 160%
(OSSC CHSL 2025)

21. Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio A : B.
(a) 2:3 (b) 1:1 (c) 3:4 (d) 4:3
(OSSC CTSRE 2023)

22. The salaries of Ritu, Nitu and Situ are in the ratio 2:3:5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries?
(a) 3:3:10 (b) 10:11:20
(c) 23:33:60 (d) Cannot be determined
(OSSC CTSRE 2023 and CGL SPL 2023)

23. The ratio of employees to managers in an organization is 7:3. 70% of the employees and 30% of the managers take lunch in the canteen. What % of total workforce takes lunch in the canteen?
(a) 63% (b) 53%
(c) 58% (d) Cannot be determined
(OSSC CGL SPL 2022)

24. In a college of 26,000 students, 45% of them are boys. If 40% of the girls and 60% of the boys failed in the examination, then find the number of students who passed in the examination.
(a) 15260 (b) 12260 (c) 14260 (d) 13260
(OSSC CGL 2021)

25. In a city, 40% of the adults are illiterate while 85% of the children are literate. If the ratio of the adults to that of the children is 2:3, then what percent of the population is literate?
(a) 20% (b) 25% (c) 50% (d) 75%
(OSSC CGL SPL 2022)

26. On a certain island, 5% of the 2000 inhabitants are one-legged and half of the other go barefoot. What is the least number of shoes needed on the island if one pair is counted as two shoes?
(a) 1900 (b) 4000 (c) 2000 (d) 2100
(OSSC CGL SPL 2022)

27. In an election of two candidates, the candidate who gets 41% is defeated by a margin of 2412 votes. Find the total number of votes polled?
(a) 14200 (b) 13800 (c) 12900 (d) 13400
(OSSC CPGL 2023)

28. In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes polled was 7,500, then what is the number of valid votes in favour of the other candidate?
(a) 2,500 (b) 2,700 (c) 2,900 (d) 3,100
(OSSC CHSL 2024)

29. If 3.5% of the income is taken as tax and 12.5% of the remaining is saved, this leaves Rs. 4053 to spend. What is the income?
(a) Rs. 4500 (b) Rs. 4900
(c) Rs. 4800 (d) Rs. 5000
(OSSC CGL SPL 2023)

30. After deducting 10% from a certain sum and then 20% from the remainder, there is 3600 left. Find the original sum.
(a) 4000 (b) 3800 (c) 5000 (d) 5500
(OSSC CPGL 2023 and Stenographer 2023)

31. A man had a certain amount of money with him. He spent 20% of that to buy grocery and 5% of the remaining on transport and gifted away Rs. 120. If

he left with Rs. 1400, then the amount he spent on transport is:

(a) Rs. 76 (b) Rs. 61 (c) Rs. 95 (d) Rs. 80

(OSSC CTSRE 2024)

32. Rakesh spends 10% of his monthly income on his household expenditure, 20% on books, 25% on clothes and saved the rest. On counting, he comes to know that he has finally saved Rs. 156516083. Find his monthly income (in Rs.)

(a) 35746 (b) 35740 (c) 35745 (d) 35750

(OSSC CGL 2021)

33. Sridhar donated 18% of his savings to an old age home, 18% of the savings to an orphanage and 18% of his savings to foundations for medical help. The remaining amount of Rs. 9200 of savings is deposited in Bank. Find the salary of Sridhar, if 80% of the salary was saving amount (in Rs.)

(a) 20,000 (b) 35,000 (c) 25,000 (d) 40,000

(OSSC CGL 2021)

34. In a society number of males are 80 more than the number of females, in total number of males 30% are boys and in females 35% are girls and rest are adults. If the number of girls is 18 less than the number of boys. Calculate the total population of the society.

(a) 330 (b) 370 (c) 300 (d) 320

(OSSC CPGL 2024)

35. In an competitive examination, 66% candidates passed in section A and 51% in section B, while 8% failed in both the sections. If 450 students passed in both the sections, find the total number of candidates who appeared on the competitive examination.

(a) 1900 (b) 1800 (c) 2000 (d) 1700

(OSSC CGL 2021)

36. Out of a total 85 children playing badminton or table tennis or both, total number of girls in the group is 70% of the total number of boys in the group. The number of boys playing only badminton is 50% of the number of boys and the total number of boys playing badminton is 60% of the total number of boys. The number of children playing only table tennis is 40% of the total number of children and a total of 12 children play badminton and table tennis both. What is the number of girls playing only badminton?

(a) 16 (b) 14 (c) 17 (d) Data inadequate

(OSSC CPGL 2024)

37. The marks scored by a student in four subjects are in the ratio of 4:3:7:6. The candidate scored an overall aggregate of 60% of the sum of the maximum marks and the maximum marks on all four subjects are same. In how many subjects did he score more than 60% marks?

(a) 4 (b) 3 (c) 1 (d) 2

(OSSC Jr. clerk mains 2022)

38. The gross income of a person is Rs. 25,000. If 20% of his income is exempted from income tax and the rate of income tax is 5%, then what is his net income after income tax?

(a) Rs. 23,500 (b) Rs. 24,000
(c) 24,500 (d) Rs. 25,000

(OSSC Jr clerk mains 2022)

39. Due to fall in manpower, the production in a factory decreases by 60%. By what percent should the working hours be increased, to restore the original production in the factory?

(a) 40% (b) 66.66% (c) 150% (d) 120%

(OSSC CGL 2022)

40. If the price of petrol has increased from Rs. 40 per litre to Rs. 60 per litre, then by how much percent a person has to decrease his consumption of petrol so that his expenditure remains the same?

(a) 66.66% (b) 45.45% (c) 43.43% (d) 33.33%

(OSSC CGL 2024)

41. If the price of petrol falls down by 20%, by how much percent must a person increase its consumption, so as to maintain the expenditure on petrol same as previous?

(a) 20% (b) 25% (c) 33.33% (d) 80%

(OSSC CTSRE 2023)

42. Jadeja purchased a car 3 years ago for Rs. 2 lakhs. Its value depreciated each year by 25% per annum. What is the present value of car?

(a) 85260 (b) 84050 (c) 84375 (d) 82540

(OSSC CTSRE 2023)

43. A scooter costs Rs. 25,000 when it is brand new. At the end of each year, its value is only 80% of what it was at the beginning of the year. What will be the value of the scooter at the end of 3 years?
(a) Rs. 10,000 (b) Rs. 12,500
(c) Rs. 12,800 (d) Rs. 12,000
(OSSC CGL 2024)

44. The population of a town is decreasing at the rate of 10% per annum. If the population 2 years ago was 20,000, then what is the present population?
(a) 15,000 (b) 15,200
(c) 16,000 (d) 16,200
(OSSC CGL 2023)

45. Anil's salary was Rs. 18,000. An increase of 20% each in two consecutive years is equal to a single increment of what percentage?
(a) 22% (b) 32% (c) 40% (d) 44%

46. Vikram bought a new plot which needs to be fenced immediately. Due to this length as well as the breadth of rectangular working place is reduced by 17%. Find the percentage decrease in the area.
(a) 31.11% (b) 28.44%
(c) 32.44% (d) 30.05%
(OSSC CGL 2021)

47. A blanket when bleached, decreases in length by 20% and in breadth by 15%. What is the percentage decrease in its area?
(a) 32% (b) 35% (c) 42% (d) 45%
(OSSC CGL 2023)

48. The length, breadth and height of a room in shape of a cuboid are increased by 20%, 25% and 30% respectively. Find the percentage change in the volume of the cuboid.
(a) 105% decrease (b) 105% increase
(c) 95% decrease (d) 95% increase
(OSSC CGL 2021)

49. An error 2% in excess is made while measuring the side of a square. The percentage of error in the calculated area of the square is:
(a) 2% (b) 2.02% (c) 4% (d) 4.04%

50. If the edge of a cube is increased by 30%, then what is the percentage of increase in its surface area?
(a) 71% (b) 69% (c) 60% (d) 30%
(OSSC Statistical Asst.2024)

51. The length of a rectangle is halved, while its breadth is tripled. What is the percentage change in area?
(a) 25% increase (b) 50% increase
(c) 66% decrease (d) 50% decrease
(OSSC Accountant 2024 and CGL mains 2024)

52. The tax rate on properties was reduced by 20% in the latest Union Budget. Tom's property appreciation appreciated by 20% during this period. What is the effect on the tax that Tom will have to pay?
(a) Increased by 16% (b) Decreased by 16%
(c) Decreased by 4% (d) No change
(OSSC Jr clerk mains 2022)

53. The population of a town in the first year increased by 10%, in the next year it decreased by 10%. Once again in the third year it increased by 10% and in the fourth year it decreased by 10%. If the present population be 20,000, then the population after four year will be:
(a) 16902 (b) 19602
(c) 20692 (d) None of these
(OSSC CGL 2021)

54. The salary of a worker is first increased by 5% and then it is decreased by 5%. What is the overall change in his salary compared to the original salary?
(a) 0.25% decrease (b) 0.5% increase
(c) 0.25% increase (d) 0.5% decrease
(OSSC CGL SPL 2023)

55. The numerator of a fraction is increased by 7.69% and the denominator is decreased by 7.69%. By what percent the original fraction changed?
(a) 0.5% decrease (b) 16.66% increase
(c) 7.14% (d) No change
(OSSC Jr. clerk mains 2021)

56. In an examination of 300 marks, a student scored 72%. Dissatisfied with the result, he attempted the examination again to improve his score. How many

more marks from his previous score should he score to have an overall percentage of 90%?
(a) 54 (b) 60 (c) 63 (d) 66

57. Two numbers A and B are respectively 50% and 80% more than a third number. Then, find the ratio A:B.
(a) 6:5 (b) 5:6 (c) 4:5 (d) 6:7
(OSSC ESI 2023)

58. In an examination, 25% students failed in math and 35% students failed in science. If 15% students failed in both, then what is the percentage of students who passed in both the subjects?
(a) 50% (b) 55% (c) 60% (d) 45%

59. If M = y% of z and N = z% of y, then which of the following must be true?
(a) M is equal to N
(b) M is greater than N
(c) Cannot be determined
(d) M is less than N

60. 500 books are there which are to be distributed equally among some school children. The distribution is to be done in such a way that the number of books each child received is 20% of the total number of children. How many books did each child receive?
(a) 11 (b) 10 (c) 9 (d) 8

61. The number of seats in an auditorium is increased by 25%. The price of a ticket is also increased by 12%. Then the increase in revenue collection will be:
(a) 40% (b) 35% (c) 45% (d) 48%
(OSSC LTR 2025)

62. The ratio of the number of boys and girls in a college is 3:2. If 20% of the boys and 25% of the girls are adults, the percentage of those students who are not adults, is:
(a) 58% (b) 67.5% (c) 78% (d) 82.5%
(OSSC LTR 2025)

63. The population of a town was 62,500 two years ago. It increased every year at the rate of 4% per annum. Find its present population.
(a) 67,000 (b) 68,200 (c) 67,600 (d) 69,000
(OSSC Stenographer 2023)

64. Rajeev bought a car at Rs. 1,75,000. If its value depreciates at the rate of 20% per annum, what will be its value after three years?
(a) 88,600 (b) 89,600
(c) 87,500 (d) 89,400
(OSSC Stenographer 2023)

65. The population of a town is 8,000. It increased by 10% during the first year and by 20% during the second year. What is the population after two years?
(a) 10,450 (b) 10,560 (c) 10,650 (d) 11,050
(OSSC Stenographer 2023)

66. A candidate gets 30% of the marks in a test but fails by 50 marks. Another candidate gets 320 marks fails by 30 marks. Find the maximum marks.
(a) 1200 (b) 1100 (c) 1000 (d) 1500
(OSSC Stenographer 2023)

67. In an examination, 40% of the students failed in Mathematics, 30% failed in English and 10% failed in both. Find the percentage of students who passed in both the subjects.
(a) 30 (b) 40 (c) 45 (d) 55

68. If one side of the sides of a rectangle is increased by 20% and the other is increased by 5%, find the percent value by which the area changes.
(a) 22 (b) 24 (c) 26 (d) 28

69. A shopkeeper marks the price at 15% higher than the original price. Due to increase in demand, he further increased the price by 10%. How much percent profit will he get?
(a) 25% (b) 26.5% (c) 27% (d) 30%
(OSSC Stenographer 2023)

70. In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got was:
(a) 2700 (b) 2900 (c) 3000 (d) 3100
(OSSC Stenographer 2024)

71. The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?

(a) 8 : 9 (b) 17 : 18
(c) 21 : 22 (d) cannot be determined
(OSSC Stenographer 2024)

72. (0.08% of 363 + 0.6% of 241) × 500 = ?
(a) 8.682 (b) 86.82 (c) 846.2 (d) 868.2
(OSSC Stenographer 2024)

73. What approximate value will come in the place of the question mark '?' in the following expression?
9.99% of 29.906 + 299.84 % of 54.908 - 49.86 % of 149.59 = ?
(a) 106 (b) 90 (c) 93 (d) 80
(OSSC CGL Mains 2022)

74. In a club 20% of the members own only two cars each, 40% of the remaining own three cars each, and the remaining members own only one car each. Then the percentage of the total members own one car each?
(a) 40% (b) 60% (c) 48% (d) 52%
(OSSC GL Main 2023)

75. P and Q are two fixed points with 5cm apart. R is a point on the line segment PQ such that the length of the segment PR is 3cm. If the length of the segment PR is increased by 6%, then the length of the segment RQ is decreased by:
(a) 5% (b) 7% (c) 9% (d) 10%
(OSSC CGL Main 2023)

76. The length of a rectangle is increased by 60%. By what percent should the width be decreased to maintain the same area?
(a) 34.5% (b) 36% (c) 37% (d) 37.5%
(OSSC CGL Main 2024-25)

77. Ashok got 30% of the maximum marks in an examination and failed by 10 marks. However Hari who take the same examination got 40% of the total marks and got 15 marks more than the passing marks. What was the passing marks on the examination?
(a) 75 (b) 80 (c) 85 (d) 90
(OSSC CGL Mains 2024-25)

78. The population of a town is 8000. If the males increase by 6% and females by 10%, the population will be 8600. Find the number of females in the town.
(a) 2000 (b) 3000 (c) 4000 (d) 1500
(OSSC CGL Mains 2024-25)

79. Due to fall in manpower, the production in a factory decreases by 25%. By what percent should the working hours be increased to restore the original production?
(a) $25\frac{1}{3}\%$ (b) $35\frac{2}{3}\%$ (c) $28\frac{2}{3}\%$ (d) $33\frac{1}{3}\%$
(OSSC CGL Mains 2024 - 25)

80. If the price of a commodity be raised by 20%, find by how much percent must a householder reduce his consumption of that commodity so as not to increase his expenditure.
(a) $14\frac{1}{3}\%$ (b) $12\frac{2}{3}\%$ (c) $16\frac{2}{3}\%$ (d) $18\frac{1}{3}\%$
(OSSC SSC Mains 2024-25)

81. A man buys a shirt and a trouser for Rs. 371. If the trouser costs 12% more than the shirt, find the cost of the shirt.
(a) Rs 125 (b) Rs 150 (c) Rs 175 (d) Rs 200
(OSSC CHSL 2025)

82. 220 liters of a mixture of milk and water contains 45% water. How much water should be added so that the mixture has 80% water? (in liters)
(a) 385 (b) 400 (c) 390 (d) 395
(OSSC CGL 2021)

83. 6 liters of a 20% solution of alcohol in water are mixed with 4 liters of a 60% solution of alcohol in water. The percentage alcoholic strength of the mixture is:
(a) 80 (b) 40 (c) 36 (d) 48
(OSSC CGL 2024)

84. A mixture of 150 liters of wine and water contains 20% of water. How much more water should be added so that water becomes 25% of the new mixture?
(a) 10 liters (b) 20 liters
(c) 30 liters (d) 40 liters
(OSSC CHSL 2022)

85. What approximate value should come in place of the question mark (?) in the following questions?
45 % of 1500 + 35 % of 1700 = ? % of 3175
(a) 40 (b) 45 (c) 30 (d) 35
(OSSC CPGL 2024)

86. In 1kg mixture of sand and iron, 20% is iron. How much sand should be added so that the proportion of iron becomes 10%?
(a) 1 kg (b) 2 kg (c) 3 kg (d) 4 kg
(OSSC Steno 2022)

87. Fresh grapes contain 90% water by weight, while dry grapes contain 20% water by weight. What is the weight of dry grapes available from 20kg of fresh grapes?
(a) 5 kg (b) 2.5 kg (c) 4 kg (d) 3 kg
(OSSC CGL Mains 2022)

88. Akshay went to a fruit market with certain amount money. With this amount of money he can buy either 50 oranges or 40 mangoes. If he retains 10% of the money for taxi fare and buys 20 mangoes, then the number of oranges he can buy is:
(a) 20 (b) 18 (c) 16 (d) 14
(OSSC CGL Mains 2022)

89. The present cost of a house is Rs. 111395. After a year, its cost increased to Rs. 199229. The percentage increase (rounded off to the nearest integer) in the cost of the house is:
(a) 76 (b) 79 (c) 83 (d) 80
(OSSC JEO & JA 2024)

90. A number is first decreased by 20% and then increased by 20%. The number so obtained is 720 less than the original number. What is the original number?
(a) 18500 (b) 17500 (c) 18000 (d) 19000
(OSSC JEO & JA 2024)

91. The present cost of a hospital is Rs 154848. After a year, its cost increased to Rs. 182776. The percentage increase (rounded off to the nearest integer) in the cost of the hospital is:
(a) 15 (b) 18 (c) 22 (d) 23
(OSSC JEO & JA 2024)

92. The current population of a town is 12500. It increases by 10% and 12% in two successive years but decreased by 28% in the third year. What is the population of the town at the end of the third year?
(a) 14648 (b) 14652 (c) 14656 (d) 14651
(OSSC JEO & JA 2024)

93. Richa's income is 20% more than that of Rita's. By how much percentage is Rita's income less than that of Richa's?
(a) $18\frac{2}{3}\%$ (b) $15\frac{2}{3}\%$ (c) $17\frac{2}{3}\%$ (d) $16\frac{2}{3}\%$
(OSSC JEO & JA 2024)

94. A man losses 20% of his money. After spending 20% of the remainder, he has Rs. 480 left. What is the amount of money he originally had?
(a) Rs. 625 (b) Rs. 655 (c) Rs. 635 (d) Rs. 645
(OSSC JEO & JA 2024)

95. If the radius of the base of a right circular cylinder is decreased by 17% and its height is increased by 227%, then what is the percentage increase (closest integer) in its volume?
(a) 0.95 (b) 1.25 (c) 1.21 (d) 1.38
(OSSC JEO & JA 2024)

96. The number 35 is increased successively by 10%, 20% and 30%. Find the resultant number.
(a) 64.02 (b) 64 (c) 60.06 (d) 62.05
(OSSC JEO & JA 2024)

97. If a number 24,000 increased successively by 15%, 25% and 20%, then the overall increase in percentage was:
(a) 52.5% (b) 62% (c) 68.3% (d) 72.5%
(OSSC JEO & JA 2024)

98. The current population of a town is 10,000. It increased by 8% and 25% in two successive years but decreased by 2% in the third year. What is the population of the town at the end of the third year?
(a) 13230 (b) 13232 (c) 13225 (d) 13228
(OSSC JEO & JA 2024)

99. A number is first increased by 12.5% and then the increased number is decreased by 14%. Find the net increase or decrease percentage (correct to two places of decimals).
(a) 4.18% decrease (b) 4.18% increase
(c) 3.25% increase (d) 3.25% decrease
(OSSC JEO & JA 2024)

100. The current population of a town is 12,000. It increased by 25% and 56% in two successive years but decreased by 11% in the third year, what is the

population of the town at the end of the third year?

(a) 20824 (b) 20826 (c) 20823 (d) 20827

(OSSC JEO & JA 2024)

101. If 20% of a number is 120, then 112% of that number is:

(a) 692 (b) 672 (c) 662 (d) 652

(OSSC ATO 2023)

102. If the length of each side of a square is increased by 50%, then what will be the ratio between the new area and original area of the square?

(a) 9 : 4 (b) 5 : 4 (c) 4 : 9 (d) 4 : 5

(OSSC ATO 2023)

103. What is the number whose 35% is 280?

(a) 700 (b) 750 (c) 800 (d) 850

(OSSC ATO 2023)

ANSWER KEY

01. (d)	02. (b)	03. (c)	04. (d)	05. (c)	06. (d)
07. (a)	08. (c)	09. (c)	10. (d)	11. (b)	12. (a)
13. (d)	14. (c)	15. (d)	16. (b)	17. (b)	18. (d)
19. (c)	20. (d)	21. (d)	22. (c)	23. (c)	24. (c)
25. (d)	26. (c)	27. (d)	28. (b)	29. (c)	30. (c)
31. (d)	32. (b)	33. (c)	34. (d)	35. (b)	36. (b)
37. (d)	38. (b)	39. (c)	40. (a)	41. (b)	42. (c)
43. (c)	44. (d)	45. (d)	46. (a)	47. (a)	48. (d)
49. (d)	50. (b)	51. (b)	52. (c)	53. (b)	54. (c)
55. (d)	56. (a)	57. (b)	58. (b)	59. (a)	60. (b)
61. (a)	62. (c)	63. (c)	64. (b)	65. (b)	66. (c)
67. (b)	68. (c)	69. (b)	70. (a)	71. (c)	72. (d)
73. (c)	74. (c)	75. (c)	76. (d)	77. (c)	78. (b)
79. (d)	80. (c)	81. (c)	82. (a)	83. (c)	84. (a)
85. (a)	86. (a)	87. (b)	88. (a)	89. (b)	90. (c)
91. (b)	22. (b)	93. (d)	94. (a)	95. (b)	96. (c)
97. (d)	98. (a)	99. (d)	100. (b)	101. (b)	
	102.(c)	103. (c)			

SOLUTION

1. Required percentage = $\frac{468}{1852} \times 100 = 25\%$
2. Required percentage = $\frac{2044}{7300} \times 100 = 28\%$
3. 43% of 101400 = 43,602
4. 20% of 40% of 30% of 75% of 3400
   = $\frac{1}{5} \times \frac{2}{5} \times \frac{3}{10} \times \frac{3}{4} \times 3400 = 61.2$
5. 30% of 40% of 150% of 200% of 360
   = $\frac{3}{10} \times \frac{2}{5} \times \frac{3}{2} \times 2 \times 360 = 129.6$
6. 760% of X = 837% of 760 = 760% of 837
   X = 837
7. X = 40% of 480 – 20% of 340
   = $\frac{2}{5} \times 480 - \frac{1}{5} \times 340$ = 192 – 68 =124
8. x% = $\frac{40\%\ of\ 490 - 25\%\ of\ 360}{40\%\ of\ 490} = \frac{196-90}{196} \times 100$
   $\frac{106}{196} \times 100$ = 54.08%
9. 35% of x = 2940
   x = $2940 \times \frac{100}{35}$ = 8400
   75% of x = $\frac{3}{4} \times 8400$ = 6300
10. 26% of x = 962
    39% of x = $\frac{39}{26} \times 962$ = 1443
11. Pass% = $\frac{1350}{1800} \times 100$ = 75%
12. Sachin scored by running between the wicket = 100 – 3 × 4 – 8 × 6 = 40
    Required% = $\frac{40}{100} \times 100$ = 40%
13. Let he had x apples.
    He had left with 100% - 40% = 60% apples

60% of x = 420
X = 420× $\frac{5}{3}$ = 700 apples

14. Number of Candidates = x.
Candidates failed = 100% - 96% = 4%
ATQ, 4%x = 50
x = 50 × 25 = 1250

15. Percentage of tin = $\frac{14}{100+14} \times 100$ = 12.3%

16. Let the number be x.
74% of x + 364 = 100% of x
100% x – 74%x = 364
26% x = 364
X = 364× $\frac{100}{26}$ = 1400

17. Let the third number be x.
First number = 100 + 20 = 120
Second number = 100 + 50 = 150
Required % = $\frac{120}{150} \times 100$ = 80%

18. Let the first student secured x marks.
Second students secured x + 9 marks
ATQ, x + 9 = (x + x + 9)× $\frac{56}{100}$
$\frac{x+9}{2x+9} = \frac{14}{25}$
$\frac{2x+18}{2x+9} - 1 = \frac{28}{25} - 1$
$\frac{9}{2x+9} = \frac{3}{25}$
2x + 9 = 75 X= 33

Or 56% = $\frac{14}{25} = \frac{14}{14+11}$
ATQ, 14 – 11 = 3 units = 9
1 unit = 3
The mark obtained by them are 14 units = 14×3 = 42 and 11 units = 11×3 = 33

19. Let A = 100, B = 100 + 30 = 130
C = 130 + 20% of 130 = 156
A : C = 100 : 156 = 25 : 39

20. Let Rani's weight = 100 kg.
Meena's weight = 100/25% = 400 kg
Tara's weight = 100/40% = 250 kg
Required % = $\frac{400}{250} \times 100$ = 160%

21. ATQ,
5% of A + 4% of B = 2/3(6% of A + 8% of B)
15% of A + 12% of B = 12% of A + 16% of B
3% of A = 4% of B
A : B =4 : 3

22. Let the salaries of Ritu, Nitu and Situ be 200, 300 and 500 respectively.
New salaries:
Ritu = 200 + 15% of 200 = 230
Nitu = 300 + 10% of 300 = 330
Situ = 500 + 20% of 500 = 600
Required ratio = 230 : 330 : 600 = 23 : 33 : 60

23. Number of employees = 70x
Number of manager = 30x
Required % = $\frac{70\%\ of\ 70x + 30\%\ of\ 30x}{100x} \times 100$
= 49 + 9 = 58%

24. Number of students who failed in the exam
= $\frac{40}{100} \times 14300 + \frac{60}{100} \times 11700$
= 5720 + 7020 12,740
Number of students who passed in the examination = 26,000 – 12,740 = 14,260

25. Let the number of adults and children be 200 and 300 respectively.
Number of literate Adults
= (100 – 40)% of 200 = 120
Number of literate Children
= 85% of 300 = 255
Required % = $\frac{120+255}{200+300} \times 100 = 75\%$

26. One legged inhabitants = 5% of 2000 = 100
Bare foot inhabitants = ½(2000 - 100) = 950
Remaining = 2000 – 100 – 950 = 950
Least number of shoes required = 950 × 2 + 100 × 1 = 2000

27. Let the total number of voters = x
Winner candidates gets 59% votes
Looser candidates gets = 41% votes
ATQ, (59 – 41)% of x = 2412
18% of x = 2412
x = 2412 × $\frac{100}{18}$ = 13400

28. Total number of valid votes = 80% of 7500 = 6000
If one got 55%, then another got 45% of total valid votes = 45% of 6000 = 2700

29. Let the income of the person = x
ATQ, $x\left(1 - \frac{3.5}{100}\right)\left(1 - \frac{12.5}{100}\right) = 4053$

$x \times \frac{96.5}{100} \times \frac{87.5}{100} = 4053$

$x \times \frac{96.5}{100} \times \frac{7}{8} = 4053$

$x = 4053 \times \frac{1000}{965} \times \frac{8}{7} = 4800$

30. Let the sum is x.
ATQ, (100- 10)% of (100 - 20)% of x = 3600
90% of 80% of x = 3600
x = $3600 \times \frac{10}{9} \times \frac{5}{4}$ = 5000

31. Let the amount of money be 100x
Grocery = 20% of 100x = 20x
Transport = 5% of (100 – 20)x = 4x
Remaining amount = 100x – 20x – 4x = 76x
ATQ, 76x = 1400 + 120 = 1520
x = 1520/76 = 20
Amount he spent on transport
= 4x = 4 × 20 = Rs. 80

32. Total expenditure = 10 + 20 + 25 = 55%
Saving = 100 – 55 = 45%
ATQ, 45% of x = 16083
$\frac{9}{20}x = 16083$
x = 16083× $\frac{20}{9}$ = 35,740
Monthly income = 35,740

33. Total Donation = 18+18+18 =54%
Let salary of Sridhar is x
His saving = 80% of x
ATQ, 80% of x = 54% of 80% of x + 9200
46% of 80% of x = 9200
$\frac{46}{100} \times \frac{4}{5}x = 9200$
$x = 9200 \times \frac{5}{4} \times \frac{100}{46} = 25{,}000$

34. Number of females = x
Number of males = x + 80
Total population = x + x + 80 = 2x + 80
= 2×120+80 = 320

35. $|A \cup B| = |A| + |B| - |A \cap B|$
$|A \cup B| = E - |A \cap B|'$ = 100 – 8 = 92%
92% = 66% + 51% - $|A \cap B|$
$|A \cap B|$ = 25%
ATQ, 25% = 450
Total number of candidates = 100% = 4 × 25% = 4 × 450 = 1800

36. Total number of children = 85
Boys : Girls = 10 : 7
Total 17 units = 85
1 unit = 5
Number of boys = 10 units = 50 and
number of girls = 7 units = 35
Number of boys playing only badminton
= 50% of 50 = 25
Number of girls playing badminton
= 60% of 50 = 30
Number of children playing only table tennis
= 40% of 85 = 34
Number of children playing table tennis
= 34 + 12 = 46
$|B \cup T| = |B| + |T| - |B \cap T|$
85 = $|B|$ + 46 – 12
$|B|$ = 51
Number of children playing only Badminton = 51 – 12 = 39
Number of girls playing only Badminton = 39 – number of boys playing only Badminton = 39 – 25 = 14

37. Let the maximum marks of each subject be 100.
Marks secured = 60% of 4 × 100 = 240
Again (4+3+7+6) units = 240
20 units = 240
1 unit = 12
Marks obtained in all four subjects are 4 × 12 = 48, 3 × 12 = 36, 7 × 12 = 84 and 6 × 12 = 72 respectively.
In two subjects, he scored more than 60% i.e. 84 and 72.

38. Gross income = 25,000
Income tax exempted = 20% of 25,000 = 5000
Remaining = 20,000
Income tax on 20,000 = 5% of 20,000 = 1000
Net income = 25,000 – 1000 = 24000

39. Required % = $\frac{60}{100-60} \times 100$ = 150%

40. % increase in price = $\frac{60-40}{60} \times 100$ = 66.66%

41. Use formula, $\frac{r}{100-r} \times 100 = \frac{20}{100-20} \times 100$ = 25%

42. Present value of car = $200000\left(1 - \frac{25}{100}\right)^3$

$= 200000\left(1-\frac{1}{4}\right)^3 = 200000\left(\frac{3}{4}\right)^3 = 84{,}375$

43. Value of scooter at the end of 3 years
$= 25000\left(\frac{80}{100}\right)^3$
$= 25000\left(\frac{4}{5}\right)^3 = 12{,}800$

44.

Before	Present
10	9
10	9
100	81

ATQ, 100 units = 20,000
81 units = $\frac{81}{100} \times 20{,}000 = 16200$

45. Apply successive increase formula,
$20 + 20 + \frac{20\times20}{100} = 44\%$

46. Apply successive decrease formula
$17 + 17 - \frac{17\times17}{100} = 31.11\%$

47. $20 + 15 - \frac{20\times15}{100} = 32\%$

48. $20 + 25 + 30 + \frac{20\times25}{100} + \frac{25\times30}{100} + \frac{30\times20}{100} + \frac{20\times25\times30}{10000}$
$75 + 5 + 7.5 + 6 + 1.5 = 95\%$
Or,

Old	New
5	6
4	5
10	13
200	390

Percentage increase = $\frac{390-200}{200} \times 100 = 95\%$

49. $2 + 2 + \frac{2\times2}{100} = 4.04\%$

50. Increase in surface area = $30 + 30 + \frac{30\times30}{100}$
$= 69\%$

51.

	Old		New
Length:	2		1
Breadth:	1		3
Area:	2	:	3

Percentage increase in area = $\frac{3-2}{2} \times 100$
$= 50\%$

52. Apply successive increase / decrease formula,
$-20 + 20 - \frac{20\times20}{100} = 4\%$ decrease

53. Population after 4 years = $20{,}000\left(1+\frac{10}{100}\right)\left(1-\frac{10}{100}\right)\left(1+\frac{10}{100}\right)\left(1-\frac{10}{100}\right)$
$= 20{,}000\times\frac{11}{10}\times\frac{9}{10}\times\frac{11}{10}\times\frac{9}{10} = 19{,}602$

54. Decrease in salary = $\frac{x^2}{100} = \frac{5^2}{100} = 0.25\%$

55. Let the fraction be $\frac{X}{Y}$
ATQ, $\frac{X(1+7.69)\%}{Y(1+7.69)\%} = \frac{X}{Y}$
No change in fraction.

56. (90 – 72)% of 300 = 18% of 300 = 54

57. Let the third number be 100.
A = 100 + 50 = 150
B = 100 + 80 = 180
A : B = 150 : 180 = 5 : 6

58. $|M| = 25\%$, $|F| = 35\%$ and $|M \cap F| = 15\%$
$|M \cup F| = |M| + |F| - |M \cap F|$
$= 25 + 35 - 15 = 45\%$
Number of students who passed in both subjects = $100 - 45 = 55\%$

59. M = y% of z = z% of y = N

60. Let the total number of children = 5x
Each child received = $5x \times 20\% = x$
ATQ, $5x^2 = 500$
x = 10

61. Apply successive increase / decrease formula,
$25 + 12 + \frac{25\times12}{100} = 40\%$

62. Let the number of boys and girls be 300x and 200y
Number of adult = 20% of 300x + 25% of 200x
$= 60x + 50x = 110x$
Number of students who are not adult = 500x – 110x = 390x
Required % = $\frac{390x}{500x} \times 100 = 78\%$

63. Present population = $62{,}500\left(1+\frac{4}{100}\right)^2$
$= 62{,}500\left(1+\frac{1}{25}\right)^2 = 62{,}500\left(\frac{26}{25}\right)\left(\frac{26}{25}\right) = 67600$

64. Value of car after 3 years = $1{,}75{,}000\left(1-\frac{20}{100}\right)^3 = 1{,}75{,}000\left(1-\frac{1}{5}\right)^3$
$= 1{,}75{,}000 \times \frac{4}{5}\times\frac{4}{5}\times\frac{4}{5} = 89{,}600$

65. Population after two years
$= 8000\left(1+\frac{10}{100}\right)\left(1+\frac{20}{100}\right)$
$= 8000\times\frac{11}{10}\times\frac{6}{5} = 10{,}560$

66. Passing mark = 30% of M + 50 = 320 + 30
30% of M = 300
M = 1000 marks

67. $|M|$ = 40%, $|E|$ = 30% and $|M \cap E|$ = 10%
$|M \cup E|$ = 40 + 30 – 10 = 60%
Number of students who passed in both subjects = 100 – 60 = 40%

68. % change in area = $20 + 5 + \frac{20\times5}{100}$ = 26%

69. Profit% = $15 + 10 + \frac{15\times10}{100}$ = 26.5%

70. Total number of valid votes
= 7500 – 20% of 7500 = 6000
Number of valid votes other candidate gets = (100 - 55)% × 6000 = 2700

71. Boys: 700 + 20% of 700 = 840
Girls: 800 + 10% of 800 = 880
Required ratio = 840 : 880 = 21 : 22

72. (0.08% of 363) + (0.6% of 24) × 500
= (0.08 × 363) + (0.6 × 24) × 5
= (29.04 + 144.4) × 5 = 868.2

73. 9.99% of 29.906 + 299.84% of 54.908 – 49.86% of 149.59
= 10% of 30 + 300% of 55 – 50% of 150
= 3 + 165 – 75 = 93

74. Let total member = 100x
Two car owner = 20
Three car owner = (100 – 20) × 40% = 32%
One car owner = 100 – 20 – 32 = 48%

75. PR = 3 cm and RQ = 2 cm
PR is increased by 6% i.e. 6% of 3 = 0.18.
PQ is decreased by $\frac{0.18}{2} \times 100$ = 9%

76. Use formula, $\frac{r}{100+r} \times 100 = \frac{60}{100+60} \times 100$ = 37.5%

77. Let the maximum marks be M.
Passing mark = 30% of M + 10 = 40% of M – 15
10% of M = 25
M = 250
Passing marks = 30% of M + 10
= 30% of 250 + 10 = 85

78. Overall increase in population = $\frac{600}{8000} \times 100$ = 7.5%
Number of females = $\frac{3}{8} \times 8000$ = 3000

79. Manpower 20% = $\frac{+1}{5}$ ↑ Hours $\frac{1}{(5+1)} = \frac{1}{6}$ ↓ = 33.33%

80. Manpower 25% = $\frac{-1}{4}$ ↓ Hours $\frac{1}{(4-1)} = \frac{1}{3}$ ↑ = 16.67%

81. 12% = $\frac{3}{25}$
Shirt : Trouser = 25 : 28
53 units = 371 1 unit = 7
Cost price of shirt = 25 units = 25 × 7 = 175

82. In addition of water, quantity of milk will remain constant.
55% of mixture$_1$ = 20% of mixture$_2$
$M_1 : M_2$ = 20 : 55 = 4 : 11
11 – 4 = 7 units water added
ATQ, 4 units = 220
1 unit = 55
7 units = 7 × 55 = 385

83. % of alcohol strength = $\frac{20\%\ of\ 6+60\%\ of\ 4}{10} \times 100$
= $\frac{1.2+2.4}{10} \times 100$ = 36%

84. Water is added, so we will go through wine.
80% of M_1 = 75% of M_2
$M_1 : M_2$ = 75 : 80 = 15 : 16
16 – 15 = 1 unit water is added.
15 units = 150 litres
1 unit = 10 litres

85. 45% of 1500 + 35% of 1700 = ?% of 3175
45 × 15 + 35 × 17 = ?% of 3175
? = $\frac{1270}{3175} \times 100$ = 40%

86. Sand is added, iron will remains constant.
20% of M_1 = 10% of M_2
$M_1 : M_2$ = 10 : 20 = 1 : 2
2 – 1 = 1 unit of sand is added.
1 unit = 1 kg

87.

	Water	Pulp
Fresh Fruit:	90	10
Dry Fruit :	20	80

Pulp remains constant and water varies
10% of M_1 = 80% of M_2
$M_1 : M_2$ = 80 : 10 = 8 : 1
8 units = 20 kg
1 unit = 2.5 kg

88. Let he has Rs. 200 (LCM of 40 and 50)
Ratio of cost price of Orange : Mango = 5 : 4
Taxi fare = 10% of 200 = 20
Remaining amount = 200 – 20 = Rs.180

Amount spent on 20 mangoes = 20 × 5 = Rs. 100
Amount spent on Orange = 200 – 100 – 20 = Rs.80
Number of oranges = 80/4 = 20

89. Increase in cost = 199229 – 111395 = 87834
% = $\frac{87834}{111395} \times 100$ = 78.84% = 79%(approx)

90.

Original	New
5	4
5	6
25	24

25 – 24 = 1 unit = 720
25 units = 25 × 720 = 18,000

91. Increase in cost = 182776 – 154848 = 27928
% = $\frac{27,928}{154848} \times 100$ = 18.03% = 18(approx)

92. Population at the end of the third year
= 12500× $\frac{120}{100} \times \frac{132}{100} \times \frac{74}{100}$
$= 12500 \times \frac{6}{5} \times \frac{33}{25} \times \frac{37}{50}$ = 14,652

93. Required % = $\frac{20\times100}{100+20} \times 100 = 16\frac{2}{3}\%$

94. Let he had Rs.x.
ATQ, $x \times \frac{80}{100} \times \frac{80}{100} = 400$
$x = 400 \times \frac{5}{4} \times \frac{5}{4}$ = Rs.625

95. Applying successive decrease,
-17 - 17 + $\frac{17\times17}{100}$ = 32.16% = -31.11%
Again, 227 - 31.11 - $\frac{227\times31.11}{100}$
= 195.89 – 70.619 = 125.2703%

96. Applying successive increase,
10 + 20 + $\frac{10\times20}{100}$ = 32%
Again, Applying successive increase,
32 + 30 + $\frac{32\times30}{100}$ = 71.6%
Resultant number = 35 + 71.6% of 35
= 35 + 25.06 = 60.06%

97. Applying successive increase / decrease,
25 + 20 + $\frac{25\times20}{100}$ = 50%
Again, 50 + 15 - $\frac{15\times50}{100}$ = 72.5%

98. Applying successive increase / decrease,
8 + 25 + $\frac{8\times25}{100}$ = 35%
Again, 35 - 2 - $\frac{35\times2}{100}$ = 33 – 0.7 = 32.3%
Population at the end of third year
= 10,000× $\frac{123.3}{100}$ = 13230

99.

	Old	New
	8	9
	50	43
	400	387

% decrease = $\frac{400-387}{400} \times 100$ = 3.25%

100.

	Old	New
1st:	4	5
2nd:	25	39
3rd:	100	89
	10000	17355

10000 units = 12,000
1 unit = 1.2
17355 units = 1.2 × 17355 = 20,826

101. 20% = 120
1% = 6
112% = 112 × 6 = 672

102.

Old		New
2		3
2		3
4	:	9

103. 35% = $\frac{7}{20}$
7 units = 280
1 unit = 20
20 units = 40 × 20 = 800

1. SP > CP, Profit = SP – CP
2. SP < CP, Loss = CP – Sl
3. SP = CP, Neither Profit nor Loss
4. P/L% = $\frac{P/L}{CP} \times 100$
   Profit or Loss percent is calculated on CP.
5. CP = $\frac{100}{(100 \pm P)} \times$ SP
6. SP = $\frac{(100 \pm P)}{100} \times 100$
   Take +ve sign for profit & -ve sign for loss

#1. x% P/L = $\frac{x}{100}$ → Profit / CP; SP = $(100 \pm x)$

e.g. 30% Profit = $\frac{+3}{10}$

Profit = 3 units, CP = 10 units & SP = 13 units

#2. 20% Loss

CP = 100% & SP = 100% - 20% = 80%

#3. SP of x articles = CP of y articles

$\frac{SP}{CP} = \frac{y}{x}$

P/L % = $\frac{y-x}{x} \times 100$

P/L % is calculated on selling quantity

Selling Quantity > Buying Quantity → Loss

Selling Quantity < Buying Quantity → Profit

#4. If two articles are sold at same price, one at a profit of x% and another at a loss of x%, then

Loss% = $\frac{x^2}{100}$%

#5. If CP is same, then Change in SP% = Change in Profit/Loss%

EXERCISE

1. A monitor for personal computer is bought for Rs. 22500 and sold at Rs. 15750. Find its loss percentage.
   (a) 35 (b) 45 (c) 40 (d) 30
   (OSSC CGL 2021)
2. A mobile is bought for Rs. 5300 and sold at Rs. 8745. Find the gain percentage.
   (a) 74 (b) 71 (c) 65 (d) 69
   (OSSC CGL 2021)
3. Abdul buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 6600, his gain percent is:
   (a) 10% (b) 12% (c) 18% (d) 20%
   (OSSC CGL Spl. 2022)
4. A dealer bought a washing machine for Rs. 18800 and sold at a gain of 40%. Find its selling price. (in Rs.)
   (a) 26620 (b) 26420 (c) 26320 (d) 26520
   (OSSC CGL 2021)
5. An article is bought for Rs. 49,000 and sold at a loss of 35%. Find its selling price (in Rs.)
   (a) 33850 (b) 34850 (c) 31850 (d) 32850
   (OSSC CGL 2021)
6. By selling a table for Rs. 3840, a shopkeeper lost 20%. At what price should he sell it to gain 20%? (in Rs.)
   (a) 5860 (b) 5960 (c) 5760 (d) 6060
   (OSSC CGL 2021)
7. A person sold a stove for Rs. 423 and incurred a loss of 6%. At what price would it be sold so as to earn a profit of 8%?
   (a) Rs. 486 (b) Rs. 490 (c) Rs. 500 (d) Rs. 550
   (OSSC CTSRE 2024)
8. The purchase price of an article is 20% less than the profit made. What would be the profit, if the selling price is Rs. 360?
   (a) Rs. 160 (b) Rs. 180 (c) Rs. 200 (d) Rs. 240
   (OSSC CHSL 2024)

9. By selling a table for Rs. 2380, a shopkeeper loses 30%. At what price should he sell it to earn a gain 30%? (in Rs.)
(a) 4620 (b) 4520 (c) 4720 (d) 4420
(OSSC CGL 2021)

10. By selling an article for Rs. 96, double profit is obtained than the profit that would have been obtained by selling it for Rs. 84. What is the cost price of the article?
(a) Rs. 72.00 (b) Rs. 75.00
(c) Rs. 70.00 (d) Rs. 68.00
(OSSC CGL 2021)

11. The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit?
(a) Rs. 2000 (b) Rs. 2200
(c) Rs. 2400 (d) Data inadequate
(OSSC CGL Spl. 2022)

12. There are two shopkeepers, first shopkeeper calculates his profit percent on the selling price whereas the second shopkeeper calculates his profit percent on the cost price. If the selling price for both the shopkeepers is same and the difference between their profit is Rs. 175. Calculate the sum of the cost price for both the shopkeepers if the profit percentage for both the shopkeeper is 25%.
(a) Rs. 5425 (b) Rs. 4875
(c) Rs. 4675 (d) Rs. 5275
(OSSC CGL 2024)

13. A man sells two wristwatches, one at a profit of 10% and other at a loss of 10%. But the selling price of each watch is Rs. 200. What is the percentage of profit or loss?
(a) 1% profit (b) 1% loss
(c) 20% profit (d) 2% loss
(OSSC CGL 2022)

14. A merchant has 1000 kg of sugar, part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. The quantity sold at 18% profit is:
(a) 400 kg (b) 560 kg
(c) 600 kg (d) 640 kg
(OSSC PRE CGL SPL. &CTSRE 2025)

15. If the cost price of 15 tables is equal to selling price of 20 tables, find the gain or loss percentage?
(a) 25% (b) 20% (c) 40% (d) 15%
(OSSC CGL SPL. 2023)

16. The selling price of 5 shares is equal to the cost price of 7 shares. What is the profit or loss percentage?
(a) 40% loss (b) 40% profit
(c) 20% loss (d) 25% profit
(OSSC CHSL 2024)

17. On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is:
(a) Rs. 45 (b) Rs. 50 (c) Rs. 55 (d) Rs. 60
(OSSC CHSL 2023)

18. A dishonest dealer professed to sell his goods at cost price, but he uses a weight of 960 gm for the kg weight. Find the gain percent.
(a) 4% (b) $6\frac{1}{6}\%$ (c) 4.5% (d) 4.9%
(OSSC CGL SPL. 2023)

19. A shopkeeper bought candies at 5 for a rupee. How much for a rupee must he sell to gain 25%?
(a) 3 (b) 4 (c) 5 (d) 6
(OSSC CTSRE 2023)

20. A person sold a cow at a gain of 15%. Had he bought the cow for 25% less and sold it for Rs. 600 less, then he would have made a profit of 32%. What was the cost price of the cow?
(a) Rs. 3,750 (b) Rs. 3,250
(c) Rs. 2,750 (d) Rs. 2,250
(OSSC CPGL 2024)

21. A person purchased two bags at the same price and selling the first bag he makes a profit of 10%. Selling price of second bag is Rs. 90 more than the selling price of the first bag. Find the cost price of one bag if his overall profit percent is 13%?
(a) Rs. 1800 (b) Rs. 3000
(c) Rs. 2000 (d) Rs. 2400
(OSSC CPGL 2024)

22. A dishonest milkman professed to sell his milk at cost price but he mixed it with water and thus he

gains 25%. The percentage of water in the mixture is:
(a) 14% (b) 20% (c) 25% (d) 50%
(OSSC Accountant 2023)

23. On selling 18 balls at Rs. 720, there is a cost equal to the cost price of 6 balls. The cost price of a ball is:
(a) Rs. 55 (b) Rs. 50 (c) Rs. 65 (d) Rs. 60
(OSSC Accountant 2023)

24. A vegetable vendor buys 4 lemons for Rs. 10 and sells 6 lemons for Rs. 18. What is his gain percentage?
(a) 15% (b) 20% (c) 18% (d) 22%
(OSSC Jr. Clerk Mains 2023)

25. A girl bought a cell phone for Rs. 444 and spent Rs. 556 on repairs. At what price should she sell it to earn a profit of 40%?
(a) Rs. 5000 (b) Rs. 5500
(c) Rs. 7000 (d) Rs. 8000
(OSSC Jr. Clerk Mains 2023)

26. A dealer bought a washing machine for Rs. 18300 and sold at a gain 15%. Find the selling price. (in Rs.)
(a) 21045 (b) 19995 (c) 20845 (d) 22045
(OSSC SCEW 2022)

27. By selling a table for Rs. 1870, a shopkeeper loses 30%. At what price should he sell it to gain 30%?
(a) 3580 (b) 3680 (c) 3380 (d) 3480
(OSSC SCEW 2022)

28. An article is bought for Rs. 25,000 and sold at a loss of 15%, find the selling price.
(a) 23250 (b) 21250 (c) 22250 (d) 20250
(OSSC Jr. Clerk 2023 and SCEW 2022)

29. A tricycle was sold for Rs. 873 at a loss of 3%. Its cost price is:
(a) Rs. 846.81 (b) Rs. 899.19
(c) Rs. 927 (d) Rs. 900

30. 100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:
(a) $14\frac{2}{7}$% profit (b) $14\frac{2}{7}$% loss
(c) 15% profit (d) 11% loss
(OSSC Statistical Asst. 2014)

31. If a shopkeeper doubles the selling price of mangoes, then his profit triples. Find the present profit percent that he is earning before doubling the selling price:
(a) 100% (b) 300% (c) 150% (d) 200%
(OSSC ESI 2023)

32. Bananas were bought at half-dozen for Rs. 5 and then sold at 5 bananas for Rs. 6. What is the percentage gain or loss?
(a) 33% (b) 44% (c) 35% (d) 38%
(OSSC ESI 2023)

33. If a person buys 15 pens for Rs. 12 and sells 12 pens for Rs. 15, find the gain or loss percentage
(a) gain of 56.25% (b) loss of 31.75%
(c) loss of 56.25% (d) gain of 43.75%
(OSSC VSC 2023)

34. A trader sells 65 m of cloth for Rs. 6825 at the profit of Rs. 20/m of cloth. What is the cost price of 1 m of cloth?
(a) 85 (b) 105 (c) 90 (d) 95
(OSSC VSC 2023)

35. Roopa sold 10 pencils for Rs. 12 and still made 10% profit. What is the cost price of 10 pencils?
(a) Rs. 19 (b) Rs. 20 (c) Rs. 24 (d) Rs. 25.25
(OSSC VSC 2023)

36. Akash sells his scooter for Rs. 15,000 and he loses 25%. To gain 25%, at what price should he sell it for?
(a) Rs. 15,000 (b) Rs. 25,000
(c) Rs. 10,000 (d) Rs. 12,000
(OSSC VSC 2023)

37. An article was sold for Rs. 96. If percentage of profit was numerically equal to the cost price, the cost price of the article is:
(a) Rs. 70 (b) Rs. 60 (c) Rs. 90 (d) Rs. 100
(OSSC LTR 2024)

38. A man sold two steel chairs for Rs. 500 each. On one, he got gain 20% and on other, he lost 12%. How much does he gain or lose in the whole transaction (approx)?
(a) 1.5% gain (b) 2% gain
(c) 1.5% loss (d) 2% loss
(OSSC LTR 2024)

39. A sell a bicycle to B at a profit of 30% and B sell it to C at a loss of 20%. If C pays Rs. 520 for it, at what price did A buy?
(a) 520 (b) 580 (c) 500 (d) 620
(OSSC Steno 2023)

40. If a shopkeeper gains an amount equivalent to the selling price of 40 pens by selling 100 pens, what is his percentage profit?
(a) 66.67% (b) 40% (c) 33.33% (d) 20%
(OSSC JEO & JA 2024)

41. Ramesh purchased an article for Rs. 40,000 and sold it at 20% above cost and paid a tax of Rs. 1600. Find the post-tax is:
(a) Rs. 6000 (b) 6,200 (c) 6,400 (d) Rs. 6600
(OSSC JEO & JA 2024)

42. By selling 30 oranges for Rs. 135, a man loses 10%. He sells the remaining apples for Rs. 81 to make an overall profit of 20%. How many apples did the man sell for Rs. 81?
(a) 9 (b) 10 (c) 5 (d) 6
(OSSC JEO & JA 2024)

43. A milkman has 20 litres of milk. He mixes 5 litres of water , which is freely available, in 20 litres of pure milk. If the cost of pure milk is Rs. 18 per litre, then the profit of the milkman, when he sell all the mixture at cost price is:
(a) 20% (b) 25% (c) 5% (d) 33.33%
(OSSC CGL 2022)

44. A dealer sells his goods at 20% loss on the cost price but uses 35% less weight. What is his percentage profit or loss?
(a) $20\frac{1}{13}$% loss (b) $23\frac{1}{13}$% profit
(c) $21\frac{1}{13}$% profit (d) $23\frac{1}{13}$% loss
(OSSC JEO & JA 2024)

45. If Harshal sells an article for Rs. 800 more, he would make 5% of profit instead of an 11% loss. What was the cost price of the article?
(a) Rs. 3000 (b) Rs. 4500 (c) Rs. 4200 (d) Rs. 5000
(OSSC JEO & JA 2024)

46. A person sold two trucks for Rs. 19,00,000 each. He gained 12% on one truck and lost 12% on another one. Find his gain or loss percent.
(a) Loss 1.2% (b) Gain 1.2%
(c) Gain 1.44% (d) Loss 1.44%
(OSSC JEO & JA 2024)

47. The cost price of 25 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:
(a) 20 (b) 23 (c) 24 (d) 25
(OSSC JEO & JA 2024)

48. A man purchases 17 pencils for Rs. 19 and sells 21 pencils for Rs. 17. What is his profit or loss (round up to two decimal places)?
(a) 30.06% profit (b) 30.06% loss
(c) 27.57% profit (d) 27.57% loss
(OSSC JEO & JA 2024)

49. A manufacturer fixes his selling price at 68% over the cost of production. If the cost of production goes up by 68% and the manufacturer raises his selling price by 50%, find the profit percentage.
(a) 47% (b) 50% (c) 51% (d) 52%
(OSSC JEO & JA 2024)

50. A shopkeeper sells a jacket at a profit of 10%. If he had bought it at 8% less and sold it for Rs. 102 more, he would gain 24%. What is the cost price?
(a) Rs. 2550 (b) Rs. 2400
(c) Rs. 2450 (d) Rs. 2500
(OSSC JEO & JA 2024)

51. Lalith purchased a car for Rs. 80,000 and spent Rs. 8,000 on it for its repair. If he then sold the car for Rs. 91,520, the percentage of profit is:
(a) 4.5% (b) 5% (c) 3.5% (d) 4%
(OSSC JEO & JA 2024)

52. Tamanna sold two chairs for Rs. 630 each. On one she gained 5% and on the other she lost 10%. How much did Tamanna gain or loss on this entire deal (correct up to two decimal places)?
(a) 3.17% loss (b) 3.17% gain
(c) 3.08% loss (d) 3.05% gain
(OSSC JEO & JA 2024)

53. Ravi bought some lemons at the rate of Rs. 22 for 6 and again an equal number of lemons at the rate of Rs. 28 for 8. Ravi sold all the lemons at the rate of Rs. 50 for 12. Find Ravi's profit percentage (correct to two places of decimals).
(a) 12.23% (b) 16.28% (c) 19.56% (d) 14.38%
(OSSC JEO & JA 2024)

54. A manufacturer sells a product to a wholesaler at a profit of 25%. The wholesaler, in turn, sells it to a retailer at a profit of 25% and the retailer sells it to a customer at a profit of 12%. If the customer pays Rs. 707, find the cost price (in Rs.) for the manufacturer.
(a) 407 (b) 404 (c) 405 (d) 401
(OSSC JEO & JA 2024)

55. Nitin sells two articles for Rs. 2541 each with no profit, no loss in the entire transaction. If one article was sold at a gain of 50%, then the other article is sold at a loss of:
(a) 23% (b) 25% (c) 27% (d) 28%
(OSSC JEO & JA 2024)

56. Two-third consignment was sold at a profit of 6% and the rest at a loss of 3%. If there was an overall profit of Rs. 540, find the value of the consignment.
(a) Rs. 10,450 (b) Rs. 12,000
(c) Rs. 18,000 (d) Rs. 20,000
(OSSC CGL MAINS 2024-25)

57. A milkman mixed some water with milk to gain 25% by selling the mixture at the cost price. The ratio of water and milk is respectively:
(a) 5 : 4 (b) 4 : 5 (c) 1 : 5 (d) 1 : 4
(OSSC Stenographer 2025)

58. Ritika sold an article to Ruhaan at a profit of 10%, Ruhaan sold that article to Mohan at a profit of 12%, Mohan sold that article to Sanjay at a loss of 20%. Sanjay again sold that article to Ritika at a profit of 5%. Overall, what was the approximate percentage of profit/loss for Ritika?
(a) 13% loss (b) 6.29% profit
(c) 7% loss (d) 4.12% profit
(OSSC CTSRE 2025)

59. A shopkeeper mixes 60 kg of sugar priced Rs. 30 per kg with 90 kg of sugar priced Rs. 40 per kg. At what price he must sell the mixture to gain 20%?
(a) Rs. 30 per kg (b) Rs. 34 per kg
(c) Rs. 38 per kg (d) Rs. 43.2 per kg
(OSSC CGL PRE 2024-25)

60. A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is:
(a) No profit, No gain (b) 5% (c) 8% (d) 10%
(OSSC CGL PRE 2022)

61. How many kgs of Bajra costing Rs. 8 per kg must be mixed with 36 kg of wheat costing Rs. 5.40 per kg, so that 20% gain may be obtained by selling the mixture at Rs. 7.20 per kg?
(a) 10.8 kg (b) 10.6 kg (c) 10.4 kg (d) 9.8 kg
(OSSC CGL PRE 2022)

62. By what fraction, the selling price of a product be multiplied to get the cost price, if the loss is 20%?
(a) $\frac{4}{5}$ (b) $\frac{6}{5}$ (c) $\frac{5}{4}$ (d) $\frac{8}{5}$
(OSSC CGL PRE 2023)

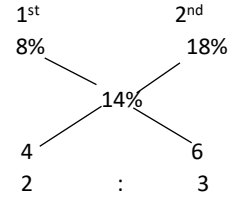
ANSWER KEY

01. (d)	02. (c)	03. (d)	04. (c)	05. (c)	06. (c)
07. (a)	08. (c)	09. (d)	10. (a)	11. (a)	12. (a)
13. (b)	14. (c)	15. (a)	16. (b)	17. (d)	18. (b)
19. (b)	20. (a)	21. (b)	22. (c)	23. (d)	24. (b)
25. (c)	26. (a)	27. (c)	28. (b)	29. (d)	30. (a)
31. (a)	32. (b)	33. (a)	34. (a)	35. (b)	36. (b)
37. (b)	38. (a)	39. (c)	40. (a)	41. (c)	42. (d)
43. (b)	44. (b)	45. (d)	46. (d)	47. (a)	48. (d)
49. (b)	50. (d)	51. (d)	52. (c)	53. (b)	54. (b)
55. (b)	56. (c)	57. (d)	58. (b)	59. (d)	60. (b)
61. (a)	62. (c)				

EXERCISE

1. Loss = 22,500 – 15,750 = 6750
   Loss% = $\frac{6750}{22500} \times 100 = 30\%$
2. Gain = 8745 – 5300 = 3445
   Gain = $\frac{3445}{5300} \times 100 = 65\%$
3. CP of Scooter = 4700 + 800 = 5500
   Gain = 6600 – 5500 = 1100
   Gain = $\frac{1100}{5500} \times 100 = 20\%$
4. CP = 100%, SP = (100+40)%,
   SP = 18800× $\frac{140}{100}$ = 26320
5. CP = 100%, SP = (100 - 35)%,
   SP = 49000× $\frac{65}{100}$ = 31850
6. CP = 100%, SP_1 = (100 – 20)% = 80%,
   SP_2 = (100 + 20)% = 120%
   ATQ, 80% = 3840
   120% = $3840 \times \frac{120}{80}$ = 5760
7. CP = 100%, SP_1 = (100 – 6)% = 94%,
   SP_2 = (100 + 8)% = 108%
   ATQ, 94% = 423
   108% = $423 \times \frac{108}{94}$ = 486
8. Profit = 100%, CP = 100 – 20 = 80%
   SP = 100 + 80 = 180%
   ATQ, 180% = 360
   Profit = 100% = 360× $\frac{100}{180}$ = 200
9. CP = 100%, SP_1 = (100 – 30)% = 70%,
   SP_2 = (100 + 30)% = 130%
   ATQ, 70% = 2380
   130% = $2380 \times \frac{130}{70}$ = 4420
10. Let the cost price of the article = x.
    ATQ, 96 – x = 2(84 – x)
    96 –x = 168 – 2x
    x = 168 – 96 = 72
11. Let the cost price of the article = x.
    ATQ, 1920 – x = x - 1280
    2x = 3200
    x = 1600
    SP = $1600 \times \frac{125}{100}$ = 2000
12. Profit calculated on SP
    25% = $\frac{1(P)}{4(SP)}$
    CP = 4 – 1 = 3 unit
    Profit calculate on CP
    25% = $\frac{1(P)}{4(CP)}$
    SP = 4 + 1 = 5 units

SP	CP	P
$4_{\times 5}$	$3_{\times 5}$	$1_{\times 5}$
$5_{\times 4}$	$4_{\times 4}$	$1_{\times 4}$

    Make SP same i.e. 20.
    Profit difference = 5 – 4 = 1 unit
    1 unit = 175
    Sum of CP = 15 + 16 = 31 units
    = 31 × 175 = Rs. 5425
13. If SP of two article is same, then
    loss% = $\frac{x^2}{100}$
    = $\frac{10\times10}{100}$ = 1% loss
14. 

    ATQ, 5 units = 1000 kg 1 unit = 200 kg
    3 unit = 3 × 200 = 600 kg
15. CP of 15 tables = SP of 20 tables
    CP : SP = 20 : 15 = 4 : 3
    Loss% = $\frac{4-3}{4} \times 100 = 25\%$
16. SP of 5 shares = CP of 7 shares = Rs. 35 (LCM of 5 & 7)
    CP of 1 share = Rs. 5 and SP of 1 share = Rs. 5
    Profit % = $\frac{7-5}{5} \times 100 = 40\%$
17. SP of 17 balls – CP of 17 balls = -CP of 5 balls
    SP of 17 balls = CP of 12 balls
    CP of 12 balls = Rs. 720

CP of 1 ball = Rs. 720/12 =Rs. 60

18. ATQ, Dealer uses a weight of 960 gm instead of 1000 gm.
Cost price of 1000 gm = Selling price of 960 gm.
CP : SP = 96 : 100
Profit% = $\frac{100-96}{96} \times 100 = 6\frac{1}{6}\%$

19. CP of 5 candles = Rs. 1
CP of 1 candle = Rs. 1/5
SP = $\frac{1}{5} \times \frac{125}{100}$ = Rs. $\frac{1}{4}$
He sells 4 candles for Rs. 1

20. CP_1 = 100, CP_2 = (100 – 25)% = 75%,
SP_1 = (100 + 15)% = 115%
$SP_2 = 75 \times \frac{132}{100} = 99$
ATQ, $SP_1 - SP_2 = 115 - 99 = 16$
16 units = 600
1 unit = 600/16 = 37.5
Cost price of the cow = 100 units
= 100 × 37.5 = 3750

21. Let CP of each bag = 100 units
Let the second article be sold at x% profit.
ATQ, $100 \times \frac{10}{100} + 100 \times \frac{x}{100} = 100 \times \frac{13}{100}$
10 + x = 13
x = 3
Second bag, profit% = Rs. 90
3% = 90 1% = 30
CP = 100% = 3000

22. 25% = $\frac{1}{4}$
4 unit = 1000ml
1 unit = 250 ml
Water% = $\frac{250}{1000} \times 100 = 25\%$

23. SP of 18 balls – CP of 18 balls = - CP of 16 balls
SP of 18 balls = CP of 12 balls
CP of 12 balls = Rs. 720
CP of 1 ball = Rs. 60

24. CP: 4 lemons = Rs. 10 SP: 6 lemons = Rs. 18
12 lemons = Rs. 30 12 lemons = Rs. 36
Gain = 36 – 30 = 6
Gain% = $\frac{6}{30} \times 100 = 20\%$

25. CP of the Cell phone = 4444 + 556 = 5000
SP = $\frac{140}{100} \times 5000 = 7000$

26. SP = $\frac{115}{100} \times 18300$ = Rs. 21045

27. CP = 100%, SP_1 = (100 – 30)% = 70%,
SP_2 = (100 + 30)% = 130%
ATQ, 70% = 1820
130% = $1820 \times \frac{130}{70} = 3380$

28. SP = $\frac{85}{100} \times 25000$ = Rs. 21250

29. CP = $\frac{100}{97} \times 873$ = Rs. 900

30. CP of 1 orange = 350/100 = 3.50
SP of 1 orange = 48/12 = 4.00
Profit% = $\frac{4-3.50}{3.50} \times 100 = \frac{1}{7} \times 100 = 14\frac{2}{7}\%$

31. SP – CP = Profit
ATQ, 2SP – CP = 3(SP – CP)
SP = 2CP
CP : SP = 1 : 2
Profit% = $\frac{2-1}{1} \times 100 = 100\%$

32. 6 banana ----------Rs. 5
30 banana ---------- Rs. 25
5 banana ---------- Rs. 6
30 banana ----------Rs. 36
Profit% = $\frac{11}{24} \times 100 = 44\%$

33. 15 pens ----------Rs. 12
60 pens ---------- Rs. 48
12 pens ---------- Rs. 15
60 pens ----------Rs. 75
Profit% = $\frac{27}{48} \times 100 = 56.25\%$

34. By selling 1m ---------- Profit Rs. 20
65 m ---------- 65 × 20 = Rs. 1300 Profit
CP of 65 m = 6825 – 1300 = 5525
CP of 1m = 5525/65 = Rs. 85

35. SP of 10 pencil = Rs. 22
CP of 10 pencil = Rs. 22 × $\frac{100}{110}$ = Rs. 20

36. Let CP = 100%, SP_1 = 100 – 25 = 75%
SP_2 = 100 + 25 = 125%
SP_1 : SP_2 = 3 : 5
3 units = Rs. 15,000
1 unit = 5,000
5 units = 5 × 5000 = Rs. 25,000

37. Go through option (b)
CP = Rs. 60
Profit% = 60%
60% of 60 = Rs.36
SP = 60 + 30 = 96

38. 20% = $\frac{1}{5}$ 12% = $\frac{3}{25}$

CP	SP
$5_{\times 11}$	$6_{\times 11}$
$25_{\times 3}$	$22_{\times 3}$
130	132

Profit% = $\frac{132-130}{130} \times 100 = 1.53\%$

39. 30% = = $\frac{3}{10}$ and 20% = = $\frac{1}{5}$
Cost Price of A = 5 ×10 = 50
SP of A or CP of B = $50 \times \frac{130}{100} = 65$
SP of B or CP of C = $65 \times \frac{80}{100} = 52$
CP of C = 52 units = Rs. 520
1 unit = 10
CP of A = 50 units = 50 × 10 = Rs. 500

40. SP of 100 pens – CP of 100 pens = SP of 40 pens
SP of 60 pens = CP of 100 pens
$\frac{CP}{SP} = \frac{60}{100} = \frac{3}{5}$
Profit% = $\frac{5-3}{3} \times 100 = 66.66\%$

41. CP = 40,000
Post tax = 20% of 40,000 – 1600
8000 – 1600 = 6400

42. SP of 30 oranges = 135
CP of 30 oranges = $135 \times \frac{100}{90} = 150$
CP of 1 orange = $\frac{150}{30}$ = Rs.5
SP of 1 orange = $5 \times \frac{120}{100}$ = Rs.6
Let the man sell x oranges for Rs. 81.
SP = $(30 + x) \times 6 = 135 + 81 = 216$
$180 + 6x = 216$
$6x = 36$
$x = 6$

43. CP of 20 litres milk = Rs. 20
He mixes 5 litres of water.
CP of 25 litres of milk = Rs. 20
He sells all the mixture at cost price.
SP of 25 litres of milk = Rs. 25
Profit% = $\frac{25-20}{20} \times 100 = 25\%$

44. Article Price

CP: 10 → 10 = 65
SP: 6.5 → 8 = 80

Profit = 80 – 65 = 15
Profit % = $\frac{15}{65} \times 100 = 23\frac{1}{3}\%$

45. SP_1 CP SP_2
89 100 105
ATQ, 105 – 89 = 16 units = 800
1 unit = 50
100 units = 100 × 50 = Rs. 5000

46. Loss% = $\frac{(12)^2}{100}$ = 1.44%

47. 25% = $\frac{+1}{4}$ → Selling Quantity
Buying Quantity = 4 + 1 = 5 units
ATQ, 5 units = 25
4 units = 4 × 5 = 20

48. Article Price

CP: 17 → 19 = 399
SP: 21 → 17 = 289

Profit = 399 – 289 = 110
Loss % = $\frac{110}{399} \times 100 = 27.57\%$

49. CP SP
100 168
+ 68 50% 84
168 252
Profit = 252 – 168 = 84
Profit% = $\frac{84}{168} \times 100 = 50\%$

50. $CP_1 = 100$ $SP_1 = 110$
$CP_2 = 92$ $SP_2 = 92 + 24\%$ of 92 = 114.08
ATQ, 114.08 – 110 = 4.08 units
4.08 units = 102

1 unit = 25

100 units = 100 × 25 = Rs. 2500

51. CP of Lalith = 80,000 + 8,000 = 88,000

Profit = 91,520 – 88,000 = 3,520

Profit% = $\frac{3520}{88,000} \times 100$ = 4%

52. 5% = $\frac{1}{20}$ 10% = $\frac{1}{10}$

CP	SP
$20_{\times 3}$	$21_{\times 3}$
$10_{\times 7}$	$9_{\times 7}$
130	126

Loss% = $\frac{130-126}{130} \times 100$ = 3.08%

53. LCM of 6,8,12 = 24

Let Ravi bought 24 lemons.

6 lemons ---------- Rs. 22

24 lemons ..... Rs. 88

Again, 8 lemons ---------- Rs. 28

24 lemons ---------- Rs. 84

CP of 48 lemons = 88 + 84 = Rs. 172

CP of 12 lemons = 43

SP of 12 lemons = Rs. 50

Profit = 50 – 43 = 7

Profit% = $\frac{7}{43} \times 100$ = 16.28%

54. Let CP of manufacturer = 4 × 4 × 25 = 400

CP of wholesaler = 400 × $\frac{125}{100}$ = 500

CP of Retailer = 500 × $\frac{125}{100}$ = 625

CP of Customer = 625 × $\frac{112}{100}$ = 700

ATQ, 700 units = 707

100 units = 101

CP of manufacturer = 400 units = 404

55.

CP	SP
100	150
X	150
100 + X	300

ATQ, 100 + X = 300

X = 200

Loss% = $\frac{200-150}{200} \times 100$ = 25%

56. Let the total assignment = 3 units

Overall profit percent = $\frac{2\times6-1\times3}{3}$ = 3%

ATQ, 3% = 540

1% = 180

100% = Rs. 18,000

57. Required Ratio = 25% = $\frac{1}{4}$ = 1 : 4

58. SP of Ritika = 100 × $\frac{110}{100}$ = 110

SP of Ruhaan = 110 × $\frac{112}{100}$ = 123.20

SP of Mohan = 123.20 × $\frac{80}{100}$ = 98.56

SP of Sanjay = 98.56 × $\frac{105}{100}$ = 103.48

Ritika spent Rs. 103.48 to buy the same article back.

Her profit = 110 – 103.488 = 6.512

Profit% = $\frac{6.512}{103.488} \times 100$ = 6.29%

59. CP of Sugar = $\frac{60\times30+90\times40}{150}$ = Rs. 36 per kg

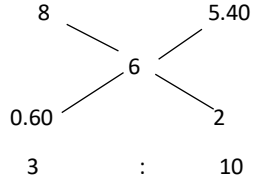
SP = 36 × $\frac{120}{100}$ = Rs. 43.2 per kg

60. CP of rice = $\frac{26\times20+30\times36}{30+26}$ = Rs. $\frac{200}{7}$ per kg

CP : SP = $\frac{200}{7}$: 30 = 20 : 21

Profit% = $\frac{21-20}{20} \times 100$ = 5%

61.



3 : 10

ATQ, 10 units = 36 kg

1 unit = 3.6 kg

3 units = 10.8 kg

62. 20% = $\frac{1}{5}$

CP = 5 units, Loss = 1 unit

SP = 5 – 1 = 4 units

So, we multiply SP by $\frac{5}{4}$

SP = 4 × $\frac{5}{4}$ = 5 = CP

Discount: Reduction of Marked Price to sell at a lower rate.

Discount is calculated on marked price.

Discount = MP – SP

Discount% = $\frac{D}{MP} \times 100$

SP = $MP \times \frac{(100-D)\%}{100\%} = CP \times \frac{(100\pm P)\%}{100\%}$

$\frac{MP}{CP} = \frac{(100\pm P)}{(100-D)}$

Two successive discount of x% and y% is equivalent to a single discount of $\left(x + y - \frac{xy}{100}\right)$%

EXERCISE

1. The printed price of a system monitor is Rs. 13,500. If a sales tax of 8% is realized from the buyer, find the price at which the system monitor is sold? (in Rs.)
   (a) 15580 (b) 14580 (c) 16580 (d) 17580
   (OSSC CGL 2021)

2. A buyer paid for a metal article whose market price is Rs. 17,500. He has to pay a sales tax of Rs. 1190. Find the rate of sales tax (in %)
   (a) 9 (b) 8 (c) 6 (d) 7
   (OSSC CGL 2021)

3. The selling price of an article becomes 31/25 times the listed price due to the inclusion of sales tax. Find the rate of sales tax (in %).
   (a) 24% (b) 28% (c) 26% (d) 30%
   (OSSC CGL 2021)

4. If an article is sold at Rs. 3835 after a discount of 35%, find its marked price (in Rs.)
   (a) 5700 (b) 5800 (c) 5900 (d) 5600
   (OSSC CGL 2021)

5. Jacob gets successive discounts of 20% and then 30% on his food bill of Rs. 5150. What is the amount paid by Jacob? (in Rs.)
   (a) 2884 (b) 2784 (c) 2684 (d) 2584
   (OSSC CGL 2021)

6. After successive discounts of 12% and 5%, an article was sold for Rs. 209. What was the original price of the article?
   (a) Rs. 226 (b) Rs. 250 (c) Rs. 252 (d) Rs. 269
   (OSSC CHSL 2021)

7. What is the difference between a discount of 10% on Rs. 20,000 and two successive discounts of 6% and 4% on the same amount? (in Rs.)
   (a) 40 (b) 48 (c) 44 (d) 36
   (OSSC CHSL 2021)

8. What is the difference between a single discount of 20% on Rs. 23,000 and two successive discounts of 14% and 6% on the same amount? (in Rs.)
   (a) 190 (b) 180 (c) 210 (d) 200
   (OSSC CGL 2021)

9. For a certain article, if discount is 25%, the profit is 25%. If the discount is 10%, then the profit is:
   (a) 10% (b) 20% (c) 35% (d) 50%
   (OSSC CGL 2021)

10. A businessman gives 4% discount on the marked price and gives 1 article free for buying every 15 articles and thus gains 35%. The marked price is increased above the cost price by:
    (a) 20% (b) 39% (c) 50% (d) 55%
    (OSSC CTSRE 2024)

11. The price of a CPU is Rs. 19376 inclusive of sales tax. If the rate of sales tax is 12%, find the printed price of the CPU (in Rs.)
    (a) 17500 (b) 17600 (c) 17400 (d) 17300
    (OSSC CGL 2021)

12. Naresh purchased a TV set for Rs. 11,250 after getting a discount of 10% on the labelled price. He spent Rs. 150 on transport and 800 on installation. At what price should it be sold so that profit earned would be 15% if no discount was offered?
    (a) Rs. 12,937.50 (b) Rs. 14,030
    (c) Rs. 13,450 (d) Rs. 15,467.50
    (OSSC CPGL 2021)

13. An article is marked up 40% higher than CP but it was sold at x% discount. The shopkeeper then gains 12%. What would be the S.P. of the article with CP Rs. 120 and sold on x% profit?
    (a) Rs. 134.50 (b) Rs. 144
    (c) Rs. 128 (d) Rs. 148
    (OSSC CPGL 2021)

14. The market price of a TV is Rs. 32,500. After allowing a 20% discount to the customer, a

shopkeeper still makes a profit of 30%. Find the cost price of the TV. (in Rs.)
(a) 10,000 (b) 18,000
(c) 20,000 (d) 22,000
(OSSC Steno 2023)

15. A shopkeeper earned a profit of 25% on selling a microwave at 15% discount on the printed price. Find the ratio of the printed price and cost price of the microwave.
(a) 17:25 (b) 25:27 (c) 27:25 (d) 25:17
(OSSC Steno 2024)

16. A shopkeeper marks his goods at 80% more than their cost price and allows a discount of 48% on the marked price. His loss percentage is:
(a) $7\frac{1}{7}\%$ (b) $3\frac{1}{5}\%$ (c) $8\frac{4}{5}\%$ (d) $6\frac{2}{5}\%$
(OSSC Steno 2025)

17. A shopkeeper marks his goods 30% above the cost price and allows a discount of 10% on the marked price. In order to earn 6.5% more profit, what would be the discount on the marked price?
(a) 4% (b) 5% (c) 5.5% (d) 6%
(OSSC CGL 2023 mains)

18. A trader gains 29% by selling an article after two successive discounts of 11% and 20% on its marked price. If the cost price of the article is increased by 45%, then what single discount should he now give on the same marked price to get the same profit percentage as earlier?
(a) 61% (b) 62% (c) 47.3% (d) 54.8%
(OSSC JEO & JA 2024)

19. An item is marked 150% higher than its cost price. Even after allowing some discount, shopkeeper earned 75% profit. Find the discount percent allowed by the shopkeeper.
(a) 30% (b) 29% (c) 33% (d) 27%
(OSSC JEO & JA 2024)

20. Find the single percentage discount (corrected to 1 decimal) equivalent to three successive discounts of 21%, 13% and 35% respectively.
(a) 48.5% (b) 55.3% (c) 62.4% (d) 49.3%
(OSSC JEO & JA 2024)

21. An item is marked 92% higher than its cost price. Even after allowing some discount, shopkeeper earned 44% profit. Find the discount percent allowed by the shopkeeper.
(a) 23% (b) 24% (c) 25% (d) 26%
(OSSC JEO & JA 2024)

22. A trader gains 36% by selling an article after two successive discounts of 75% and 32% on its marked price. If the cost price of the article is increased by 78%, then what single discount should he now give on the same marked price to get the same profit percentage as earlier?
(a) 60.6% (b) 68% (c) 74% (d) 69.7%
(OSSC JEO & JA 2024)

23. How much percentage above the cost price should a shopkeeper mark his goods so as to earn a profit of 15% after allowing a discount of 8% on the marked price?
(a) 25% (b) 14% (c) 23% (d) 20%
(OSSC JEO & JA 2024)

24. The price of an article is raised by 40% and then two successive discounts of 10% and x% are allowed so that the price of the article is increased by 12.5%. The value of x is: (Rounded up to one decimal point)
(a) 10.1 (b) 10.7 (c) 89.3 (d) 10.6
(OSSC JEO & JA 2024)

25. The marked price of an item is 35% above its cost price. The shopkeeper sold the item after giving a discount of Rs. 975, and the shopkeeper gets a profit of 15%. Find the cost price of that item:
(a) Rs. 4540 (b) Rs. 4875 (c) Rs. 4880 (d) Rs. 4330
(OSSC JEO & JA 2024)

26. A man sold an article for Rs. 418 by first giving a d% discount on its price and then another discount having the same nominal value (in Rs.). If the marked price of the article is Rs. 836, then what is the value of d?
(a) 22 (b) 29 (c) 21 (d) 25
(OSSC JEO & JA 2024)

27. A trader marks an article 65% above the cost price and offers 30% discount on the marked price. What is his gain percentage?
(a) $15\frac{1}{2}\%$ (b) $13\frac{1}{2}\%$ (c) $14\frac{1}{2}\%$ (d) $12\frac{1}{2}\%$
(OSSC JEO & JA 2024)

28. Two successive discounts of 60% and 20% are equivalent to a single discount of:
(a) 92% (b) 68% (c) 28% (d) 52%
(OSSC JEO & JA 2024)

29. A dealer purchased a microwave for Rs. 15,650. He allowed a discount of 12% on its marked price and still made a profit of 8%. Find the marked price. (rounded off to 2 decimal places) of the microwave.
(a) Rs. 19,206.82 (b) Rs. 18,430.20
(c) Rs. 16,702.24 (d) Rs. 17,625.65
(OSSC JEO & JA 2024)

30. The single discount equivalent to three successive discounts of 10%, 10% and 20% is:
(a) 24.0% (b) 39.0% (c) 29.4% (d) 35.2%
(OSSC JEO & JA 2024)

31. An article costs Rs. 314 and the marked price is mentioned as 785. What is the profit percentage of the seller if he sells it by allowing a discount of 40% on the marked price?
(a) 53% (b) 50% (c) 51% (d) 48%
(OSSC JEO & JA 2024)

32. Ravi announced a scheme of 20% discount on the MRP of all the winter wears in his shop and 30% discount on MRP if anyone purchased 4 or more items of the same brand. Jitendra purchased 5 woollen sockets of brand X each having MRP Rs. 5800, 3 sweaters of brand Y each having MRP Rs. 9400, and 6 shawls, out of which 3 were of brand Z and 3 were of brand Y, having MRP of Rs. 1900 for each shawl. Find the amount he had paid for all these items.
(a) Rs. 33,580 (b) Rs. 35,420
(c) Rs. 35,990 (d) Rs. 36,910
(OSSC JEO & JA 2024)

33. A lady bought a watch at a discount of 40%. On paying in cash, she also got a discount of 15%. If she paid Rs. 867, then the marked price of the watch is:
(a) Rs. 1800 (b) 1500 (c) 1700 (d) 2100
(OSSC JEO & JA 2024)

34. If 15 pens are sold at the marked price of 12 pens, then what is the percentage of discount offered?
(a) 10% (b) 20% (c) 24% (d) 33.33%
(Jr. Clerk Mains 2023)

ANSWER KEY

01. (b)	02. (c)	03. (a)	04. (c)	05. (a)	06. (b)
07. (b)	08. (a)	09. (d)	10. (c)	11. (d)	12. (d)
13. (b)	14. (c)	15. (d)	16. (d)	17. (b)	18. (d)
19. (a)	20. (b)	21. (c)	22. (d)	23. (a)	24. (b)
25. (b)	26. (d)	27. (a)	28. (b)	29. (a)	30. (d)
31. (b)	32. (c)	33. (c)	34. (b)		

SOLUTION

1. Price of monitor including sale tax
= 13,500 + 8% of 13, 500
= 13500 + 1080 = 14,580

2. Price of metal article = Marked price – Sale tax = 20,670 - 1170 = 19500
Rate of Sale tax = $\frac{1170}{17,500} \times 100$ = 6 %

3. SP = $\frac{31}{25}$ × Listed price
Listed price = 25 and SP = 31
Rate of sales tax = $\frac{31-25}{25} \times 100$ = 24%

4. MP = $3835 \times \frac{100}{100-35} = 3835 \times \frac{20}{13}$
= Rs.5900

5. Amount paid by Jacob
= 5150× $\frac{100-20}{100} \times \frac{100-30}{100}$
= $5150 \times \frac{4}{5} \times \frac{7}{10}$ = Rs. 2884

6. Original price of article = $209 \times \frac{100}{100-12} \times \frac{100}{100-5}$
= $209 \times \frac{25}{22} \times \frac{20}{19}$ = Rs.250

7. Equivalent discount of 6% and 4%
= 6 + 4 - $\frac{6\times4}{100}$ = 9.76%
Difference = (10 – 9.76)% of 20,000= Rs. 48

8. Equivalent discount of 14% and 6%

= 14 + 6 - $\frac{14\times6}{100}$ = 20% - 0.84%

Difference = 0.84% of 23,000= Rs. 193.20

9. MP : CP = (100 + Profit) : (100 – Discount)

(100 + 25) : (100 – 25) = 5 : 3

SP = $5 \times \frac{90}{100}$ = 4.5%

Profit% $\frac{4.5-3}{3} \times 100$ = 50%

10. MP of 15 articles = SP of 16 articles

$\frac{MP}{SP} = \frac{16}{15}$

Discount% = $\frac{16-15}{16} \times 100 = 6\frac{1}{4}$%

Equivalent discount of 4% and 6.25%

= 4 + 6.25 - $\frac{4\times6.25}{100}$ = 10.25 - 0.25 = 10%

MP : CP = (100 + 35) : (100 – 10) = 3 : 2

Marked price is increased by $\frac{3-2}{2} \times 100$ = 50%

11. Printed price = 19376× $\frac{100}{112}$ = Rs. 17300

12. Labelled of TV set = 11,250 × $\frac{100}{90}$ = Rs. 12500

CP of TV for Naresh = 12500 + 150 + 800 = 13,450

SP = 13,450 × $\frac{100+15}{100}$

= $13450 \times \frac{23}{20}$ = 15467.50

13. Let CP = 100 MP = 140

$\frac{MP}{CP} = \frac{100+P}{100-D} = \frac{140}{100}$

$\frac{100+12}{100-x} = \frac{7}{5}$

500 + 60 = 700 - 7x

7x= 140 x = 20

SP = 120× $\frac{120}{100}$ = Rs. 144

14. $\frac{MP}{CP} = \frac{100+P}{100-D} = \frac{130}{80}$

$\frac{32500}{CP} = \frac{13}{8}$

CP = $32500 \times \frac{8}{13}$ = Rs. 20,000

15. MP : CP = (100 + 25) : (100 – 15) = 25 : 17

16. Let CP = 100 MP = 180

SP = $180 \times \frac{100-48}{100}$ = 180× $\frac{52}{100}$ = 93.60

Loss% = 100 – 93.60 = 6.40 = $6\frac{2}{5}$%

17. Profit = 30 – 10 - $\frac{30\times10}{100}$ = 17%

Let CP = 100, MP = 130, SP_1 = 117

SP_2 = 117 + 6.5 = 123.5

Discount% = $\frac{130-123.50}{130} \times 100$

= $\frac{6.5}{130} \times 100$ = 5%

18. Let CP_1 = Rs. 100 SP_1 = 129

MP = $129 \times \frac{100}{39} \times \frac{100}{80}$

CP_2 = $100 \times \frac{145}{100}$ = 145

SP_2 = 145× $\frac{129}{100}$

MP : SP_2 = $129 \times \frac{100}{39} \times \frac{100}{80}$: 145× $\frac{129}{100}$

= 100 × 100 : 29 × 39 × 4 = 10000 : 4524

Discount% = $\frac{10000-4524}{10000} \times 100$

= 54.76 ≈54.8%

19. Let CP = 100

MP = $100 \times \frac{250}{100}$ = 250

SP = $100 \times \frac{175}{100}$ = 175

Discount% = $\frac{250-175}{250} \times 100$ = 30%

20. Equivalent discount of 21%, 13% and 35%

= 21 + 13 - $\frac{21\times13}{100}$ = 34 – 2.73 = 31.27%

Again, 31.27 + 35 - $\frac{31.27\times35}{100}$

= 66.27 – 10.94 = 55.33%

21. Let CP = 100 MP = 100 + 92 = 192

SP = 100 + 44 = 144

Discount = $\frac{48}{192} \times 100$ = 25%

22. Let CP_1 = 100 SP_1 = 136

MP = $136 \times \frac{100}{25} \times \frac{100}{68}$

CP_2 = 178 SP_2 = $178 \times \frac{136}{100}$

MP : SP_2 = $136 \times \frac{100}{25} \times \frac{100}{68}$: $178 \times \frac{136}{100}$

= $\frac{100}{17}$: $\frac{178}{100}$ = 10000 : 3026

Discount = 10000 – 3026 = 6974

Discount% = $\frac{6974}{10000} \times 100 = 69.74\%$

23. MP : CP = (100 + 15) : (100 – 8) = 5 : 4

    Required % = $\frac{5-4}{4} \times 100 = 25\%$

24. Let CP = 100, MP = 140 and SP = 112.50

    Again, $140 \times \frac{90}{100} \times \left(\frac{100-x}{100}\right) = 112.50$

    $\frac{100-x}{100} = \frac{112.50}{126}$

    $100 - x = \frac{11250}{126}$

    $x = 100 - 89.3 = 10.7$

25. Let CP = 100, MP = 135 and SP = 115
    Discount = 135 – 115 = 20
    ATQ, 20 units = 975
    100 units = 975 × 5 = Rs. 4875

26. ATQ, $836 \times \left(\frac{100-d}{100}\right) - \frac{d}{100} \times 836 = 418$

    $836\left(1 - \frac{2d}{100}\right) = 418$

    $1 - \frac{2d}{100} = \frac{418}{836} = \frac{1}{2}$

    $\frac{2d}{100} = 1 - \frac{1}{2} = \frac{1}{2}$

    d = $\frac{100}{4} = 25$

27. Let CP = 100%, MP = 165% and SP = 115.50%
    Gain% = 115.50 – 100 = 15.5%

28. Equivalent discount = 60 + 20 - $\frac{60\times20}{100}$
    = 68%

29. CP : MP = (100 - 12) : (100 + 8) = 22 : 27
    ATQ, 22 units = 650

    27 units = $\frac{650}{22} \times 27$ = 19,206.82

30. Equivalent discount 10%, 10% and 20%

    = 10 + 10 - $\frac{10\times10}{100}$ = 19%

    Again, 19 + 20 - $\frac{19\times20}{100}$ = 39 – 3.8 = 35.2%

31. SP of article = 785 × $\frac{(100-40)}{100}$ = 785 × $\frac{3}{5}$ = 471
    Profit = 471 – 314 = 157

    Profit% = $\frac{157}{314} \times 100 = 50\%$

32. Amount paid for 5 woollen socket of brand X
    = 5 × 5800 × $\frac{70}{100}$ = 20,300
    Amount paid for 3 sweater and 3 shawls of brand Y
    = 3 × (9400 + 1900) × $\frac{70}{100}$ = 11,130
    Amount paid for 3 shawls of brand Z
    = 3 × 1900 × $\frac{80}{100}$ = 4560
    Total amount paid = 20,300 + 11,130 + 4560
    = 35,990

33. 40% = $\frac{2}{5}$ 15% = $\frac{3}{20}$

MP	SP
5	3
20	17
100	51

    ATQ, 51 units = 867
    1 unit = 17
    100 units = 100 × 17 = Rs. 1700

34. SP of 15 pens = MP of 12 pens = Rs. 60 (LCM of 12 & 15)
    SP = Rs. 4 and MP = Rs. 5

    Discount% = $\frac{5-4}{5} \times 100 = 20\%$

Simple Interest (SI): When interest charged on initial amount, it is called Simple interest.

$$SI = \frac{P \times R \times T}{100}$$

P = Principal, R = Rate of Interest & T = Time

$$\frac{SI}{P} = \frac{RT}{100}$$

If Principal = 100 units, SI = RT

Example: Find the simple interest on a sum of Rs. 5000 at 18% per annum for 3 years.

Solution: SI = RT% = 18% × 3 = 54%

ATQ, 100% = 5000

54% = $\frac{5000}{100\%}$ × 54% = Rs. 2700

Alternatively, 54% = $\frac{27}{50}$

ATQ, 50 units = 5000

27 units = 2700

Alternatively, SI = $\frac{5000 \times 18 \times 3}{100}$ = Rs. 2700

Example: A sum of Rs. 2400 gives a simple interest of 504 in 3 years. Find the rate of interest per annum.

Solution: ROI = $\frac{SI\ for\ 1\ year}{Principal}$ × 100

SI for 1 year = $\frac{504}{3}$ = 168

ROI = $\frac{168}{2400}$ × 100 = 7%

Principal	Amount	SI	RT%
1	2	1	100%
1	3	2	200%
1	4	3	300%

Example: If a sum triples in 4 years at simple Interest, find the time that it would take to become 5 times itself at the same rate of interest.

Solution: Amount = 3 times SI = 2 times
RT% = 200% R% = 200/4 = 50%
Again, Amount = 5 times SI = 4 times
RT% = 400% T = 400/50 = 8 years

Alternatively,

Amount	Principal	SI	Time
3	1	2	4
		×2	×2
42	1	4	8

Required time = 4 × 2 = 8 years

Annual Installment = $\frac{100A}{100t + \frac{rt(t-1)}{2}}$

Where, A = Amount Borrowed, t = Time period & r = Rate of Interest

Example: What annual installment will discharge a debt of Rs.848 due in 4 years at 4% simple interest?

Solution: Annual Installment = $\frac{100 \times 848}{100 \times 4 + \frac{4 \times 4(4-1)}{2}}$

= $\frac{100 \times 848}{400+24}$ = 200

EXERCISE

1. Find the simple interest on Rs. 5400 at 4% per annum for 15 years. (in Rs.)
   (a) 3420 (b) 3140 (c) 3340 (d) 3240
   (OSSC CGL 2021 & SCEW 2022)
2. Find the simple interest on Rs. 12400 at 25% per annum for 6 months. (in Rs.)
   (a) 1660 (b) 1550 (c) 1770 (d) 1440
   (OSSC CGL 2021)
3. The simple interest at the rate of x% for x years will be Rs. x on a sum of:
   (a) Rs. 10x (b) Rs. 100/x
   (c) Rs. 100x (d) Rs. $100/x^2$
   (OSSC CTSRE 2024)
4. Find the principal (in Rs.) when simple interest = Rs. 3645, rate = 15% p.a. and time = 2 years.
   (a) 11150 (b) 12250 (c) 12350 (d) 12150
   (OSSC CGL 2021)
5. A sum of Rs. 4650 earns an interest of Rs. 1395 in 5 years at what rate of simple interest?
   (a) 10% (b) 6% (c) 4% (d) 8%
   (OSSC CGL 2021)
6. A sum of Rs. 4450 earns an interest of Rs. 1780 in 8 years at what rate of simple interest?
   (a) 9% (b) 5% (c) 3% (d) 7%
   (OSSC CGL 2021)
7. If Suresh borrows Rs. 36,000 from Mukesh at the rate of 6% simple interest, then what is the total amount that Suresh has to pay at the end of 4 years?

(a) Rs. 42,960 (b) Rs. 33,560
(c) Rs. 43,960 (d) Rs. 44,640
(OSSC CHSL 2024)

8. If the annual rate of simple interest increases from 10% to 12.5%, a man's annual income increased by Rs. 1250. The principal is:
(a) Rs. 45,000 (b) Rs. 50,000
(c) Rs. 60,000 (d) Rs. 65,000
(OSSC CTSRE 2025)

9. A sum of money at simple interest amounts to Rs. 7840 in 2 years and Rs. 8960 in 3 years. Find the sum (in Rs.)
(a) 5500 (b) 5700 (c) 5800 (d) 5600
(OSSC CGL 2021)

10. A sum of money at simple interest amounts to Rs. 6860 in 4 years and to Rs. 7350 in 5 years. Find the sum (in Rs.)
(a) 4900 (b) 5000 (c) 4700 (d) 4800
(OSSC BSSO 2022)

11. A sum of money invested at simple interest becomes 7 times of itself in 12 years. How many times will it become in 24 years time?
(a) 17 (b) 11 (c) 13 (d) 15
(OSSC CGL 2021)

12. A sum of money at simple interest triples itself in 16 years. Find how many years will it become 15 times itself at the same rate of interest?
(a) 114 (b) 110 (c) 116 (d) 112
(OSSC CGL 2021)

13. A sum of money at simple interest becomes 4 times of itself in 9 years. How many times will it become in 21 years time?
(a) 8 (b) 10 (c) 12 (d) 16

14. The amount doubles itself under simple interest in 2.5 years. In how many years will it become 42 times of itself?
(a) 102.5 (b) 104.5 (c) 100.5 (d) 106.5
(OSSC CGL 2021)

15. A lent a part of Rs. 25800 to 'X' at 9% simple interest and the rest to 'Y' at 5% simple interest. After 4 years, if he got an amount of Rs. 33540 in total, then what is the amount lent to 'Y'? (in Rs.)
(a) 9775 (b) 9675 (c) 9875 (d) 9575

16. A certain amount of money was invested in a simple interest for a period of 2 years. If it had been invested at 4% higher rate, then it would have fetched Rs. 480 more. Find the amount of money invested?
(a) Rs. 6500 (b) Rs. 6000
(c) Rs. 5600 (d) Rs. 5300
(OSSC CGL 2023)

17. A man purchased a cow for Rs. 3000 and sold it for Rs. 3600 the same day allowing the buyer a credit for 2 years. If the man charged a rate of simple interest of 10% per annum from the buyer, then the man had a gain of:
(a) 0% (b) 2.5% (c) 3.5% (d) 5%
(OSSC CHSL 2013)

18. A lent Rs. 5000 to B for 2 years and Rs. 3000 to C for 4 years on simple interest at the same rate of interest and received Rs. 2200 in all from both of them as interest. The rate of interest per annum is:
(a) 5% (b) 7% (c) $7\frac{7}{8}\%$ (d) 10%
(OSSC CGL 2024)

19. A sum of Rs. 725 is lent on the beginning of a year at a certain rate of interest. After 8 months, a sum of Rs. 362.50 more is lent but at the rate of interest twice the former. At the end of the year, Rs. 33.50 is earned of interest from both the loans. What was the original rate of interest?
(a) 3.6% (b) 4.5% (c) 5% (d) 3.46%
(OSSC CGL 2024)

20. A man took a loan from a bank at the rate of 12% p.a. simple interest. After 3 years, he had to pay Rs. 5,400 interest only for that period. The principal amount borrowed by him was:
(a) Rs. 10,000 (b) Rs. 12,000
(c) Rs. 15,000 (d) Rs. 20,000
(OSSC CGL 2024)

21. Mr. Jacob invested Rs. 17,500 by dividing it into two different schemes A and B at simple interest rate of 20% and 7.5% respectively. If the total amount of the simple interest earned in 2 years is Rs. 3775, what was the amount invested in scheme A? (in Rs.)
(a) 4600 (b) 5600 (c) 6600 (d) 3600
(OSSC CGL 2021)

22. The rates of simple interest in two banks A and B are in the ratio 5 : 4. A person wants to deposit his total savings in two banks in such a way that he received equal half-yearly interest from both. He should deposit the savings in banks A and B in the ratio:
(a) 2 : 5 (b) 4 : 5 (c) 5 : 2 (d) 5 : 7
(OSSC CPGL 2021)

23. A man invested Rs. 12,000 in each scheme A and B. Scheme A offers simple interest at the rate of 8% p.a. for three years, while scheme B offers simple interest at the rate of 12% p.a. for four years. Find the total interest (Rs.) received by the man from both schemes.
(a) 8080 (b) 8640 (c) 8560 (d) 8400

24. Thomas invested an amount of Rs. 13,900 divided in two different schemes P & Q at the simple interest of 14% p.a. and 11% p.a., respectively. If the total amount of simple interest earned in 2 years is Rs. 3,508, then what was the amount invested in the scheme Q?
(a) Rs. 6,400 (b) Rs. 6,500
(c) Rs. 7,200 (d) Rs. 7,500
(OSSC CHSL 2013 & Statistical Asst.2024)

25. A principal sum of money amounts to Rs. 16,000 after 5 years and Rs. 19,600 after 8 years at the same rate of simple interest. The rate of interest per annum is:
(a) 15% (b) 8% (c) 12% (d) 15%
(OSSC ESI 2023)

26. A sum of money lent out at simple interest amounts to Rs. 720 after 2 years and to Rs. 1020 after a further period of 5 years. The sum is:
(a) Rs. 500 (b) Rs. 400 (c) Rs. 600 (d) Rs. 700
(OSSC LTR 2024)

27. A person took a loan of Rs. 10,000 partly from a bank at 8% per annum and remaining from another bank at 10% per annum. He pays a total interest of Rs. 950 per annum. Amount of loan taken from the first bank (in Rs.) is:
(a) 2500 (b) 5200 (c) 2050 (d) 5020
(OSSC LTR 2024)

28. A sum of money doubles itself in 10 years at simple interest. What is the rate of interest?
(a) 15 (b) 12 (c) 18 (d) 10
(OSSC Steno 2023)

29. At what rate percent per annum will a sum of money become double in 8 years?
(a) 11.25% (b) 12.5% (c) 13.5% (d) 15%
(OSSC Steno 2025)

30. Aparna invests money in three different schemes for 6 years, 10 years and 12 years at 10%, 12% and 15% simple interest respectively. At the completion of each scheme, she gets the same interest. The ratio of her investments is:
(a) 2 : 3 : 4 (b) 3 : 4 : 6
(c) 3 : 4 : 2 (d) 6 : 3 : 2
(OSSC Steno 2025)

31. In how many years, Rs. 150 will produce the same amount of interest at the rate of 8% simple interest per annum as Rs. 800 will produce in 3 years at the rate of 4.5% simple interest per annum?
(a) 5 years (b) 7 years
(c) 8 years (d) 9 years
(OSSC CGL Mains 2024)

32. At what rate of simple interest per annum will the interest on a sum of money be 2/5th of the amount in 10 years?
(a) 4% (b) 5% (c) 8% (d) 10%
(OSSC CGL Mains 2024)

33. A certain sum of money at simple interest doubles in 10 years. In how many years, at the same simple interest, will it be tripled?
(a) 15 years (b) 18 years
(c) 20 years (d) 24 years
(OSSC CGL Mains 2024)

34. A man invested 1/3rd of capital at 7%, 1/4th at 8% and remainder at 10%. If his annual income is Rs. 561, then capital is:
(a) Rs. 6600 (b) Rs. 6300
(c) Rs. 6000 (d) Rs. 6500

35. A sum, when invested at 10% simple interest per annum, amounts to Rs. 5280 after 2 years. What is the simple interest (in Rs.) on the same sum at the same rate of interest in 1 year?
(a) 880 (b) 1760 (c) 220 (d) 440
(OSSC JEO & JA 2024)

36. On simple interest, a certain sum of money amounts to Rs. 1700 in 3 years and to Rs. 2000 in 4 years. Find the rate of interest per annum in %:
(a) 47.5% (b) 37.5% (c) 42.5% (d) 32.5%
(OSSC JEO & JA 2024)

37. Sapna invested Rs. 21200 on simple interest, partly at 9% per annum and partly at 6% per annum. If she earns equal interests from the two investments after 4 years, then find the sum sum invested at 9% per annum (in Rs.).
(a) 8481 (b) 8477 (c) 8479 (d) 8480
(OSSC JEO & JA 2024)

38. If X lends Rs. 4,500 to Y at 8% simple interest per annum and Y lends the same sum to Z at 10% simple interest per annum, then what is the gain of Y in a period of 3 years?
(a) Rs. 220 (b) Rs. 240
(c) Rs. 250 (d) Rs. 270
(OSSC ATO 2024)

39. A man has invested Rs. 52,000 at a rate of 12% per annum simple interest for 3 years. Find the amount (in Rs.) that will receive after 3 years.
(a) 71720 (b) 19720
(c) 70720 (d) 18720
(OSSC JEO & JA 2024)

40. The true discount on Rs. 1980 due after a certain time at 15% per annum is Rs. 180. The time after which it is due is:
(a) 7 months (b) 10 months
(c) 9 months (d) 8 months
(OSSC JEO & JA 2024)

41. A sum of money at simple interest amounts to Rs. 600 in 4 years and Rs. 650 in 6 years. Find the rate of interest per annum.
(a) 3% (b) 5% (c) 6% (d) 6%
(OSSC CGL Mains 2024-25)

ANSWER KEY

01. (a)	02. (b)	03. (b)	04. (d)	05. (b)	06. (b)
07. (d)	08. (b)	09. (d)	10. (a)	11. (c)	12. (d)
13. (a)	14. (a)	15. (b)	16. (b)	17. (a)	18. (d)
19. (d)	20. (c)	21. (a)	22. (b)	23. (b)	24. (a)
25. (c)	26. (c)	27. (a)	28. (d)	29. (b)	30. (d)
31. (d)	32. (a)	33. (c)	34. (a)	35. (d)	36. (b)
37. (d)	38. (d)	39. (c)	40. (d)	41. (b)	

SOLUTION

1. SI = RT% = 4 × 15% = 60% = $\frac{3\,(SI)}{5\,(P)}$
ATQ, 5 units = Rs. 5400
1 units = Rs. 1080
3 units = Rs. 1080 × 3 = Rs. 3240

2. SI = RT% = 25 × $\frac{1}{2}$% = 12.5% = $\frac{1\,(SI)}{8\,(P)}$
ATQ, 8 units = Rs. 12400
1units = Rs. 1550

3. ATQ, $x = \frac{p \times x \times x}{100}$
P = Rs. $\frac{100}{x}$

4. SI = RT% = 2 × 15 = 30%
ATQ, 30% = Rs. 3645
Principal = 100% = $\frac{3645}{30\%} \times 100\% = 12150$

5. SI for 5 years = Rs. 1395
SI for 1 year = $\frac{1395}{5}$ = Rs. 279
ROI = $\frac{SI\ for\ 1\ year}{Principal} \times 100$
= $\frac{279}{4650} \times 100 = 6\%$

6. R = $\frac{SI}{PT} \times 100 = \frac{1780}{4450 \times 8} \times 100 = 5\%$

7. SI = 4 × 6 = 24%
Amount = 100 + 24 = 124%
ATQ, 100% = 36,000
1% = 360
124% = 124 × 360 = Rs. 44,640

8. Increased rate of interest = 12.5 – 10 = 2.5%
ATQ, 2.5% = Rs. 1250
Principal = $1250 \times \frac{100}{2.5}$ = Rs. 50,000

9. SI for 1 year = 8960 – 7840 = 1120
   Required sum = Amount in 2 years – SI for 2 years
   = 7840 – 2 × 1120 = Rs. 5600

10. SI for 1 year = 7350 – 6860 = 490
    Required sum = Amount in 4 years – SI for 4 years
    = 6860 – 4 × 490 = Rs. 4900

11. | Amount | Principal | SI | Time |
    |---|---|---|---|
    | 7 | 1 | 6 | 12 |
    | | | ×2 | ×2 |
    | x | 1 | 12 | 24 |

    In 24 years, sum will become 12 + 1 = 13 times

12. | Amount | Principal | SI | Time |
    |---|---|---|---|
    | 3 | 1 | 2 | 16 |
    | | | ×7 | ×7 |
    | 15 | 1 | 14 | 112 |

    Required time = 16 × 7 = 112

13. | Amount | Principal | SI | Time |
    |---|---|---|---|
    | 4 | 1 | 3 | 9 |
    | | | $\times\frac{7}{3}$ | $\times\frac{7}{3}$ |
    | 8 | 1 | 7 | 21 |

    In 21 years, sum will become 7 + 1 = 8 times

14. | Amount | Principal | SI | Time |
    |---|---|---|---|
    | 2 | 1 | 1 | 2.5 |
    | | | ×41 | ×41 |
    | 42 | 1 | 41 | 102.5 |

    Required time = 2.5 × 41 = 102.5

15. SI on Rs. 25,800 for 4 years = 33540 – 25800
    = Rs. 7740
    SI for 1 year = $\frac{7740}{4}$ = 1935
    Overall ROI = $\frac{1935}{25800} \times 100$ = 7.5%

1st part		2nd part
9		5
	7.5	
2.5		1.5
5	:	3

    ATQ, (5 + 3) = 8 units = Rs. 25800
    1 unit = Rs. 3225
    Amount invested at 5% = 3 units = 3 × 3225 = Rs. 9675

16. Increase in rates = 4 × 2 = 8%
    ATQ, 8% = 480
    Principal = 100% = $480 \times \frac{100}{8}$ = Rs. 6000

17. CP = Rs. 3000
    Let principal = 100, SI = RT = 2 × 10 = 20
    Amount = 120
    120 units = 3600 1 unit = 30
    100 units = 100 × 30 = 3000 = SP
    Profit = 3000 – 3000 = 0
    Profit = 0%

18. ATQ, SI on Rs. 5000 for 2 years + SI on 3000 for 4 years = 2200
    $\frac{5000\times2\times R}{100} + \frac{3000\times4\times R}{100}$ = 2200
    100R + 120R = 2200
    220R = 2200 R = 10%

19. $\frac{725\times1\times R}{100} + \frac{362.50\times4\times2R}{12\times100}$ = 33.50
    $\frac{725R}{100} + \frac{725R}{300}$ = 33.50
    $\frac{725R}{100}\left(1+\frac{1}{3}\right)$ = 33.50
    $R = 33.50 \times \frac{3}{4} \times \frac{100}{725}$ = 3.46%

20. SI = 3 × 12 = 36%
    ATQ, 36% = Rs. 5400
    1% = 150
    Principal = 100% = 150 × 100 = 15,000

21. Let the amount invested in scheme A = x
    ATQ, $x \times \frac{20\times2}{100} + (17{,}500 - x)\frac{7.5\times2}{100} = 3775$
    $\frac{40x}{100} + 17{,}500 \times \frac{15}{100} - \frac{15x}{100} = 3775$
    $\frac{25x}{100} = 3775 - 2625$ = 1150
    x = 4 × 1150 = Rs. 4600

22. $\frac{A\times5\times T}{100} = \frac{B\times4\times T}{100}$
    5A = 4B
    A : B = 4 : 5

23. Total SI = $\frac{12{,}000\times8\times3}{100} + \frac{12{,}000\times12\times4}{100}$
    = 120 × 8 × 3 + 120 × 12 × 4
    = 120 (24 + 48) = 120 × 72 = Rs. 8640

24. Let the amount invested in the scheme Q be x.
    ATQ, $\frac{(139-x)\times14\times2}{100} + \frac{x\times11\times2}{100} = 3508$
    $139 \times 28 - \frac{28x}{100} + \frac{22x}{100} = 3508$

$\frac{6x}{100} = 3892 - 3508 = 384$

$x = \frac{38400}{6}$ = Rs. 6400

25. SI for 3 years = 19600 – 16000 = 3600

SI for 1 year = $\frac{3600}{3}$ = 1200

Principal = 16,000 – 5 × 1200 = 10,000

ROI = $\frac{1200}{10000} \times 100$ = 12%

26. SI for 5 years = 1020 – 720 = 300

SI for 1 year = $\frac{300}{5}$ = 60

The sum = 720 – 2 × 60 = Rs. 600

27. Overall ROI = $\frac{950}{10,000} \times 100$ = 9.5%

1st part 2nd part

8 — 9.5 — 10

0.5 — 1.5

1 : 3

ATQ, (1 + 3) = 4 units = Rs. 10000

1 unit = Rs. 2500

28. Amount (200%) = Principal (100%) + SI (100%)

SI = 10R% = 100

R% = 10%

29. Amount (200%) = Principal (100%) + SI (100%)

SI = 8R% = 100

R% = 12.5

30. $P_1 \times 10\% \times 6 = P_2 \times 12\% \times 10 = P_3 \times 15 \times 12$

$60P_1 = 120P_2 = 180P_3 = 360$

$P_1 : P_2 : P_3 = 6 : 3 : 2$

31. ATQ, $\frac{150 \times 8 \times T}{100} = \frac{800 \times 3 \times 4.5}{100}$

12 T = 108

T = 9 years

32. SI = 10R% = $\frac{2}{5} \times 100$ = 40%

R% = 4%

33. Amount doubles, it means SI = 100%

10R% = 100% R = 10

Again, amount triples, it means SI = 200%

10T% = 200% T = 20 years

34. Principal = 12 units

4 3 5

×7% ×8% ×10%

28% + 24% + 50% = 102%

ATQ, 102% = 561

1 unit = $561 \times \frac{100}{102}$ = 550

Capital = 12 units= 12 × 550 = Rs. 6600

35. Amount = 100% + 2 × 10% = 120%

ATQ, 120% = 5280

1% = 44

100% = 100 × 44 = 4400

SI for 1 year = 10% of 4400 = Rs. 440

36. SI for 1 year = 2000 – 1700 = 300

Principal = 1700 – 3 × 300 = 800

ROI = $\frac{300}{800} \times 100$ = 37.5

37. Ratio of principal = $R_2T_2 : R_1T_1$

6 × 4 : 9 × 4 = 2 : 3

ATQ, (2 + 3) = 5 units = 21200

2 units = 21200 × $\frac{2}{5}$ = Rs. 8480

38. Let principal = 100 unit

Interest paid by Y = 24 units

Interest paid by Z = 30 units

Gain of Y 30 – 24 = 6 units

ATQ, 100 units = Rs. 4500

6 units = 6 × 45 = Rs. 270

39. Amount after 3 years = 100 + 12 × 3 = 136

ATQ, 100 units = 52,000

1 unit = 520

Amount = 136 units = 136 × 520 = Rs. 70720

40. Present worth = Face value – True Discount

= 1980 – 180 = 1800

SI on Rs. 1800 at 15% p.a. is 180.

Time = $\frac{180 \times 100}{1800 \times 15} = \frac{2}{3}$ years = 8 months

41. SI for 2 years = 650 – 600 = 50

SI for 1 years = 650 – 600 = 25

Principal = 600 – 4 × 25 = 500

ROI = $\frac{SI\ for\ 1\ year}{Principal} \times 100$

= $\frac{25}{500} \times 100$ = 5%

Compound Interest: When interest is charged on total outstanding amount, it is called compound interest.

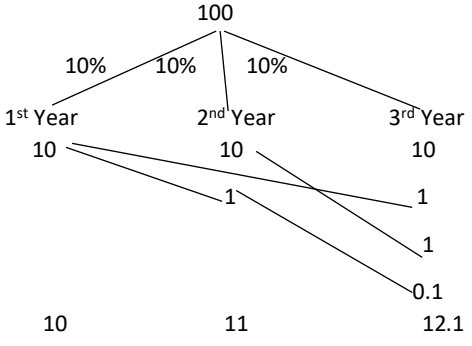
A = $P\left(1+\frac{r}{100}\right)^t$ Where, A = Amount, P = Principal, r = Rate of interest & t = Time

- Let Rs. 100 lent at 10% per annum compounded annually for 3 years –

Amount = $100 \times \frac{110}{100} \times \frac{110}{100}\frac{110}{100} = 133.1$

CI = 133.1 – 100 = 33.1

Alternatively,



Total CI = 10 + 11 + 12.1 = 33.1

Alternatively, Effective ROI of 10%, 10 % 10%

= $3 \times 10 + 3 \times \frac{10\times10}{100} + \frac{10\times10\times10}{(100)^2} = 33.1\%$

CI = 33.1% of 100 = 33.1

Alternatively,

100 $\xrightarrow{+10\%}$ 110 $\xrightarrow{+10\%}$ 121 $\xrightarrow{+10\%}$ 133.1

CI = 133.1 – 100 = 33.1

- When different rate of interest for different years.

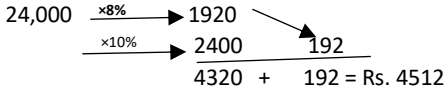
Amount = P $\times \left(1+\frac{R_1}{100}\right) \times \left(1+\frac{R_2}{100}\right) \times \left(1+\frac{R_3}{100}\right)$ .....

Example: The interest on Rs. 24,000 in 2 years compounded annually when the rates are 8% p.a. and 10% p.a. for two successive years is:

Solution: Amount = $24{,}000 \times \frac{108}{100} \times \frac{110}{100} = 28{,}512$

CI = 28,512 – 24,000 = Rs. 4,512

Alternatively,



Alternatively, Effective ROI = $8 + 10 + \frac{8\times10}{100} = 18.8$

CI = 18.8% of Rs. 24,000 = Rs. 4512

Alternatively, 8% = $\frac{2}{25}$, 10% = $\frac{1}{10}$

Principal	Amount
25	27
10	11

250297

CI = 47 units

ATQ, 250 units = 24,000

1 units = 96

47 units = 47 × 96 = Rs. 4512

- When interest is calculated annually, half-yearly, Quarterly or monthly etc.

Effective ROI = $\frac{Yearly\ ROI}{Period\ of\ calculation\ in\ year}$

Annual ROI	Calculation Basis	No. of Cycle	Effective ROI
24%	Half-yearly	2	12%
24%	4 months	3	8%
24%	Quarterly	4	6%
24%	2 months	6	4%
24%	1 month	12	1%

- Instalment for CI

Amount borrowed

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

Where, x = value of each instalment

Example: A sum of Rs. 210 was taken as a loan. This is to be paid back in two equal installments. If the rate of interest be 10% compounded annually, then the value of each installment is:

Solution: $210 = \frac{x}{1.1} + \frac{x}{(1.1)^2}$

$\frac{210}{x} = \frac{10\times11}{11\times11} + \frac{100}{121}$

x = 121

- Difference between CI & SI

CI – SI for 2 years = P$\left(\frac{R^2}{100}\right)$

CI – SI for 3 years = $3P\left(\frac{R}{100}\right)^2 + P\left(\frac{R}{100}\right)^3$

CI – SI for 4 years

$= 6P\left(\frac{R}{100}\right)^2 + 4P\left(\frac{R}{100}\right)^3 + P\left(\frac{R}{100}\right)^4$

CI & SI

Let A = R% of P B = R% of A

C = R% of B D = R% of D

P ⟶ A ⟶ B ⟶ C ⟶ D

CI for 2 years = 2A + B

CI for 2nd year = A + B

CI – SI for 2 years = B

CI for 3 years = 3A + 3B + C

CI for 3rd year = A + 2B + C

CI – SI for 3 years = 3B + C

CI for 4 years = 4A + 6B + 4C + D

CI for 4th year = A + 3B + 3C + D

CI – SI for 4 years = 6B + 4C + D

Example: A sum of Rs. 18,000 is lent at 10% p.a. compound interest, compounded annually.

18,000(P) ⟶ 1800(A) ⟶ 180(B)

180(B) ⟶ 18(C) ⟶ 1.8(D)

1. What is the difference between the compound interest for 3rd year and 4th year?

   Solution: (A + 3B + 3C + D) – (A + 2B + C)
   = B + 2C + D
   = 180 + 2 × 18 + 1.8 = 217.80

2. Find the difference between CI and SI for 4 years.
   Solution: CI – SI for 4 years = 6B + 4C + D
   6 × 180 + 4 × 18 + 1.8 = 1153.8

EXERCISE

1. Find the sum invested at compound interest at 30% per annum which will amount to Rs. 4901 in 2 years.
   (a) 2700 (b) 2600 (c) 2800 (d) 2900
   (OSSC CGL 2021)

2. The effective annual rate of interest corresponding to a nominal rate of 6% per annum payable half-yearly is:
   (a) 6.06% (b) 6.07% (c) 6.08% (d) 6.09%
   (OSSC CGL 20221)

3. At the end of three years, what will be the amount invested under compound interest at the rate of 10% p.a. on a principal of Rs. 36,000? (in Rs.)
   (a) 47,916 (b) 46,916
   (c) 48,916 (d) 47,916
   (OSSC CGL 2021)

4. A bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:
   (a) Rs. 120 (b) Rs. 121 (c) Rs. 122 (d) Rs. 123
   (OSSC CHSL 2023 & Accountant 2023)

5. On a certain sum of money, compound interest of Rs. 318 is earned in 2 years. If the rate of compound interest is 12% per annum, then what is the principal amount?
   (a) Rs. 1325 (b) Rs. 1300 (c) Rs. 1250 (d) Rs. 1200

6. On lending a certain sum of money on compound interest, one gets Rs. 7050 in 2 years and Rs. 9500 in 3 years. What is the rate of interest? (approximately)
   (a) 6% (b) 35% (c) 5% (d) 45%
   (OSSC CGL 2023)

7. At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?
   (a) 6% (b) 6.5% (c) 7% (d) 7.5%
   (OSSC Statistical Asst.2024 & CHSL 2024)

8. What is the interest on Rs. 2,500 for 2 years at the rate of 4% compound interest per annum?
   (a) Rs. 180 (b) Rs. 175 (c) Rs. 204 (d) Rs. 210
   (OSSC CHSL 2024)

9. A certain sum of money on compound interest becomes Rs. 56,180 when compounded annually after 2 years and Rs. 59,550.8 after 3 years. Find the sum. (in Rs.)
   (a) 45,200 (b) 51,100
   (c) 50,000 (d) 48,000
   (OSSC CHSL 2024)

10. At what rate of interest will Rs. 20,000 become Rs. 24,200 after 2 years when interest is compounded annually?
    (a) 5% (b) 6% (c) 10% (d) 15%
    (OSSC CTSRE 2025)

11. Find the interest on Rs. 9200 for 1 year at 11% per annum, compounded annually (in Rs.).
(a) 1012 (b) 1112 (c) 1312 (d) 1212
(OSSC BSSO 2022)

12. The amount doubled itself under compound interest in 15 years. In how many years will it become 256 times of itself at the same rate of interest?
(a) 120 (b) 127 (c) 115 (d) 125
(OSSC CGL 2021)

13. Dravid left a will of Rs. 50,400 for his two sons whose ages are 17 and 18 years. They must get equal amounts when they are 20 years at 10% compound interest. Find the present share of the younger son. (in Rs.)
(a) 24,000 (b) 26,000
(c) 25,000 (d) 23,000
(OSSC CGL 2021)

14. What is the difference between the compound interest on Rs. 15,000 for 1 year at 6% per annum compounded yearly and half-yearly? (in Rs.)
(a) 15.5 (b) 11.5 (c) 17.5 (d) 13.5
(OSSC CGL 2021)

15. A sum of Rs. 10,000 is borrowed at 8% per annum compound annually, which is paid back in three equal annual installments. What is the amount of each installment?
(a) Rs. 4179.04 (b) Rs. 3880.34
(c) Rs. 3905 (d) Rs. 4180.35
(OSSC CGL 2021)

16. What is the compound interest on Rs. 4000 under a rate of interest of 20% for 2 years, when compounding is done half-yearly?
(a) Rs. 1856 (b) Rs. 2010
(c) Rs. 2352 (d) Rs. 2678
(OSSC Jr. Clerk main 2022)

17. Raman invested Rs. 9000 in fixed deposits under compound interest at a rate of interest of 8%, compounding annually for 3 years. What is the total amount that he gets at the end of 3 years?
(a) Rs. 11,200 (b) Rs. 11,337
(c) Rs. 11,560 (d) Rs. 11,850
(OSSC Jr. Clerk main 2021)

18. At the end of two years, what will be the compound interest at the rate of 10% p.a. on an amount of Rs. 6100?
(a) 1281 (b) 1381 (c) 1081 (d) 1181
(OSSC SCEW 2022)

19. Find the sum invested at compound interest at 30% per annum which will amount to Rs. 3387 in 2 years.
(a) 2400 (b) 2300 (c) 2100 (d) 2000
(OSSC SCEW 2022)

20. Find the compound interest on Rs. 12,600 for 2 years at 10% per annum compounded annually.
(a) Rs. 2646 (b) Rs. 2254
(c) Rs. 7846 (d) Rs. 1546
(OSSC VSA 2023)

21. The compound interest on Rs. 16,000 for 12 months at 24% per annum, interest being compounded semiannually is:
(a) 3058.45 (b) 4123.25
(c) 3970.30 (d) 4070.40
(OSSC VSA 2023)

22. A sum of money placed at compound interest doubles itself in 4 years. In how many years will it amount to eight times itself?
(a) 10 (b) 12 (c) 8 (d) 14
(OSSC Steno 2023)

23. At what rate per annum will a sum of Rs. 3125 become Rs. 3645 in two years?
(a) 6 (b) 8 (c) 10 (d) 7
(OSSC Steno 2023)

24. Rs. 1250 at 12% per annum compounded annually will amount to Rs. 1568 in:
(a) 3 years (b) 4 years
(c) 1 year (d) 2 years
(OSSC Steno 2023)

25. Find the difference between the compound interest on Rs. 6000 at the rate of interest 10% per annum for one year, compounded half-yearly and annually.
(a) 20 (b) 24 (c) 16 (d) 15
(OSSC JEO & JA 2024)

26. For an amount to be double on compound interest (compounded annually) in 6 years, the rate of

interest will be _____% per annum. (Take $\sqrt[6]{2}$ = 1.12)
(a) 13 (b) 12 (c) 10 (d) 11
(OSSC JEO & JA 2024)

27. Radhika invested Rs. 24,000 for 2 years at compound interest of 5% per annum, compounded annually. What is the amount that she will get on maturity?
(a) Rs. 26,900 (b) Rs. 26,250
(c) Rs. 26,460 (d) Rs. 25,840
(OSSC JEO & JA 2024)

28. A certain sum amounts to Rs. 96,438 at the rate of 12% per annum in 2 years, interest compounded 8-monthly. What will be the amount payable (in Rs., rounded off to the nearest number) on the same sum at the same rate and on the same time, if the interest is compounded yearly?
(a) 96878 (b) 96272
(c) 96031 (d) 95726
(OSSC JEO & JA 2024)

29. A certain sum of money yields Rs. 309 as compound interest for 2 years at 6% per annum. The sum is:
(a) Rs. 2500 (b) Rs. 2525
(c) Rs. 2550 (d) Rs. 2575
(OSSC JEO& JA 2024)

30. A certain sum amounts to Rs. 39,044 at the rate of 15% per annum in 2 years, interest compounded 8-monthly. What will be the amount payable (in Rs., rounded off to the nearest number) on the same sum at the same rate and on the same time, if the interest is compounded yearly?
(a) 36620 (b) 36090
(c) 36581 (d) 36214
(OSSC JEO & JA 2024)

31. Naresh deposited a sum of Rs. 29600 at 20% rate of interest per annum, compounded annually. The total amount (in Rs.) received after 2 years, is:
(a) 42624 (b) 42731
(c) 42460 (d) 42147
(OSSC JEO & JA 2024)

32. A certain sum amounts to Rs. 77,941 at the rate of 66% per annum in 2 years, interest compounded 8-monthly. What will be the amount payable (in Rs., rounded off to the nearest number) on the same sum at the same rate and in the same time, if the interest is compounded yearly?
(a) 71088 (b) 71927
(c) 71589 (d) 72013
(OSSC JEO & JA 2024)

33. The compound interest on Rs. 62,720 at 6.25% per annum for 1 year, 73 days is:
(a) Rs. 4,753 (b) Rs. 4,735
(c) Rs. 67,743 (d) Rs. 67,473
(OSSC JEO & JA 2024)

34. If a bank gives 8% compound interest on deposits which are compounded annually, then an amount of Rs. 1,00,000 deposited in the bank would become approximately Rs. 1,36,049 in _____ years.
(a) 4.5 (b) 4 (c) 3.5 (d) 5
(OSSC JEO & JA 2024)

35. Ravi borrowed a certain sum from the market at 20% per annum compounded annually. He lent out the sum on compound interest compounded semiannually to Maya at the same rate of interest. If after one year he earned a profit of Rs. 1725, then what was the sum (in Rs.) borrowed by Ravi?
(a) 1,72,500 (b) 1,63,500
(c) 1,64,000 (d) 1,74,500
(OSSC JEO & JA 2024)

CI & SI

36. Simple interest on a sum at 20% per annum for 2 years is Rs. 1040. Find the amount under compound interest on the same sum for the same period and same rate of interest.
(a) 3644 (b) 3544 (c) 3844 (d) 3744
(OSSC CGL 2021)

37. Simple interest on a sum at 20% per annum for 2 years is Rs. 960. Find the amount under compound interest on the same sum for the same period and same rate of interest.
(a) 3156 (b) 3356 (c) 3456 (d) 3256
(OSSC BSSO 2022)

38. Compound and simple interest on a certain sum at certain rate of interest after two years is 220 and 200 respectively. What is the principal sum?

(a) Rs. 2200 (b) Rs. 2000
(c) Rs. 500 (d) Rs. 1000

(OSSC CGL 2022)

39. There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?
(a) Rs. 2160 (b) Rs. 3120
(c) Rs. 3972 (d) Rs. 6240

(OSSC CGL SPL. 2023 & Steno 2024)

40. Difference between the compound interest and the simple interest accrued on an amount of Rs. 18,000 in two years was Rs. 405. What was the rate of interest per annum?
(a) 16 (b) 12
(c) 15 (d) cannot be determined

(OSSC CGL 2021)

41. The difference between compound interest and simple interest for 2 years at the rate of 12% per annum on Rs. 5000 will be:)
(a) Rs. 47.50 (b) Rs. 63
(c) Rs. 72 (d) Rs. 45

(OSSC CGL SPL 2023)

42. The difference between simple interest and compound interest on Rs. 1200 for one year at 10% per annum reckoned half-yearly is:
(a) Rs. 2.50 (b) Rs. 3
(c) Rs. 3.75 (d) Rs. 4

(OSSC CGL SPL 2022)

43. The difference betⁿ simple interest and compound interest at the same rate for Rs. 5600 for 2 years is Rs. 350. Find the rate of interest.
(a) 23% (b) 29% (c) 27% (d) 25%

(OSSC BSSO 2022)

44. The difference between compound interest and simple interest on a certain sum of money at 10% per annum for 3 years is Rs. 620. Find the principal if it is known that the rate of interest is compounded annually.
(a) Rs. 20,0,000 (b) Rs. 20,000
(c) Rs. 10,000 (d) Rs. 100,1000

(OSSC CPGL 2024)

45. 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 percent per annum is:
(a) Rs. 400 (b) Rs. 500
(c) Rs. 600 (d) Rs. 800

(OSSC ESI 2023)

46. If the difference between the compound interest and simple interest on certain sum of money for 2 years at the rate of 4% per annum is Re. 1.00 then the sum (in Rs.) is:
(a) Rs. 625 (b) Rs. 452
(c) Rs. 526 (d) Rs. 456

(OSSC CGL Mains 2022)

47. What is the compound interest at the rate of 6% p.a. for 2 years on a certain sum of money, which in 2 years at the rate of 2% per annum with simple interest gives Rs. 8000?
(a) Rs. 47,270 (b) Rs. 42,770
(c) Rs. 27,420 (d) Rs. 24,720

(OSSC CGL Mains 2024)

48. On a certain sum of money, the simple interest for 2 years at the rate of 4% per annum is Rs. 350. If the same sum of money is invested for compound interest with the same rate of interest for the same duration, then how much more interest will be earned?
(a) Rs. 3.50 (b) Rs. 5.50
(c) Rs. 7.00 (d) Rs. 14.50

(OSSC CGL Mains 2024)

49. The difference between compound interest and simple interest earned in two years for a certain amount of money at a rate of interest of 12% is 576. What is the principal amount?
(a) Rs. 30,000 (b) Rs. 40,000
(c) Rs. 50,000 (d) Rs. 60,000

(OSSC Junior Clerk Mains 2022)

50. If at a same rate of interest, in 2 years, the simple interest is Rs. 72 and compound interest is Rs. 81, then what is the principal (in Rs.)?
(a) 148 (b) 139 (c) 137 (d) 144

(OSSC JEO & JA 2024)

51. If at the same rate of interest in 2 years, the simple interest is Rs. 74 and compound interest is Rs. 75, then what is the principal?
(a) 1369 (b) 1364 (c) 1362 (d) 1373

ANSWER KEY

01. (d)	02. (d)	03. (d)	04. (b)	05. (c)	06. (c)
07. (a)	08. (c)	09. (c)	10. (c)	11. (a)	12. (a)
13. (a)	14. (d)	15. (b)	16. (a)	17. (b)	18. (a)
19. (b)	20. (a)	21. (d)	22. (b)	23. (b)	24. (d)
25. (d)	26. (b)	27. (c)	28. (c)	29. (a)	30. (a)
31. (a)	32. (b)	33. (a)	34. (b)	35. (a)	36. (d)
37. (c)	38. (c)	39. (c)	40. (c)	41. (c)	42. (b)
43. (d)	44. (b)	45. (b)	46. (a)	47. (d)	48. (c)
49. (b)	50. (d)	51. (a)			

SOLUTION

1. 30% = $\frac{3}{10}$

Principal	Amount
10	13
10	13
100	169

ATQ, 169 units = 4901

100 its = $4901 \times \frac{100}{169}$ = 2900

2. Effective ROI = 3 + 3 + $\frac{3\times3}{100}$ = 6.09%

3. Amount = $36{,}000\left(1+\frac{10}{100}\right)^3$

= $36{,}000\left(\frac{11}{10}\right)^3 = 36{,}000 \times \frac{1331}{1000}$ = 47,916

4. CI on Rs. 1600 which deposited on 1st January

1600 —×2.5%→ 40 ↘ 1
1600 —×2.5%→ 40
80 + 1 = 81

CI on Rs. which deposited on 1st july

1600 —×2.5%→ 40

At the end of the year, Interest = 81 + 40 = 121

5. 12% = $\frac{3}{25}$ Principal = $(25)^2$ = 625

CI = 2 × 3 × 25 + 3 × 3 = 159

ATQ, 159 units = Rs. 318

1 unit = Rs. 2

625 units = Rs. 1250

6. 2 Years 3 Years

9050 9500

$\frac{450}{9050} \times 100$ = 4.97% = 5%(approx.)

Note: 2nd year's amount is the principal for 3rd year

7. Principal : Amount = 1200 : 1348.32

= 120000 : 134832 = 10000 : 11236

= $(100)^2 : (106)^2$

ROI = $\sqrt{(100)^2}$ $\sqrt{(106)^2}$

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

8. 2500 —×4%→ 100 ↘ 4
2500 —×4%→ 100
200 + 4 = 204

9. Principal Rs. 56,180 Rs. 59,550.80

3370.80

ROI = $\frac{3370.80}{56180} \times 100$ = 6%

Equivalent ROI for 2 years = 6 + 6 + $\frac{6\times6}{100}$

= 12.36

ATQ, 112.36 units = 56,180

Principal = 100 units = $\frac{56{,}180}{112.36} \times 100$ = 50,000

10. Principal Amount

$\sqrt{20{,}000}$ $\sqrt{24200}$

$\sqrt{100}$ $\sqrt{121}$

10 11

ROI = $\frac{1}{10} \times 100$ = 10%

11. CI = 9200× $\frac{11}{100}$ = 1012

12. Amount Years

2^1 times 15years

2^8 (256 times) 15×8 = 120 years

13. Difference between their ages = 18 – 17 = 1 year

Ratio of distribution of amount = $\left(1+\frac{10}{100}\right)^1$

= 110 : 100 = 11 : 10
21 units = 50400
1 unit = 2400
Younger son's share = 10 units = 10 × 2400 = Rs. 24,000

14. Half yearly, ROI = 3%, No. of cycle = 2
Effective ROI = $3 + 3 + \frac{3\times3}{100}$ = 6.09%
Difference between ROI = 6.09 – 6 = 0.09%
Required Difference = 15,000 × 0.09%
= Rs. 13.50

15. 8% = $\frac{2}{25}$
Make each instalments equal.

Principal	Instalment
$25_{\times729}$	$27_{\times729}$
$25^2{}_{\times27}$	$27^2{}_{\times27}$
25^3	27^3

Principal = 18225 + 16875 + 15625 = 50,725
Instalments = 19683
ATQ, 50,725 units = 10,000
19683 units = $\frac{10,000}{50,725} \times 19683$ = 3880.34

16. 20% ---------- Yearly ---------- 2 Cycles
10% ---------- Half yearly -------- 4 Cycles
Principal = 10^4 = 10000

10000	1000	100	10	1
	×4	×6	×4	×1
	4000 +	600 +	40 +	1

= 4641

ATQ, 10,000 units = 4000
4641 units = $\frac{4000}{10000} \times 4641$ = 1856

17. 9000 $\xrightarrow{\times8\%}$ 720 $\xrightarrow{\times8\%}$ 57.6 $\xrightarrow{\times8\%}$ 4.608

×3	×3	×1
2160	172.8	4.608

Total amount at the end of 3 years = 9000 + 2160 + 172.8 + 4.608 = 11,337.408

18. 6100 $\xrightarrow{\times10\%}$ 610 $\xrightarrow{\times10\%}$ 61

×2		×1
1220	+	61 = 1281

19.

Principal	Amount
10	13
×10	×13
100	169

169 units = 3887
1 unit = 23
100 its = 2300

20. 12,600 $\xrightarrow{\times10\%}$ 1260 $\xrightarrow{\times10}$ 61

×2		×1
2520	+	126 = Rs. 2646

21. 24% ---------- yearly
12% ---------- Half yearly ---------- 2 cycle

16,000 $\xrightarrow{\times12\%}$ 1920 $\xrightarrow{\times12\%}$ 230.4

×2		×1
38400	+	230.4 = 4070.40

22. 2^1 times ---------- 4 years
2^3 times ---------- 4 × 3 = 12 years

23.

Principal	Amount
$\sqrt{3125}$	$\sqrt{3645}$
$\sqrt{625}$	$\sqrt{729}$
25	27

$\frac{2}{5} \times 100$ = 8%

24. 12% = $\frac{3}{25}$

	Principal	Amount
	1250	1568
	625	784
	$(25)^2$	$(28)^2$
After n years:	$(25)^n$	$(28)^n$

n = 2

25. 10% -------- Yearly ---------- 1 Cycle
5% -------- Half yearly-------- 2 Cycle
Effective ROI = $5 + 5 + \frac{5\times5}{100}$ = 10.25%
Difference between CI = (10.25 – 10)% of 6000 = Rs. 15

26.

Principal		Amount
1		2
$\sqrt[6]{1}$		$\sqrt[2]{6}$
1	:	1.12

ROI = $\frac{1.12-1}{1} \times 100$ = 12%

27. 24,000 $\xrightarrow{\times5\%}$ 1200 $\xrightarrow{\times5\%}$ 60

×2		×1
2400	+	60 = 2460

Maturity amount = 24,000 + 2460 = Rs. 26,460

28. 12% -------- Yearly ---------- 2 Cycle
$12 \times \frac{8}{12}$ = 8% -------- 8-monthly-------- 3 Cycle

Effective ROI compounded 8-monthly

$= 3 \times 8 + 3\times \frac{8\times8}{100} + \frac{8\times8\times8}{(100)^2} = 24 + 1.92 + 0.0512$

$= 25.9712\% \approx 26\%$

Effective ROI compounded yearly $= 12 + 12 + \frac{12\times12}{100}$

$= 24 + 1.44 \approx 25.45$

Amount_1 : 126% = 96438

Amount_2 :125.44% $= \frac{96438}{126} \times 125.44$

= 96,009 (approx.) nearest to 96031

29. Effective ROI for 2 years $= 6 + 6 + \frac{6\times6}{100} = 12.36$

CI: 12.36% = 309

1% = 25

Sum = 100% = 2500

30. 57% -------- Yearly ---------- 2 Cycle

$57\times \frac{8}{12}$ = 38% -------- 8-monthly-------- 3 Cycle

$P \times \frac{138}{100} \times \frac{138}{100} \times \frac{138}{100} = 39044$

$P = 39044\times \frac{100}{138} \times \frac{100}{138} \times \frac{100}{138}$ = Rs. 14856(approx.)

CI for 2 years at 57%

$14856\times \frac{157}{100} \times \frac{157}{100} = 36620$ (approx.)

31. $29{,}600 \xrightarrow{\times20\%} 5920 \xrightarrow{\times20} 1184$

$\underline{\times2}$ $\underline{\times1}$

11840 + 1184 = Rs.1302

Amount = 29600 + 13024 = 42624

32. 66% -------- Yearly ---------- 2 Cycle

$66\times \frac{8}{12}$ = 44% -------- 8-monthly-------- 3 Cycle

$P \times \frac{144}{100} \times \frac{144}{100} \times \frac{144}{100} = 77941$

$P = 77941\times \frac{100}{144} \times \frac{100}{144} \times \frac{100}{144}$ = Rs.26102 (approx.)

CI for 2 years at 66%

$26102\times \frac{166}{100} \times \frac{166}{100} = 71927$ (approx.)

33. 6.25% $= \frac{1}{16}$, T $= 1 + \frac{73}{365} = (1 + \frac{1}{5})$ years

$62{,}720 \xrightarrow{\times1/16} 3920$

$\xrightarrow{\times1/16}$ (3920 + 245)$\times \frac{1}{5}$

CI $= 3920 + \frac{1}{5}(3920 + 245) = 4753$

34. Principal = 100000 Amount = 136049

CI = 36049

CI = 36% of principal

$100 \xrightarrow{8\%} 8 \xrightarrow{8\%} 0.64 \xrightarrow{8\%} 0.0512 \xrightarrow{8\%} 0.004096$

×4 ×6 ×4 ×1

32 + 3.84 + 0.2048 + 0.004096

= 36% (approx.)

Number of cycle = 4 T = 4 years

35. 20% ---------- Annually ---------- 1 cycle

10% ---------- Half-yearly -------- 2 cycle

Effective ROI $= 10 + 10 + \frac{10\times10}{100} = 21\%$

Profit = 21% (Maya) – 20% (Ravi) = 1%

1% = 1725

100% = 172500

36. S.I. for 2 years = 1040

S.I. for 1 years = 520

20% of principal = 520

Principal = 520 × 5 = 2600

$2600 \xrightarrow{\times20\%} 520$

$\xrightarrow{\times20\%} 520$ 104

C.I. = 520 × 2 + 104 = 1144

Amount = 2600 + 1144= 3744

37. Principal $\xrightarrow{\times20\%} 480$

$\xrightarrow{\times20\%} 480$ 96

C.I. = 480 × 2 + 96 = 1056

20 % of principal = 480

Principal = 480 × 5 = 2400

Amount = 2400 + 1056 = 3456

38. Principal $\xrightarrow{R\%} 100$

$\xrightarrow{R\%} 100$ 20

200(SI) + 20 = 220(CI)

ROI $= \frac{20}{100} \times 100 = 20\%$

20% Principal = 100

Principal = 100 × 5 = Rs. 500

39. S.I. = RT% = 6R = 60

R% = 10%

$12{,}000 \xrightarrow{10\%} 1200_{\times3} \xrightarrow{10\%} 120_{\times3} \xrightarrow{10\%} 12_{\times1}$

CI = 3600 + 360 + 12 = 3972

40. $18000 \xrightarrow{\times R\%} 180R \xrightarrow{R\%} 1.8R^2$

ATQ, $1.8R^2 = 405$ $R^2 = \frac{405}{1.8} = \mathbf{225}$

R = 15

41. $5000 \xrightarrow{\times12\%} 600 \xrightarrow{\times12\%}$ Rs. 72

42. 10% → yearly 5% → half-yearly

No. of cycle = 2

1200 $\xrightarrow{\times 5\%}$ 60 $\xrightarrow{\times 5\%}$ Rs. 3 (CI – SI)

43. 5600 $\xrightarrow{\times R\%}$ 56R $\xrightarrow{R\%}$ $0.56R^2$

ATQ, $0.56R^2 = 350$ $R^2 = \frac{350}{56} \times 100 = 625$

R = 25

44. R = 10% = $\frac{1}{10}$ No. of cycle =3

Principal = $(10)^3 = 1000$

1000 $\xrightarrow{10\%}$ 100 $\xrightarrow{10\%}$ 10 $\xrightarrow{10\%}$ 1

×3 ×3 ×1

300 (SI) 31 (CI – SI)

ATQ, 31 units = 525 1 unit = 25

Principal 1000 units = 1000 × 20 = 20,000

45. R = 10% = $\frac{1}{10}$ No. of cycle = 2

Principal = $(10)^2 = 100$

100 $\xrightarrow{10\%}$ 10 $\xrightarrow{10\%}$ 1

×2 ×1

20(SI) + 1 (CI – SI) = 21 (CI)

ATQ, 21 units = 525 1 unit = 25

SI = 20 units = 20 × 25 = 500

46. R = 4% = $\frac{1}{25}$ No. of cycle =2

Principal = $(25)^2 = 625$

625 $\xrightarrow{4\%}$ 25 $\xrightarrow{4\%}$ 1 (CI – SI)

ATQ, 1 units = RS. 1

Principal 625 units = 625 × 1 = Rs. 625

47. SI = RT% = 2 × 2% = 4%

4% Principal = 8000

Principal = 8000 × 25 = 200000

200000 $\xrightarrow{\times 6\%}$ 12000 $\xrightarrow{\times 6\%}$ 720

×2 × 1

24000 + 720 = 24720

48. Principal $\xrightarrow{4\%}$ 175 → 7

$\xrightarrow{4\%}$ 175

350(SI) **7** (CI - SI)

49. 12% = $\frac{3}{25}$ Time = 2 years

Principal = $576 \times \frac{25}{3} \times \frac{25}{3}$ = Rs. 40,000

50. Principal $\xrightarrow{R\%}$ 36 → 9

$\xrightarrow{R\%}$ 36

72 (SI) + 9 = 81 (CI)

Principal = $36 \times \frac{36}{9} = 144$

51. Principal $\xrightarrow{R\%}$ 37 → 1

$\xrightarrow{R\%}$ 37

74 (SI) + 1 = 75 (CI)

Principal = $36 \times \frac{37}{1} = 1369$

52. 52000 $\xrightarrow{\times 12\%}$ 6240 $\xrightarrow{\times 12\%}$ 748.80 $\xrightarrow{\times 12\%}$ 89.856

×3 ×3 ×1

18720 2246.40 89.856

Total amount at the end of 3 years = 52000 + 18720 + 2246.40 + 89.856 = 73,056.256