CHAPTER 5

PERCENTAGES

BASIC DEFINITION OF PERCENTAGE

The word per cent means per hundred or for every hundred. The symbol '%' is used for the term percent. Thus, 20 per cent is written as 20% and it means 20 out of 100.

This is written in ratio form as $\frac{20}{100}$.

The percentage value of a ratio is obtained when we multiplying the ratio by 100.

Thus percentage value of the ratio $\frac{3}{5}$ will be $\frac{3}{5}\times 100\% = 60\%$.

Illustration 1: A person saves ₹ 5,000 per month from his monthly salary ₹ 30,000. Find the percentage monthly saving of the person.

Solution: Out of monthly salary ₹ 30,000, saving is ₹ 5,000

$\Rightarrow$ Out of monthly salary ₹ 1, saving is ₹ $\frac{5,000}{30,000}$

$\Rightarrow$ Out of monthly salary ₹ 100, saving is ₹ $\frac{5,000}{30,000}\times 100$

$= ₹ \frac{50}{3} = ₹ 16.67$ (approx.)

Hence percentage monthly saving = 16.67% (approx.)

Illustration 2: 250 students of *ABC* school and 350 students of *XYZ* school appeared in secondary board examination conducted by CBSE in 2013. 20 students of *ABC* school and 25 students of *XYZ* school did not pass in this board examination. Students of which of the two schools *ABC* and *XYZ* have shown poor performance?

Solution: We cannot compare the performance of the students of the two schools in secondary board examination by just looking the number of students 20 of *ABC* school and 25 of *XYZ* school who did not pass in secondary board examination.

To compare the performance, you have to find the percentage of the students who did not pass the secondary board examination of each school out of those students of each school who appeared in the secondary board examination.

Percentage of the students of *ABC* school who did not pass

$$= \frac{20}{250}\times 100\% = 8\%$$

Percentage of the student of *XYZ* school who did not pass

$$= \frac{25}{350}\times 100\% = 7.1\% \text{ (approximately)}$$

Hence students of the *XYZ* school have shown poor performance.

Illustration 3: In a survey, voters of a national party *A* are increase by 2.5 lakhs and voters of national party *B* are increase by 4 lakhs in 2012. Which party *A* or *B* has grown more in 2012 ?

Solution: In first shot the answer to the question seems to be national party *B*. But actually the question can not be answered, because we don't know the just previous year's voters of each of the national party *A* and *B*.

If we had further information that in 2011, voters of national party *A* were 5 lakhs and voters of national party *B* were 10 lakhs, we can compare growth rates of two national parties.

Percentage growth rate of national party *A* in 2012

$$= \frac{250000}{500000}\times 100\% = 50\%$$

Percentage growth rate of national party *B* in 2012

$$= \frac{400000}{1000000}\times 100\% = 40\%$$

Hence, national party *A* has higher growth rate in 2012. Thus national party *A* has grown more than *B* in 2012.

In the illustrations 2 and 3, you have seen that percentage is the most powerful tool for comparing the data. 500000 and 1000000 in illustration 3 are called base values of percentage growth rate of party *A* and party *B* respectively.

Without knowing these base values, percentage growth rate of party *A* and party *B* could not be determined.

Thus percentage of anything (let *X*) $= \frac{\text{Value of } X}{\text{Base value of } X}\times 100$

In illustration 1, ₹ 30000 is the base value of percentage monthly saving. In illustration 2, 250 is the base value of the percentage of students of *ABC* school who did not pass and 350 is the base value of the percentage of student of *XYZ* school who did not pass.

Illustration 4: Express the following as fraction

(a) 25% **(b) $33\frac{1}{3}\%$**

Solution :

(a) $25\% = \frac{25}{100}$ $\left(\text{Since \% means } \frac{1}{100}\right) = \frac{1}{4}$

(b) $33\frac{1}{3}\% = \frac{100}{3}\% = \frac{100}{3\times100} = \frac{1}{3}$

Illustration 5: 25% of a number is 80. What is the number ?

Solution:

Let the number be X. According to the given condition

$$\frac{25}{100}\times X = 80 \Rightarrow X = \frac{80\times100}{25} = 320.$$

Illustration 6: Express $\frac{1}{8}$ as a percentage.

Solution: $\frac{1}{8} = \frac{1}{8}\times100\%$

$$= \frac{100}{8}\% = \frac{25}{2}\% = 12\frac{1}{2}\%$$

Illustration 7: Two third of three fifth of one eighth of a certain number is 268.50. What is 30% of the number?

(a) 1611 **(b) 1616**

(c) 1343 **(d) 594.60**

Solution: (a) Let the number be x.

According to the question $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{1}{8}\times x = 268.50$

$$\Rightarrow \quad \frac{2}{3}\times\frac{3}{5}\times\frac{1}{8}\times x = 268.50$$

$$x = \frac{268.50\times3\times5\times8}{2\times3} = 5370$$

$$30\% \text{ of } x = \frac{30}{100}\times5370 = 1611.00$$

Illustration 8: 4598 is 95% of ?

(a) 4800 **(b) 4840**

(c) 4850 **(d) 4880**

Solution: (b) Let 95% of $x = 4598$.

Then, $\frac{95}{100}\times x = 4598 \Rightarrow x = \left(4598\times\frac{100}{95}\right) = 4840.$

PERCENTAGE INCREASE, PERCENTAGE DECREASE AND PERCENTAGE CHANGE

$$\text{Percentage increase} = \frac{\text{Increase}}{\text{Initial value (i.e., Base value)}}\times100$$

$$\text{Percentage decrease} = \frac{\text{Decrease}}{\text{Initial value (i.e., Base value)}}\times100$$

$$\text{Percentage change} = \frac{\text{Change}}{\text{Initial value (i.e., Base value)}}\times100$$

Let income of a family in the years 2010, 2011 and 2012 are ₹ 50000, ₹ 80000 and ₹ 60000 respectively.

Here income of the family increases in 2011 but decreases in 2012.

Increase in family income in 2011 from 2010

= (Higher Income) – (Lower Income)

= (Income in 2011) – (Income in 2010)

= ₹ 80000 – ₹ 50000 = ₹ 30000

Decrease in family income in 2012 from 2011

= (Higher Income) – (Lower Income)

= (Income in 2011) – (Income in 2012)

= ₹ 80000 – ₹ 60000 = ₹ 20000

Percentage increase in family income in 2011 from 2010

$$= \frac{\left(\begin{matrix}\text{Increase in income}\\ \text{in 2011 from 2010}\end{matrix}\right)}{\text{(Income in 2010)}}\times100$$

$$= \frac{30000}{50000}\times100 = 60\%$$

Percentage decrease in family income in 2012 from 2011

$$= \frac{\left(\begin{matrix}\text{Decrease in income}\\ \text{in 2012 from 2011}\end{matrix}\right)}{\text{(Income in 2011)}}\times100$$

$$= \frac{20000}{80000}\times100 = 25\%$$

Illustration 9: Rent of the house is increased from ₹ 7000 to ₹ 7700. Express the increase in price as a percentage of the original rent.

Solution:

Increase value = ₹ 7700 – ₹ 7000 = ₹ 700

$$\text{Increase \%} = \frac{\text{Increase value}}{\text{Base value}}\times100 = \frac{700}{7000}\times100$$

$$= 10$$

∴ Percentage rise = 10 %.

Illustration 10: The cost of a bike last year was ₹ 19000. Its cost this year is ₹ 17000. Find the percent decrease in its cost.

Solution:

$$\text{\% decrease} = \frac{19000-17000}{19000}\times100$$

$$= \frac{2000}{19000}\times100 = 10.5.$$

∴ Percent decrease = 10.5 %.

If the value of any thing increases, then percentage change is the percentage increase and if the value of any thing decreases, then percentage change is the percentage decrease. Thus,

Percentage change = Percentage increase, if value of any thing increases

and Percentage change = Percentage decrease, if value of anything decreases.

Practice Exercise

Level - I

1. In a public library there are 110,000 books, 40% of which are science books. It was decided to add 20,000 new books to the library. How many of the new books should be science books in order to bring the percentage of science books in the library up to 45%?
(a) 15000 (b) 1500 (c) 1450 (d) 14500

2. A batsman scored 110 runs which included 3 boundaries and 8 sixes. What percent of his total score did he make by running between the wickets ?
(a) 45% (b) $45\frac{5}{11}\%$
(c) $54\frac{6}{11}\%$ (d) 55%

3. A student secures 90%, 60% and 54% marks in test papers with 100, 150 and 200 respectively as maximum marks. The percentage of his aggregate is:
(a) 64 (b) 68
(c) 70 (d) None of these

4. If two numbers are respectively 20% and 50% of a third number, what is the percentage of the first number to the second ?
(a) 10 (b) 20 (c) 30 (d) 40

5. In an examination, 5% of the applicants were found ineligible and 85% of the eligible candidates belonged to the general category. If 4275 eligible candidates belonged to other categories, then how many candidates applied for the examination ?
(a) 30, 000 (b) 35, 000
(c) 37, 000 (d) None of these

6. Deepa decided to donate 8% of her salary to an orphanage, On the day of donation she changed her mind and donated ₹ 2240 which was 80% of what she had decided earlier. How much is Deepa's salary?
(a) ₹ 36000 (b) ₹ 42000
(c) ₹ 35000 (d) ₹ 45000

7. When the price of a radio was reduced by 20%, its sale increased by 80%. What was the net effect on the sale?
(a) 44% increase (b) 44% decrease
(c) 66% increase (d) 75% increase

8. If the price of sugar is increased by 7%, then by how much per cent should a housewife reduce her consumption of sugar, to have no extra expenditure?
(a) 7 over 107% (b) 107 over 100%
(c) 100 over 107% (d) 7%

9. A salesman's terms were changed from a flat commission of 5% on all his sales to a fixed salary of ₹ 1,000 plus 2.5% commission on all sales exceeding ₹ 4,000. If his remuneration as per the new scheme was ₹ 600 more than by the first scheme, what were his sales worth?
(a) 10,000/- (b) 11,000/- (c) 12,000/- (d) 14,000/

10. An inspector rejects 0.08% of the metres as defective. How many metres will he examine to reject 2 metres?
(a) 200m (b) 250m
(c) 2500m (d) 3000m

11. A invested 10% more than B. B invested 10% less than C. If the total sum of their investment is ₹ 14450. how much did C get?
(a) ₹ 5000 (b) ₹ 4800
(c) ₹ 5100 (d) None of these

12. A sum of ₹ 4558 is divided among A, B and C such that A receives 20% more than C, and C receives 25% less than B. What is A's share in the amount ?
(a) ₹ 1548 (b) ₹ 1720
(c) ₹ 1290 (d) ₹ 1345

13. In an election between two candidates, 75% of the voters cast their votes, out of which 2% of the votes were declared invalid. A candidate got 9261 votes which were 75% of total valid votes. Find the total number of votes enrolled in that election.
(a) 16080 (b) 16800
(c) 18600 (d) 16008

14. A spider climbed $62\frac{1}{2}\%$ of the height of the pole in one hour and in the next hour it covered $12\frac{1}{2}\%$ of the remaining height. If the height of the pole is 192 m, then distance climbed in second hour is:
(a) 3 m (b) 5 m
(c) 7 m (d) 9 m

15. A number is increased by 10% and then reduced by 10%. After these operations, the number:
(a) does not change (b) decreases by 1%
(c) increases by 1% (d) increases by 0.1%

16. The difference between the value of a number increased by 25% and the value of the original number decreased by 30% is 22. What is the original number ?
(a) 70 (b) 65
(c) 40 (d) 90

17. A salesman is allowed $5\frac{1}{2}\%$ discount on the total sales made by him plus a bonus of $\frac{1}{2}\%$ on the sales over ₹ 10,000. If his total earnings were ₹ 1990, then his total sales (in ₹) were:
(a) 30,000 (b) 32,000
(c) 34,000 (d) 35,000

18. If 12% of 75% is greater than 5% of a number by 75, the number is
(a) 1875 (b) 1890
(c) 1845 (d) 1860

19. Mr Yadav spends 60% of his monthly salary on consumable items and 50% of the remaining on clothes and transport. He saves the remaining amount. If his savings at the end of the year were ₹ 48456, how much amount per month would he have spent on clothes and transport?
(a) ₹4038 (b) ₹8076
(c) ₹9691.20 (d) ₹4845.60

20. In a certain year, the population of a certain town was 9000. If in the next year the population of males increases by 5% and that of the females by 8% and the total population increases to 9600, then what was the ratio of population of males and females in that given year?
(a) 4 : 5 (b) 5 : 4
(c) 2 : 3 (d) None of these

21. The salary of Raju and Ram is 20% and 30% less than the salary of Saroj respectively. By what % is the salary of Raju is more than the salary of Ram?
(a) 33.33% (b) 50%
(c) 15.18% (d) 14.28%

22. Wheat is now being sold at ₹ 27 per kg. During last month its cost was ₹ 24 per kg. Find by how much per cent a family reduces its consumption so as to keep the expenditure fixed.
(a) 10.2% (b) 12.1%
(c) 12.3% (d) 11.1%

23. $33\frac{1}{3}\%$ of a man's daily output is equal to 50% of a second man's daily output. If the second man turns out 1500 screws daily, then the first man's output in terms of making screws is:
(a) 500 (b) 1000
(c) 2000 (d) 2250

24. A fraction is such that if the double of the numerator and the triple of the denominator is changed by + 10% and –30% respectively then we get 11% of 16/21. Find the fraction.
(a) $\frac{4}{25}$ (b) $\frac{2}{25}$
(c) $\frac{3}{25}$ (d) None of these

25. The entry fee in an exhinition was ₹ 10. Later this was reduced by 25%, which increased the sale of tickets by 20%. Find the percentage increase in the number of visitors.
(a) 54 (b) 57
(c) 60 (d) 66

26. An inspector rejects 0.08% of the metres as defective. How many metres will he examine to reject 2 metres?
(a) 200 m (b) 250 m
(c) 2500 m (d) 3000 m

27. If the numerator of a fraction be increased by 15% and its denominator be diminished by 8%, the value of the fraction is $\frac{15}{16}$. Find the original fraction.
(a) $\frac{1}{2}$ (b) $\frac{1}{3}$
(c) $\frac{1}{4}$ (d) $\frac{3}{4}$

28. In a class, 65% of the students are boys. On a particular day 80% of girl students were present. What was the fraction of boys who were present that day if the total number of students present that day was 70%?
(a) $\frac{2}{3}$ (b) $\frac{28}{65}$
(c) $\frac{5}{6}$ (d) $\frac{42}{65}$

29. A's income is 60% of B's income, and A's expenditure is 70% of B's expenditure. If A's income is 75% of B's expenditure, find the ratio of A's saving to B's saving.
(a) 5 : 1 (b) 1 : 5
(c) 3.5 : 1 (d) 2 : 7

30. Due to fall in manpower, the production in a factory decreases by 25%. By what per cent should the working hour be increased to restore the original production?
(a) $33\frac{1}{3}\%$ (b) 20%
(c) 25% (d) 4%

31. A number is increased by 20% and then again by 20%. By what percent should the increased number be reduced so as to get back the original number ?
(a) $19\frac{11}{31}\%$ (b) $30\frac{5}{9}\%$
(c) 40% (d) 44%

32. In the month of January, the Railway Police caught 4000 ticketless travellers. In February, the number rose by 5%. However, due to constant vigil by the Police and the total number of ticketless travellers caught in the month of April was :
(a) 3125 (b) 3255
(c) 3575 (d) 3591

33. In a mixture of milk and water the proportion of water by weight was 75%. If in the 60 gm mixture, 15 gm water was added, what would be the percentage of water ?
(a) 75% (b) 88%
(c) 90% (d) None of these

34. A shopkeeper employed a servant at a monthly salary of ₹ 1500. In addition to it, he agreed to pay him a commission of 15% on the monthly sale. How much sale in Rupees should the servant do if he wants his monthly income as ₹ 6000?
(a) ₹30000 (b) ₹415000
(c) ₹31500 (d) ₹50000

35. 720 sweets were distributed equally among children in such a way that number of sweets received by each child is 20% of the total number of children. How many sweets did each child receive ?
(a) 8 (b) 10
(c) 9 (d) 12

36. A company bought a total of 60 computers and 20 printers to modernise billing operations. If the price of each computer was three times the price of each printer then what per cent of the total cost of the purchase was the total cost of the printers ?
(a) 10% (b) 11%
(c) 15% (d) 20%

37. A city had a population of 30,00,000 in the beginning of 1999. Its average growth rate is 4% per year, but due to a massive earthquake in 2001, its population is reduced by 8% in that year. But it again maintained the same growth rate of 4% in following years. What will be the approx. population of the city at the end of 2003?
(a) 32,06,460 (b) 34,68,420
(c) 31,52,360 (d) 32,28,810

38. In a factory there are three types of machines M_1, M_2 and M_3 which produces 25%, 35% and 40% of the total products respectively. M_1, M_2 and M_3 produces 2%, 4% and 5% defective products, respectively. What is the percentage of non-defective products?
(a) 89% (b) 97.1% (c) 96.1% (d) 86.1%

39. A person saves 6% of his income. Two years later, his inocme shoots up by 15% but his savings remain the same. Find the hike in his expenditure.
(a) 15.95% (b) 15% (c) 14.8% (d) 15.5%

40. In the half yearly exam only 70% of the students were passed. Out of these (passed in half yearly) only 60% student are passed in annual exam. Out of those who did not pass the half yearly exam, 80% passed in annual exam. What percent of the students passed the annual exam?
(a) 42% (b) 56%
(c) 66% (d) None of these

41. Two vessels contain equal quantities of 40% alcohol. Anil changed the concentration of the first vessels to 50% by adding extra quantity of pure alcolol. Balu changed the concentration of the second vessels to 50% replacing a certain quantity of the solution with pure alcohol. By what percentage is the quantity of alcohol added by Anil more than that replaced by Balu?
(a) 20% (b) 25%
(c) 40% (d) Cannot be determined

42. Lagaan is levied on the 60% of the cultivated land. The revenue department collected total ₹ 3,84,4000 through the lagaan from the village of Sukhiya. Sukhiya, a very rich farmer, paid only ₹ 480 as lagaan. The percentage of total land of Sukhiya over the total taxable land of the village is:
(a) 0.15% (b) 15%
(c) 0.125% (d) None of these

43. In an election between 2 candidates, Bhiku gets 65% of the total valid votes. If the total votes were 6000, what is the number of valid votes that the other candidate Mhatre gets if 25% of the total votes were declared invalid?
(a) 1625 (b) 1575
(c) 1675 (d) 1525

44. A machine depreciates in value each year at the rate of 10% of its previous value. However, every second year there is some maintenance work so that in that particular year, depreciation is only 5% of its previous value. If at the end of the fourth year, the value of the machine stands at ₹ 1, 46, 205, then find the value of machine at the start of the first year.
(a) ₹ 1, 90, 000 (b) ₹ 2, 00, 000
(c) ₹ 1, 95, 000 (d) ₹ 2, 10, 000

45. After three successive equal percentage rise in the salary the sum of 100 rupees turned into 140 rupees and 49 paise. Find the percentage rise in the salary.
(a) 12% (b) 22%
(c) 66% (d) 82%

46. The salary of Anil and Vinit is 20% and 30% less than the salary of Dheeraj respectively. By what percentage is the salary of Anil more than the salary of Vinit?
(a) 33.33% (b) 50%
(c) 10% (d) 14.28%

47. In a certain town, at least 50% of the people read a newspaper. Among those who read a newspaper, at most 25% read more than one paper. Only one of the following statements follows from the statements given below. Which one is it?
(a) At the most 25% read exactly one newspaper
(b) At least 25% read all the newspaper
(c) At the most 37½% read exactly one newspaper
(d) At least 37½% read exactly one newspaper

48. Kajal spends 55% of her monthly income on grocery, clothes and education in the ratio of 4 : 2 : 5 respectively. If the amount spent on clothes is ₹ 5540/-, what is Kajal's monthly income ? [*SBI Clerk-2012*]
(a) ₹ 55,400/- (b) ₹ 54,500/-
(c) ₹ 55,450/- (d) ₹ 55,650/-
(e) None of these

49. 35 percent of a number is two times 75 percent of another number. What is the ratio between the first and the second number respectively ? [*SBI Clerk-2012*]
(a) 35 : 6 (b) 31 : 7
(c) 23 : 7 (d) 32 : 9
(e) None of these

50. Last year there were 610 boys in a school. The number decreased by 20 percent this year. How many girls are there in the school if the number of girls is 175 percent of the total number of boys in the school this year ? [*SBI Clerk-2012*]
(a) 854 (b) 848
(c) 798 (d) 782
(e) None of these

51. Aryan got 350 marks and Vidya scored 76 percent marks in the same test. If Vidya scored 296 marks more than Aryan, what were the maximum marks of the test ?[*SBI Clerk-2012*]
(a) 650 (b) 900
(c) 850 (d) 950
(e) None of these

52. A student was awarded certain marks in an examination. However, after re-evaluation, his marks were reduced by 40% of the marks that were originally awarded to him so that the new score now became 96. How many marks did the student lose after re-evaluation ? [*SBI Clerk-2012*]
(a) 58 (b) 68
(c) 63 (d) 56
(e) 64

53. 855 candidates applied for a job, out of which 80% of the candidates were rejected. How many candidates were selected for the job ? [*SBI Clerk-2012*]
(a) 684 (b) 151
(c) 676 (d) 179
(e) None of these

54. A shopkeeper purchased 200 bulbs for ₹ 10 each. However, 5 bulbs were fused and had to be thrown away. The remaining were sold at ₹ 12 each. What will be the percentage profit ? [*SBI Clerk-2014*]
(a) 25 (b) 15
(c) 13 (d) 17
(e) None of these

55. Ajay spends 25 per cent of his salary on house rent, 5 per cent on food, 15 per cent on travel, 10 per cent on clothes and the remaining amount of ₹ 27,000 is saved. What is Ajay's income ? [*SBI Clerk-2014*]
(a) ₹60,000 (b) ₹80,500
(c) ₹60,700 (d) ₹70,500
(e) None of these

56. The salary of an employee increases every year in the month of July by 10%. If his salary in May 2000 was ₹ 15,000, his salary in October 2001 was [*SSC-Sub. Ins.-2012*]
(a) ₹ 16,500 (b) ₹18,000
(c) ₹ 18,150 (d) ₹ 19,965

57. 72% of the students of a certain class took Biology and 44% took Mathematics. If each student took Biology or Mathematics and 40 took both, the total number of students in the class was [*SSC-Sub. Ins.-2012*]
(a) 200 (b) 230
(c) 250 (d) 320

58. In a big garden 60% of the trees are coconut trees, 25% of the number of coconut trees are mango trees and 20% of the number of mango trees are apple trees. If the number of apple trees are 1500. then the number of trees in the garden is : [*SSC-Sub. Ins.-2013*]
(a) 48000 (b) 50000
(c) 51000 (d) 45000

59. If 50% of (P– Q) = 30% of (P + Q) and Q = x% of P, then the value of x is: [*SSC-Sub. Ins.-2013*]
(a) 30 (b) 25
(c) 20 (d) 50

61. In an examination 75% candidates passed in English and 60% passed in Mathematics. 25% failed in both and 240 passed the examination. Find the total number of candidates. [*SSC-Sub. Ins.-2014*]
(a) 492 (b) 300
(c) 500 (d) 400

62. If 40% of $\frac{4}{5}$ of $\frac{3}{4}$ of a number is 48, then what is 1% of the same number ? [*SSC-Sub. Ins.-2014*]
(a) 20 (b) 2
(c) 10 (d) 1

63. Two persons contested an election of Parliament. The winning candidate secured 57% of the total votes polled and won by a majority of 42,000 votes. The number of total votes polled is [*SSC-MT-2013*]
(a) 4,00,000 (b) 5,00,000
(c) 6,00,000 (d) 3,00,000

64. A number when reduced by 10% gives 30. The number is [*SSC-MT-2013*]
(a) 35 (b) $33\frac{1}{2}$
(c) $33\frac{1}{3}$ (d) 40

65. A team played 40 games in a season and won in 24 of them. What percent of games played did the team win ? [*SSC 10+2-2012*]
(a) 70% (b) 40%
(c) 60% (d) 35%

66. If 125% of x is 100, then x is : [*SSC 10+2-2012*]
(a) 80 (b) 150
(c) 400 (d) 125

67. In the annual examination Mahuya got 10% less marks than Supriyo in Mathematics. Mahuya got 81 marks. The marks of Supriyo is [*SSC 10+2-2013*]
(a) 89 (b) 90
(c) 87 (d) 88

68. Ram's income is greater than Shyam's income by 20%. Then the percent by which Shyam's income is less than Ram's income is [*SSC 10+2-2013*]
(a) $16\frac{2}{3}$ (b) $18\frac{2}{5}$
(c) $10\frac{1}{5}$ (d) $12\frac{1}{3}$

69. 1% of 1% of 25% of 1000 is [*SSC 10+2-2014*]
(a) .025 (b) .0025
(c) .25 (d) .000025

4. In a city, 35% of the population is composed of migrants, 20% of whom are from rural areas. Of the local population, 48% is female while this figure for rural and urban migrants is 30% and 40% respectively. If the total population of the city is 728400, what is its female population ?
(a) 324138 (b) 349680
(c) 509940 (d) None of these

5. Madan pays income tax at the rate of 10%. If his income increased by 10% and his tax rate increases to 15%. his net income would increase by ₹ 350. What is Madan's income ?
(a) ₹ 8000 (b) ₹ 10,000
(c) ₹ 12,000 (d) ₹ 14,000

6. The digit at unit place of a two-digit number is increased by 100% and the digit at ten places of the same number is increased by 50%. The new number thus formed is 19 more than the original number. What is the original number?
(a) 22 (b) 63
(c) 24 (d) None of these

7. Chunilal invests 65% in machinery, 20% in raw material and still has ₹ 1,305 cash with him. Find his total investment.
(a) ₹ 6,500 (b) ₹ 7, 225
(c) ₹ 8,500 (d) None of these

8. The price of oil is increased by 25%. If the expenditure is not allowed to increase, the ratio between the reduction in consumption and the original consumption is
(a) 1 : 3 (b) 1 : 4
(c) 1 : 5 (d) 1 : 6

9. A scooter costs ₹ 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 is the value of the scooter at the end of 3 years?
(a) ₹ 10,000 (b) ₹ 12,500
(c) ₹ 12,800 (d) ₹ 12,000

10. If the price of sugar rises from ₹ 6 per kg to ₹ 7.50 per kg, a person, to have no increase in his expenditure on sugar, will have to reduce his consumption of sugar by
(a) 15% (b) 20%
(c) 25% (d) 30%

11. The sum of two numbers is $\frac{28}{25}$ of the first number. The second number is what percent of the first?
(a) 12% (b) 14%
(c) 16% (d) 18%

12. A positive number is by mistake divided by 6 instead of being multiplied by 6. What is the % error on the basis of correct answer?
(a) 3 (b) 97
(c) 17 (d) 83

13. p is six times as large as q. The percent that q is less than p, is :
(a) $16\frac{2}{3}$ (b) 60
(c) $83\frac{1}{3}$ (d) 90

14. 5% of income of A is equal to 15% of income of B and 10% of income of B is equal to 20% of income of C. If C's income is ₹ 2000, then the total income of A, B and C is :
(a) ₹ 6000 (b) ₹ 14,000
(c) ₹ 18,000 (d) ₹ 20,000

15. By reduction of 20% in the price of oranges, one can purchase 5 oranges more for ₹ 2.50. Find the reduced price of the oranges per dozen. Find also the original price.
(a) 120 paise, 140 paise (b) ₹ 0.8, ₹ 1.5
(c) ₹ 1.0, ₹ 1.5 (d) ₹ 1.2., ₹ 1.5

16. In a factory, producing parts of an automobile, the parts manufactured on the shop floor are required to go through quality checks, each conducted after a specific part of the processing on the raw material is completed. Only parts that are not rejected at one stage are put through subsequent stages of production and testing. If average rejection rates at these three testing stages during a month are 10%, 5% and 2% respectively, then what is the effective rejection rate for the whole plant ?
(a) 17% (b) 15.20%
(c) 84.80% (d) 16.21%

17. In some quantity of ghee, 60% is pure ghee and 40% is vanaspati. If 10 kg of pure ghee is added, then the strength of vanaspati ghee becomes 20%. The original quantity was :
(a) 10 kg (b) 15 kg
(c) 20 kg (d) 25 kg

18. The strength of a school increases and decreases every alternate year. It starts with increase by 10% and there-after the percentage of increase/decrease is the same. Which of the following is definitely true about the strength of the school in 2001as compared to that in 1996?
(a) Increase approximately by 8%
(b) Decrease approximately by 8%
(c) Increase approximately by 20%
(d) Decrease approximately by 20%

19. A = 10% of x, B = 10% of y, C = 10% of x + 10% of y. On the basis of the above equalities, what is true in the following?
(a) A is equal to B
(b) A is greater than B
(c) B is greater than A
(d) Relation cannot be established between A and B

20. Sumitra has an average of 56% on her first 7 examinations. How much should she make on her eighth examination to obtain an average of 60% on 8 examinations?
(a) 88% (b) 78%
(c) 98% (d) Cannot be determined

21. Due to an increase of 30% in the price of eggs, 3 eggs less are availabe for ₹ 7.80. The present rate of eggs per dozen is :
(a) ₹ 8.64 (b) ₹ 8.88
(c) ₹ 9.36 (d) ₹ 10.40

22. A speaks truth in 75% and B in 80% cases. In what percentage of cases are they likely to contradict each other when narrating the same incident?
(a) 35 (b) 30
(c) 25 (d) 20

23. A's income is 60% of B's income, and A's expenditure is 70% of B's expenditure. If A's income is 75% of B's expenditure, find the ratio of A's savings to B's savings.
(a) 5 : 1 (b) 1 : 5
(c) 3.5 : 1 (d) 2 : 7

24. In a market survey, 20% opted for product *A* whereas 60% opted for product *B*. The remaining individuals were not certain. If the difference between those who opted for product *B* and those who were uncertain was 720, how many individuals were covered in the survey ?
(a) 1440 (b) 1800
(c) 3600 (d) Data inadequate

25. The income of *A* is 150% of the income of *B* and the income of *C* is 120% of the income of *A*. If the total income of *A*, *B* and *C* together is ₹ 86000, what is *C*'s income ?
(a) ₹ 30000 (b) ₹ 32000
(c) ₹ 20000 (d) ₹ 36000

26. Of the 1000 inhabitants of a town, 60% are males of whom 20% are literate. If, of all the inhabitants, 25% are literate, then what percent of the females of the town are literate ?
(a) 22.5 (b) 27.5
(c) 32.5 (d) 37.5

27. When 60% of a number A is added to another number B, B becomes 175% of its previous value. Then which of the following is true regarding the values of A and B?
(a) A > B
(b) B > A
(c) B ≥ A
(d) Either (a) or (b) can be true depending upon the values of A and B

28. In the month of January, the Railway Police caught 4000 ticketless travellers. In February, the number rise by 5%. However, due to constant vigil by the Police and the Railway staff, the number reduced by 5% and in April it further reduced by 10%. The total number of ticketless travellers caught in the month of April was:
(a) 3125 (b) 3255
(c) 3575 (d) 3591

29. The ratio of Jim's salary for October to his salary for November was 1.5 : 1.333 and the ratio of the salary for November to that for December was 2 : 2.6666. The worker got 40 rupees more for December than for October and received a bonus constituting 40 per cent of the salary for three months. Find the bonus. (Assume that the number of workdays is the same in every month.)
(a) 368.888 rupees (b) 152.5555 rupees
(c) 222.22 rupees (d) 265.6 rupees

30. King Dashratha, at his eleventh hour, called his three queens and distributed his gold in the following way: He gave 50% of his wealth to his first wife, 50% of the rest to his second wife and again 50% of the rest to his third wife. If their combined share is worth 1,30,900 kilograms of gold, find the quantity of gold King Dashratha was having initially?
(a) 1,50,000 kg (b) 1,49,600 kg
(c) 1,51,600 kg (d) 1,52,600 kg

31. After three successive raises, Aftab's salary became equal to $\frac{378}{125}$ of his initial salary. By what percentage was the salary raised the first time if the third rise was twice as high (in percentage) as the second rise was twice as high (in percentage) as the first rise?
(a) 10% (b) 15%
(c) 20% (d) 25%

32. In an assembly election at Surat, the total turnout was 80% out of which 16% of the total voters on the voting list were declared invalid. Find which of the following can be the percentage votes got by the winner of the election if the candidate who came second got 20% of the total voters on the voting list. (There were only three contestants, only one winner and the total number of voters on the voters' list was 20000.)
(a) 44.8% (b) 46.6%
(c) 48% (d) None of these

33. In the university examination last year, Rajesh scored 65% in English and 82% in History. What is the minimum percent he should score in Sociology. Which is out of 50 marks (if English and History were for 100 marks each), if he aims at getting 78% overall?
(a) 94% (b) 92%
(c) 98% (d) 96%

34. In an election of 3 candidates *A*, *B* and *C*, *A* gets 50% more votes than *B*. *A* also beats *C* by 1,80,00 votes. If it is known that B gets 5 percentage more votes than *C*, find the number of voters on the voting list (given 90% of the voters on the voting list voted and no votes were illegal)
(a) 72,000 (b) 81,000
(c) 90,000 (d) 1,00,000

35. A number is mistakenly divided by 5 instead of being multiplied by 5. Find the percentage change in the result due to this mistake.
(a) 96% (b) 95%
(c) 2400% (d) 200%

36. Ambani, a businessman, started off a business with very little capital. In the first year, he earned a profit of 50% and donated 50% of the total capital (initial capital + profit) to a charitable organisation. The same course was followed in the 2nd and 3rd years also. If at the end of three years he is left with ₹ 16, 875, then find the amount donated by him at the end of the 2nd year.
(a) ₹ 45, 000 (b) ₹ 12, 500
(c) ₹ 22, 500 (d) ₹ 20, 000

37. Arushi's project report consists of 25 pages each of 60 lines with 75 characters on each line. In case the number of lines is reduced to 55 but the number of characters is increased to 90 per lines, what is the percentage change in the number of pages. (Assume the number of pages to be a whole number.)
(a) +10% (b) +5%
(c) −8% (d) −10%

38. Recently I had gone to a locality called Shadigarh for conducting a survey about the number of married persons in the locality. The population of the locality is 7,200 and $\frac{11}{18}$ th of those are males and the rest females. If 40% of the males are married, find percentage of married females in the locality

(a) $48\frac{1}{7}\%$ (b) $52\frac{4}{7}\%$

(c) $62\frac{6}{7}\%$ (d) $71\frac{1}{7}\%$

39. Chintu is given a quadratic equation $ax^2 + bx + c = 0$ and is asked to make another quadratic equation from this with $a = 1$. Also one root of the second quadratic equation is same as one of the roots of the first equation but opposite in sign and the other root of the second equation is two times the second root of the first equation. Find the percentage change in the constant term of the second equation as compared to the first equation?

(a) 200% increase (b) 300% decrease

(c) 400% increase (d) 100% decrease

40. A salesgirl's terms were changed from a flat commission of 5% on all her sales to a fixed salary of ₹ 1000 plus 2.5% commission on all sales exceeding ₹4000. If her remuneration as per the new scheme was ₹600 more than that by the previous scheme, her total sales was [*SBI PO-2011*]

(a) ₹10000 (b) ₹5000

(c) ₹2000 (d) ₹12000

(e) None of these

41. Six-eleventh of a number is equal to twenty-two percent of second number. Second number is equal to the one-fourth of third number. The value of the third number is 2400. What is the 45% of first number? [*IBPS-PO-2011*]

(a) 109.8 (b) 111.7

(c) 117.6 (d) 123.4

(e) None of these

42. An HR Company employes 4800 people, out of which 45 percent are males and 60 percent of the males are either 25 years or older. How many males are employed in that HR Company who are younger than 25 years ? [*IBPS-PO-2011*]

(a) 2640 (b) 2160

(c) 1296 (d) 864

(e) None of these

43. In a test, a candidate secured 468 marks out of maximum marks 'A'. If the maximum marks 'A' were converted to 700 marks, he would have secured 336 marks. What were the maximum marks of the test? [*IBPS-PO-2011*]

(a) 775 (b) 875

(c) 975 (d) 1075

(e) None of these

44. Sum of three consecutive numbers is 2262. What is 41 % of the highest number ? [*IBPS-PO-2012*]

(a) 301.51 (b) 303.14

(c) 308.73 (d) 306.35

(e) 309.55

45. Akash scored 73 marks in subject A. He scored 56% marks in subject B and X marks in subject C. Maximum marks in each subject were 150. The overall percentage marks obtained by Akash in all the three subjects together were 54%. How many marks did he score in subject C ? [*IBPS-PO-2012*]

(a) 84 (b) 86

(c) 79 (d) 73

(e) None of these

46. In an examination, Raman scored 25 marks less than Rohit. Rohit scored 45 more marks than Sonia. Rohan scored 75 marks which is 10 more than Sonia. Ravi's score is 50 less than, maximum marks of the test. What approximate percentage of marks did Ravi score in the examination, if he gets 34 marks more than Raman? [*IBPS-PO-2013*]

(a) 90 (b) 70

(c) 80 (d) 60

(e) 85

47. Mr Giridhar spends 50% of his monthly income on household items and out of the remaining he spends 50% on transport, 25% on entertainment, 10% on sports and the remaining amount of ₹ 900 is saved. What is Mr Giridhar's monthly income? [*IBPS-PO-2013*]

(a) ₹6000 (b) ₹12000

(c) ₹9000 (d) Cannot be determined

(e) None of these

48. Rakesh got 273 marks in an examination and scored 5% more than the pass %. If Lokesh got 312 marks, then by what % above the pass mark did he pass the examination? [*SSC CGL-2013*]

(a) 20% (b) 27%

(c) 25% (d) 15%

49. The monthly salaries of A and B together amount to ₹ 40,000. A spends 85% of his salary and B, 95% of his salary. If now their savings are the same, then the salary (in ₹) of A is [*SSC CGL-2014*]

(a) 10,000 (b) 12,000

(c) 16,000 (d) 18,000

50. One litre of water is evaporated from 6 litres of a solution containing 5% salt. The percetange of salt in the remaining solution is [*SSC CGL-2014*]

(a) $4\frac{4}{9}\%$ (b) $5\frac{5}{7}\%$

(c) 5% (d) 6%

Hints & Solutions

Level-I

1. (d) Let X be the number of new science books. Then,
Total Science books / Total books = 45%.

$$\Rightarrow \frac{\left(X+110000\times\frac{40}{100}\right)}{(20000+10000)}=\frac{45}{100}\Rightarrow X=14500.$$

2. (b) Number of runs made by running
$= 110 - (3 \times 4 + 8 \times 6) = 50.$

$$\therefore \quad \text{Required percentage} = \left(\frac{50}{110}\times 100\right)\%$$

$$= 45\frac{5}{11}\%$$

3. (a) Total marks secured = (90% of 100 + 60% of 150 + 54% of 200)

$$= \left(\frac{90}{100}\times 100+\frac{60}{100}\times 150+\frac{54}{100}\times 200\right)$$

$= (90 + 90 + 108) = 288.$
Total maximum marks $= (100 + 150 + 200) = 450.$

$$\therefore \quad \text{Aggregate Percentage} = \left(\frac{288}{450}\times 100\right)\% = 64\%$$

4. (d) Let the third number be 100. Then, the first and second numbers will be 20 and 50, respectively.

$$\text{Required \%} = \frac{20}{50}\times 100 = 40\%$$

5. (a) Let the total number of applicants be x. Number of eligible candidates = 95% of x. Eligible candidates of other categories = 15% of (95% of x)

$$= \left(\frac{15}{100}\times\frac{95}{100}\right)\times x = \frac{57}{400}x$$

$$\therefore \quad \frac{57}{400}x = 4275 \Leftrightarrow x = \left(\frac{4275\times 400}{57}\right) = 30000$$

6. (c) Let the salary of Deepa be ₹ x.
Then, 80% of 8% of x = 2240

$$\Rightarrow \quad \frac{80}{100}\times\frac{8}{100}\times x = 2240$$

$$\Rightarrow \quad x = \frac{2240\times 100\times 100}{80\times 8} = 35000$$

Hence, the salary of Deepa = ₹ 35000

7. (a) Let the original price be x and sale be of y units.
Then, the revenue collected initially $= x \times y$

Now, new price $= 0.8x$, new sale $= 1.8y$
Then, new revenue collected $= 1.44xy$

$$\text{\% increase in revenue} = \frac{0.44xy}{xy}\times 100$$

$= 44\%$ increase

8. (a) % reduction in consumption

$$= \frac{\text{\% change in price}}{100 + \text{\% change in price}}\times 100$$

$$= \frac{7}{100+7}\% = \frac{7}{107}\%$$

9. (c) Let his sales be worth ₹ x. Then,
$1000 + 2.5\%$ of $(x - 4000) = 5\%$ of $x + 600$

$$\Rightarrow \frac{5x}{100}-\frac{2.5(x-4000)}{100} = 1000-600$$

$$\Rightarrow 2.5x + 10000 = 40{,}000$$

$$\Rightarrow x = \frac{30{,}000}{2.5} = 12{,}000$$

10. (c) Let the inspector examined x metres,
then 0.08% of $x = 2$

$$\Rightarrow \frac{x\times 0.08}{100} = 2$$

$$\text{or} \quad x = \frac{200}{0.08} = 2500 \text{ metres}$$

11. (a) Let the investment of C = ₹ 100
Then B's investment = ₹ 90 and A's investment = ₹ 99
Sum of investment = ₹ (100 + 90 + 99) = ₹ 289

Hence, C's actual investment = ₹ $\left(\frac{14450\times 100}{289}\right)$

= ₹ 5000

12. (a) Let B get ₹ x. Then C gets = 75% of $x = \frac{3x}{4}$

and A gets = 120% of $\frac{3x}{4} = \frac{120}{100}\times\frac{3x}{4} = \frac{9x}{10}$

Now, $\frac{9x}{10}+\frac{3x}{4}+x = 4558$

$$\Rightarrow \frac{53x}{20} = 4558 \Rightarrow x = \frac{4558\times 20}{53} = 1720$$

Hence, A's share = $\frac{9x}{10}$ = ₹ $\frac{9\times 1720}{10}$ = ₹ 1548

13. (b) Let the total number of votes enrolled be x. Then,
Number of votes cast = 75% of x. Valid votes = 98% of (75% of x).
$\therefore$ 75% of [98% of (75% of x)] = 9261

$$\Rightarrow \left(\frac{75}{100}\times\frac{98}{100}\times\frac{75}{100}\times x\right) = 9261$$

$$\Rightarrow x = \left(\frac{9261\times 100\times 100\times 100}{75\times 98\times 75}\right) = 16800.$$

14. (d) Height climbed in second hour

$$= 12\frac{1}{2}\% \text{ of } \left(100-62\frac{1}{2}\right)\% \text{ of } 192 \text{ m}$$

$$= \left(\frac{25}{2}\times\frac{1}{100}\times\frac{75}{2}\times\frac{1}{100}\times 192\right) m = 9 \text{ m}.$$

15. (b) Let the original number be 100.
Then, the new number $= 100 \times 1.1 \times 0.9 = 99$

$\therefore$ Reqd. ratio of population of males and females

$$= \frac{4000}{9000-4000} = \frac{4000}{5000} = 4:5$$

21. (d) Let salary of Saroj be ₹ x.

$$\therefore \text{ Salary of Raju} = \frac{80}{100}x$$

$$\text{Salary of Ram} = \frac{70}{100}x$$

$$\text{Required percentage} = \left(\frac{\frac{80x}{100}-\frac{70x}{100}}{\frac{70x}{100}}\right)\times 100$$

$$= \frac{10x}{76x}\times 100 = \frac{100}{7} = 14.28\%$$

22. (d) Let the family consumes 1 kg wheat
To keep expenditure at Rs. 24, its new consumption

13. (b) Let the total number of votes enrolled be x. Then,
Number of votes cast = 75% of x. Valid votes = 98% of (75% of x).
$\therefore$ 75% of [98% of (75% of x)] = 9261

$$\Rightarrow \left(\frac{75}{100}\times\frac{98}{100}\times\frac{75}{100}\times x\right)=9261$$

$$\Rightarrow x=\left(\frac{9261\times100\times100\times100}{75\times98\times75}\right)=16800.$$

14. (d) Height climbed in second hour

$$=12\frac{1}{2}\%\text{ of }\left(100-62\frac{1}{2}\right)\%\text{ of }192\text{ m}$$

$$=\left(\frac{25}{2}\times\frac{1}{100}\times\frac{75}{2}\times\frac{1}{100}\times192\right)m=9\text{ m}.$$

15. (b) Let the original number be 100.
Then, the new number = $100\times1.1\times0.9=99$
i.e. the number decreases by 1%.

16. (c) Work with option, $\left(\frac{5}{4}\right)x-\left(\frac{7}{10}\right)x=22$

Only $x=40$ fulfil the above equation.

17. (c) Let the total sales be ₹ x. Then, $5\frac{1}{2}\%$ of $x+\frac{1}{2}\%$ of $(x-10000)=1990$

$$\Leftrightarrow \frac{11}{2}\times\frac{1}{100}\times x+\frac{1}{2}\times\frac{1}{100}\times(x-10000)=1990$$

$$\Leftrightarrow 12x-10000=398000\Leftrightarrow 12x=408000$$

$$\Leftrightarrow x=34000$$

18. (a) Let the number be x,

Then, $\frac{12}{100}\times\frac{75}{100}\times x-\frac{5}{100}\times x=75$

$$\Rightarrow \frac{9x}{100}-\frac{5x}{100}=75\Rightarrow\frac{4x}{100}=75$$

$$\Rightarrow x=\frac{75\times100}{4}=1875$$

19. (a) $\because$ Amount, he have spent in 1 month on clothes transport = Amount spent on saving per month
$\therefore$ Amount, spent on clothes and transport

$$=\frac{48456}{12}=₹4038$$

20. (a) Let the population of males = x; then the population of females = $9000-x$
Now, 5% of x + 8% of $(9000-x)$
$=(9600-9000)=600$
or $0.05x+720-0.08x=600$
or $720-600=0.08x-0.05x$
or, $120=0.03x$
$\therefore$ $x=4000$

$\therefore$ Reqd. ratio of population of males and females

$$=\frac{4000}{9000-4000}=\frac{4000}{5000}=4:5$$

21. (d) Let salary of Saroj be ₹ x.

$\therefore$ Salary of Raju = $\frac{80}{100}x$

Salary of Ram = $\frac{70}{100}x$

$$\text{Required percentage}=\left(\frac{\frac{80x}{100}-\frac{70x}{100}}{\frac{70x}{100}}\right)\times100$$

$$=\frac{10x}{76x}\times100=\frac{100}{7}=14.28\%$$

22. (d) Let the family consumes 1 kg wheat
To keep expenditure at Rs. 24, its new consumption should be $\frac{24}{27}=\frac{8}{9}$ kg

$\therefore$ Percentage decrease in consumption

$$=\frac{\left(1-\frac{8}{9}\right)}{1}\times100=11.1\%$$

Alternative method :

$$\text{Required }\%=\frac{27-24}{27}\times100=11.1\%$$

23. (d) Let the first man's output be x.

Then, $33\frac{1}{3}\%$ of $x=50\%$ of $1500\Leftrightarrow\left(\frac{100}{3}\times\frac{1}{100}\times x\right)$
$=750\Leftrightarrow x=750\times3=2250.$

24. (b) Solve using options. 2/25 fits the requirement.

25. (c) $10\times100=1000$, 100 = no. of visitors
Now, 7.5 × No. of visitors = 1200
No. of visitors = 160

$$\text{Increase }\%=\frac{160-100}{100}\times100=60\%$$

26. (c) Let the inspector examined x metres,
then 0.08% of $x=2$

$$\Rightarrow \frac{x\times0.08}{100}=2$$

$$\text{or}\quad x=\frac{200}{0.08}=2500\text{ metres}$$

27. (d) Let the original fraction be $\frac{x}{y}$

Then, $\frac{115\%\text{ of }x}{92\%\text{ of }y}=\frac{15}{16}\Rightarrow\frac{115x}{92y}=\frac{15}{16}$

$$\Rightarrow \frac{x}{y}=\left(\frac{15}{16}\times\frac{92}{115}\right)=\frac{3}{4}$$

28. (d) Let the class has 100 students.
$\Rightarrow$ Number of girls = 35 and number of boys = 65.
Since total number of present students = 70 and number of girls present = 80% of 35 = 28, so number of boys present = 70 − 28 = 42.
$\Rightarrow$ Required fraction = 42/65.

29. (b) Let 100 units be B's income and X units be B's expenditure
$\Rightarrow$ A's income = 60 units.
A's expenditure = 70X/100 units.
But $60=75/100\text{ x X}\Rightarrow X=80$.
i.e., B's saving = (100 − 80) units = 20 units.

33. (d) Weight of water in the mixture of 60 g water

$$=60\times\frac{75}{100}=45\text{g}$$

weight of water in the mixture of 45 g water
= 45 + 15 = 60 g

$\therefore$ Percentage of water = $\frac{60\times100}{75}=80\%$

34. (a) Servant's commission amount
= 6000 − 1500 = ₹ 4500
i.e., 15% = 4500

$$\text{or,}\quad 100\%=\frac{4500}{15}\times100=₹30000$$

35. (d) Let the total number of children = x

Then, $\frac{720}{x}=20\%\text{ of }x=\frac{20}{100}\times x=\frac{x}{5}$

$$\Rightarrow x^2=720\times5=3600$$

$$\Rightarrow x=60$$

Then, $\frac{115\% \text{ of } x}{92\% \text{ of } y} = \frac{15}{16} \Rightarrow \frac{115x}{92y} = \frac{15}{16}$

$\Rightarrow \frac{x}{y} = \left(\frac{15}{16} \times \frac{92}{115}\right) = \frac{3}{4}$

28. (d) Let the class has 100 students.
$\Rightarrow$ Number of girls = 35 and number of boys = 65.
Since total number of present students = 70 and number of girls present = 80% of 35 = 28, so number of boys present = 70 – 28 = 42.
$\Rightarrow$ Required fraction = 42/65.

29. (b) Let 100 units be B's income and X units be B's expenditure
$\Rightarrow$ A's income = 60 units.
A's expenditure = 70X/100 units.
But 60 = 75/100 x X $\Rightarrow$ X = 80.
i.e., B's saving = (100 – 80) units = 20 units.

Hence A's saving = $60 - \frac{70}{100} \times 80 = 4$ units.

i.e., A's saving : B's saving = 4 : 20 = 1 : 5.

30. (a) Decrease in production is only due to decrease in manpower. Hence, manpower is decreased by 25%
Now, suppose that to restore the same production, working hours are increased by x%
Production = Manpower × Working hours
= M × W (say)
Now, M × W = (M –25% of M) × (W + x% of W)

or, $M \times W = \frac{75}{100} M \times \frac{100+x}{100} W$

or, $100 \times 100 = 75\,(100 + x)$

or, $\frac{400}{3} = 100 + x \quad \therefore \quad x = \frac{100}{3} = 33\frac{1}{3}\%$

31. (b) Let original number = 100
New number = 120% of 120% of 100

$= \left(\frac{120}{100} \times \frac{120}{100} \times 100\right) = 144.$

Decrease on 144 = 44. Decrease on 100

$= \left(\frac{44}{144} \times 100\right)\% = 30\frac{5}{9}\%$

32. (d) Number of ticketless travellers in April

$= 4000 \times \left(1 + \frac{5}{100}\right)\left(1 - \frac{5}{100}\right)\left(1 - \frac{10}{100}\right)$

$= \left(4000 \times \frac{21}{20} \times \frac{19}{20} \times \frac{9}{10}\right) = 3591.$

33. (d) Weight of water in the mixture of 60 g water

$= 60 \times \frac{75}{100} = 45$g

weight of water in the mixture of 45 g water
= 45 + 15 = 60 g

$\therefore$ Percentage of water = $\frac{60 \times 100}{75} = 80\%$

34. (a) Servant's commission amount
= 6000 – 1500 = ₹ 4500
i.e., 15% = 4500

or, $100\% = \frac{4500}{15} \times 100 = ₹\,30000$

35. (d) Let the total number of children = x

Then, $\frac{720}{x} = 20\%$ of $x = \frac{20}{100} \times x = \frac{x}{5}$

$\Rightarrow \quad x^2 = 720 \times 5 = 3600$

$\Rightarrow \quad x = 60$

$\therefore$ Each child receive = $\frac{720}{60} = 12$ sweets

36. (a) Suppose price of the printer = P
$\therefore$ Price of a computer = 3 P
Total cost of 60 computers = 180 P
Total cost of 20 printers = 20 P
$\therefore$ Total cost of the purchase = 200 P
Thus total cost of the printers is 10% of the total cost.

37. (d) Population after 2000 = 3244800
Population after 2001 = 2985216
Population at the end of 2003 = 3228810

38. (c) Non-defective products

$\frac{25 \times 0.98 + 35 \times 0.96 + 40 \times 0.95}{100} \times 100 = 96.1\%$

39. (a) On ₹ 100 he saves ₹ 6. On 115 he still saves ₹ 6.
percentage increase of 15 on 94 = 15.95%

40. (c)

Half yearly exam

100

Pass (70) Fail (30)

Annual exam

$\underbrace{70 \times 0.6}_{42} + \underbrace{30 \times 0.8}_{24}$

$\therefore$ Total pass in annual exam = 42 + 24 = 66

41. (a) Solution = 100 ml and Alcohol = 40 ml
For first vessel

$\frac{40+x}{100+x} = \frac{1}{2},$

so, x = 20ml

For second vessel

$$\frac{40+\frac{3}{5}y}{100+\frac{2}{5}y}=\frac{1}{2},$$

so, $y = 25$ml

Required percentage $= \frac{5}{25}\times 100 = 20\%$

42. (d) Total land of Sukhiya $= \frac{480x}{0.6} = 800\ x$

$\therefore$ Cultivated land of village $= 384000\,x$

$\therefore$ Required percentage $= \frac{800x}{384000}\times 100 = 0.20833.$

43. (b) Total votes = 6000. Valid votes = 75% of 6000 = 4500. Bhiku gets 65% of 4500 votes and Mhatre gets 35% of 4500. Hence, Mhatre gets: $0.35 \times 4500 = 1575$ votes.

44. (b) Solve using options. Checking for option (b), gives us:
$200000 \to 180000 \to 171000 \to 153900 \to 146205$
(by consecutively decreasing 200000 by 10% and 5% alternately)

45. (a) Solve through trial and error using the options. 12% (option (a)) is the only value that fits the situation.

46. (d) Salary of Dheeraj = ₹ 100
Salary of Anil = ₹ 80
Salary of Vinit = ₹ 70

Required percent $= \frac{10}{70}\times 100 = 14.28\%$

47. (d) Let population = 100
At least 50 people read a newspaper
At most 12.5 people read more than a newspaper
Hence, at least 37.5 people read only one newspaper.

48. (a) Let monthly income be y
Let money spent on grocery, clothes and education be $4x, 2x, 5x$
Money spent of clothes = ₹ 5540 = $2x$
$x = 2770$
Now $4x + 2x + 5x = 11x = 11 \times 2770$
$= 30470 = 55\%$ of y

$y = \frac{30470 \times 100}{55}$

$y =$ ₹ 55,400

49. (e) Let the two number be x and y.
$35\%\,x = 2 \times 75\%\,y$
$35\%\,x = 150\%\,y$

$\frac{35}{100}\times x = \frac{150}{100}\times y$

$35x = 150y$

$\frac{x}{y} = \frac{\cancel{150}^{30}}{\cancel{35}^{7}}$, $x : y = 30 : 7$

50. (a) No. of boys, last year = 610
20% of 610 = 122
No. of boys, current year = 610 – 122 = 488
No. of girls = 175% of 488

$= \frac{175 \times 488}{100} = 854$ girls

51. (c) Let maximum marks of test = x
Vidya marks = 350 + 296 = 646 = 76% of x

$x = \frac{646 \times 100}{76} = 850$

52. (e) Let initial marks of student = x
After Re-evaluation marks reduced by 40% of x
New score = 60% of x = 96

$= \frac{60}{100}\times x = 96$

$x = \frac{96 \times 100}{60}$

$x = 160$
Marks lose = 160 – 96 = 64.

53. (e) No. of candidates selected for job = 20% of 855

$= \frac{20 \times 855}{100} = 171$

54. (d) Total cost price = $200 \times 10 =$ ₹ 2000
Total selling price = $12 \times 195 =$ ₹ 2340

$\therefore$ Profit per cent $= \frac{2340 - 2000}{2000}\times 100 = 17\%$

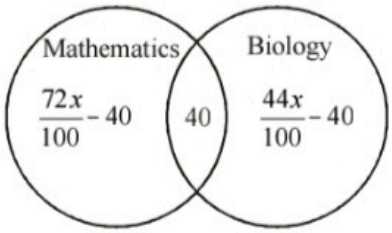
55. (a) Saving percentage = (100 – 55) % = 45%
If the income of Ajay be ₹ x, then,

$\frac{45 \times x}{100} = 27000$

$\Rightarrow x = \frac{27000 \times 100}{45} =$ ₹ 60000

56. (c) Salary in May 2000 = ₹ 15000
Salary in July 2000 $\Rightarrow$ 15000 + 10% of 15000 = ₹ 16500
Salary in October 2001 = 16500 + 10% of 16500 = ₹ 18150

57. (c) Let the total number of students in the class be x.



$\because \frac{72x}{100}-40+40+\frac{44x}{100}-40=x$

$\Rightarrow \frac{72x}{100}x+\frac{44x}{100}-x=40$

$\Rightarrow \frac{16x}{100}=40 \Rightarrow x=\frac{40\times100}{16}$

$\Rightarrow x=250$

58. (c) If the number of trees in the garden be x, then

$x\times\frac{60}{100}\times\frac{25}{100}\times\frac{20}{100}=1500$

$\Rightarrow x\times\frac{3}{5}\times\frac{1}{4}\times\frac{1}{5}=1500$

$\Rightarrow x=\frac{1500\times5\times4\times5}{3}=50000$

59. (b) $\frac{P-Q}{2}=(P+Q)\times\frac{30}{100}$

$\Rightarrow 5(P-Q)=(P+Q)\times3$

$\Rightarrow 5P-3P=5Q+3Q$

$\Rightarrow 2P=8Q \Rightarrow P=4Q$

$Q=\frac{x}{100}\times P$

$Q=\frac{x}{100}\times 4Q$

$\Rightarrow \frac{4x}{100} \Rightarrow x=25$

60. (d) Let the total number of students be x.

Let A and B represent the sets of students who passed in English and Mathematics respectively.

Then, number of students passed in one or both the subjects

$=n(A\cup B)=n(A)+n(B)-n(A\cap B)$

$=75\%\text{ of }x+60\%\text{ of }x-(x-25\%\text{ of }x)$

$=\frac{3}{4}x+\frac{3}{5}x-\frac{3}{4}x=\frac{3}{5}x$

So, $\frac{3}{5}x=240$

$x=\frac{240\times5}{3}=400$

61. (b) $\frac{40}{100}\times\frac{4}{5}\times\frac{3}{4}\times x=48$

$\frac{6}{25}x=48$

$x=\frac{48\times25}{6}=200$

1% of 200 is 2.

62. (d) % of votes secured by second candidate $=(100-57)=43\%$

Let total votes polled be x.

According to question,

$(57-43)\%$ of $x=42000$

14% of $x=42000 \Rightarrow x=3{,}00{,}000$

63. (c) Let the number is x.

According to question

$x-10\%$ of $x=30$

$x-\frac{10}{100}x=30$

$\left(\frac{100-10}{100}\right)x=30$

$x=\frac{30\times100}{90}=33\frac{1}{3}$

Hence, the number is $33\frac{1}{3}$

64. (c) Required percentage $=\frac{24}{40}\times100=60\%$

65. (a) $\frac{125}{100}\times x=100$

$\Rightarrow x=\frac{100\times100}{125}=80$

66. (b) Marks of Supriyo $=x$ marks

Accoding to question

Mahuya marks = Supriyo marks – 10% of Supriyo marks

$81=x-10\%\text{ of }x \Rightarrow x\left(1-\frac{10}{100}\right)$

$81=\frac{9}{10}x \Rightarrow \frac{810}{9}=x$

$\therefore x = 90$ marks

67. (a) $R=S+0.2S=1.2S$

$\left(\frac{R-S}{R}\right)\times100=\left(1-\frac{S}{R}\right)\times100$

$=\left(1-\frac{1}{1.2}\right)\times100$

$=\frac{100}{6}=\frac{50}{3}=16\frac{2}{3}$

68. (a) $\frac{1}{100}\times\frac{1}{100}\times\frac{25}{100}\times1000=0.025$

Level-II

1. (b) We have 5.5% of 100000
= Rent – 12.5% of Rent – 325.

$$\Rightarrow \frac{5500}{12} = \text{Rent} - \frac{\text{Rent}}{8} - \frac{325}{12}$$

$$\Rightarrow \frac{5500}{12} + \frac{325}{12} = \frac{7}{8} \times \text{Rent}.$$

$$\Rightarrow \text{Rent} = \frac{5500}{12} \times \frac{8}{7} = ₹554.76 \text{ per month.}$$

2. (c) **First expenditure:** Suppose 100 litres of petroleum at 100 units of money per litre, then total expenditure = 100 × 100 units of money = 10000 units of money.
Second expenditure: Now 80 litres of petroleum at 140 units of money per litre, total expenditure = 80 × 140 units of money = 11200 units.
⇒ Expenditure increases by

$$\frac{11200 - 10000}{10000} \times 100 = 12\%$$

Short-cut: $\text{Exp}_1 = PX, \text{Exp}_2 = 1.4P(0.8X) = 1.12PX.$
⇒ Directly we see, answer = 12%.

3. (a) A's marks $= 300 \times \frac{33\frac{1}{3}}{100} = 100.$

B's marks = 100 × (1 + 40/100) = 140.
⇒ C is ahead of B by 2/9 of his own marks i.e.
7/9 of C's marks = 140
⇒ C's marks = 140 × 9/7 = 180.

4. (d) Migrants = 35% of 728400 $= \left(\frac{35x}{100} \times 728400\right)$

= 254940.
Local population = (728400 – 254940) = 473460
Rural population = 20% of 473460 = 94692.
Urban population = (254940 – 94692) = 160248.
∴ Female population = 48% of 473460 + 30% of 94692 + 40% of 160248

$$= \left(\frac{48}{100} \times 473460 + \frac{30}{100} \times 94692 + \frac{40}{100} \times 160248\right)$$

= 227260.8 + 28407.6 + 64099.2 = 896660.

5. (b) Let Madan's income be ₹ x.
Then, Net income = (100 – 10)% of ₹ x

$$= 90\% \text{ of } ₹ x = ₹\frac{9x}{10}.$$

New net income = 85% of 110% of ₹ x

$$= ₹\left(\frac{85}{100} \times \frac{110}{100} \times x\right) = ₹\frac{187}{200}x$$

$$\therefore \quad \frac{187x}{200} - \frac{9x}{10} = 350 \Rightarrow \frac{7x}{200} = 350$$

$$\Rightarrow x = \left(\frac{350 \times 200}{7}\right) = 10000.$$

6. (d) Working with options, we have

	Original number	New number	Difference
(a)	22	34	12
(b)	63	96	33
(c)	24	38	14

Obviously, (d) is the correct option.

7. (d) Let he had originally ₹ x. Then
65% of x + 20 % of x + 1305 = x
$0.65x + 0.2x + 1305 = x$
$\Rightarrow 0.15x = 1305 \Rightarrow x = ₹8700$
∴ His total investment = 65% of 8700 + 20% of 8700
= 85% of 8700 = ₹ 7395

8. (c) Let original consumption be 1 unit costing ₹ 100
New cost = ₹125. New consumption

$$= \left(\frac{1}{125} \times 100\right) = \frac{4}{5} \text{ unit.}$$

$$\therefore \quad \frac{\text{Reduction in consumption}}{\text{Original consumption}} = \frac{\left(1 - \frac{4}{5}\right)}{1} = \frac{1}{5}$$

i.e., 1 : 5.

9. (c) After first year, the value of the scooter
= ₹ 20,000
After second year, the value of scooter = ₹ 16,000
After third year, the value of scooter = ₹ 12,800

10. (b) Let original consumption = 100 kg
and new consumption = x kg
So, $100 \times 6 = x \times 7.50 \Leftrightarrow x = 80$ kg
∴ Reduction is consumption = 20%

11. (a) Let the numbers be x and y. Then,

$$x + y = \frac{28}{25}x \Rightarrow y = \frac{28}{25}x - x \Rightarrow y = \frac{3}{25}x$$

$$\Rightarrow \frac{y}{x} = \left(\frac{3}{25} \times 100\right)\% = 12\%.$$

12. (b) Let the number be x. Then,

$$\% \text{ error} = \frac{6x - x/6}{6x} \times 100 = \frac{35}{36} \times 100 = 97.2\%$$

13. (c) $p = 6q$. So, q is less than p by $5q$.

$$\therefore \quad \text{Required percentage} = \left(\frac{5q}{p} \times 100\right)\%$$

$$= \left(\frac{5q}{6q} \times 100\right)\% = 83\frac{1}{3}\%$$

14. (c) $\frac{5}{100}A = \frac{15}{100}B$ and $\frac{10}{100}B = \frac{20}{100}C \Rightarrow A = 3B$ and $B = 2C = 2 \times 2000 = 4000$.

$\therefore$ $A = 3 \times 4000 = 12000$.

Hence, $A + B + C = (12000 + 4000 + 2000) = 18000$.

15. (d) Let original price be ₹ x per orange. Then,

Reduced rate $= (1 - 0.2)x =$ ₹ $0.8x$

$$\therefore \frac{2.50}{0.8x} - \frac{2.50}{x} = 5$$

$$\Rightarrow \frac{25}{8x} - \frac{2.5}{x} = 5 \Rightarrow x = \frac{1}{8}$$

$\therefore$ Original price of oranges per dozen $\frac{1}{8} \times 12 =$ ₹ 1.5

and Reduced price $=$ ₹ $(0.8)(1.5) =$ ₹ 1.2

16. (d) Let the total no. of parts produced at initial stage be 100. Then after three successive percentage rejections of 10%, 5% and 2%, we have

$100 \times 0.9 \times 0.95 \times 0.98 = 83.79$

Therefore, a single effective rejection

$= 100 - 83.79 = 16.21$

17. (a) Let the original quantity be x kg. Vanaspati ghee in

$$x \text{ kg} = \left(\frac{40}{100}x\right) \text{kg} = \left(\frac{2x}{5}\right) \text{kg}.$$

Now, $\frac{\frac{2x}{5}}{x+10} = \frac{20}{100} \Leftrightarrow \frac{2x}{5x+50} = \frac{1}{5} \Leftrightarrow 5x = 50$

$\Leftrightarrow x = 10$

18. (a) Let the strength of school was x in 1998

$\therefore$ strength in 2001 will be

$$= x\frac{110}{100} \times \frac{90}{100} \times \frac{110}{100} \times \frac{90}{100} \times \frac{110}{100} = 1.07811x$$

$\therefore$ increment $= 1.07811x - x = 0.07811x$

$\therefore$ % increase $= 7.811 \approx 8\%$

19. (d) The given information gives no indication regarding the comparison of x and y.

20. (d) Since the weightage of eighth examination is not known, hence can not be determined.

21. (c) Let the original price per egg be ₹ x. Then, increased

$$\text{price} = ₹\left(\frac{130}{100}x\right)$$

$$\therefore \quad \frac{7.80}{x} - \frac{7.80}{\frac{130}{100}x} = 3 \Leftrightarrow \frac{7.80}{x} - \frac{780}{130x} = 3$$

$\Leftrightarrow$ $1014 - 780 = 3 \times 130x \Leftrightarrow 390x = 234$

$\Leftrightarrow$ $x = 0.6$

So, present price per dozen $=$ ₹ $\left(12 \times \frac{130}{100} \times 0.6\right)$

$=$ ₹ 9.36.

22. (a) Let the truth spoken by A and B be p_1 and p_2 respectively, *i.e.*, $p_1 = \frac{3}{4}$ and $p_2 = \frac{4}{5}$

They will contradict each other only when one speaks truth and the other is lying.

i.e., $\frac{3}{4} \times \frac{1}{5} + \frac{4}{5} \times \frac{1}{4} = \frac{3}{20} + \frac{4}{20} = \frac{7}{20} = \frac{35}{100}$ *i.e.*, 35%

23. (b) Let B's Income $=$ ₹ x

A's Income $=$ ₹ $\frac{3}{5}x$

And B's expenditure $=$ ₹ y

A's expenditure $=$ ₹ $\frac{7}{10}$y

Also, $\frac{3}{5}x = \frac{3}{4} \cdot \frac{7}{10}y$

$$\frac{\text{A's savings}}{\text{B's savings}} = \frac{x - y}{\frac{3}{5}x - \frac{7}{10}y} = \frac{\frac{7}{8}y - y}{\frac{3}{5} \cdot \frac{7}{8}y - \frac{7}{10}y} = \frac{-y/8}{\frac{21y}{40} - \frac{7}{10}y}$$

$$= \frac{5}{25} \approx 1:5$$

24. (b) Percentage of uncertain individuals

$= [100 - (20 + 60)]\% = 20\%$

$\therefore$ 60% of x – 20% of $x = 720 \Leftrightarrow$ 40% of $x = 720$

$$\Leftrightarrow \frac{40}{100}x = 720 \Leftrightarrow x = \left(\frac{720 \times 100}{40}\right) = 1800.$$

25. (d) Suppose Income of $B =$ ₹ x

Income of $A = \frac{150}{100} \times x =$ ₹ $\frac{3x}{2}$

Income of $C = \frac{120}{100} \times \frac{3x}{2}$

$\frac{6}{5} \times \frac{3x}{2} = \frac{9x}{5}$

$\therefore$ $x + \frac{3x}{2} + \frac{9x}{5} = 86000$

$\frac{10x + 15x + 18x}{10} = 86000$

$43x = 860000$

$x = 20000$

So, income of C $= \frac{9}{5} \times 20000 =$ ₹ 36000

26. (c) Number of males $= 60\%$ of $1000 = 600$.

Number of females $= (1000 - 600) = 400$.

Number of literates $= 25\%$ of $1000 = 250$.

Number of literate males = 20% of 600 = 120
Number of literate females = (250 – 120) = 130

$\therefore$ Required percentage $= \left(\frac{130}{400}\times 100\right)\% = 32.5\%$

27. (d) B + 60% of A = 175% of B → 60% of A = 75% of B.
i.e. $0.6A = 0.75B$
$A/B = 5/4$
Apparently it seems that A is bigger, but if you consider A and B to be negative the opposite would be true.
Hence, option (d) is correct

28. (d) Number of ticketless travellers in April

$$= 4000\times\left(1+\frac{5}{100}\right)\left(1-\frac{5}{100}\right)\left(1-\frac{10}{100}\right)$$

$$= \left(4000\times\frac{21}{20}\times\frac{19}{20}\times\frac{9}{10}\right) = 3591.$$

29. (d) October : November : December = 9 : 8 : 10.666 since, he got ₹40 more in December than October, we can conclude that 1.666 = 40 → 1= 24.
Thus, total Bonus for the three months is:
$0.4 \times 27.666 \times 24 = 265.6$

30. (b) The total wealth given would be 50% + 25% (which is got by 50% of the remaining 50%) + 12.5% (which is got by 50% of the remaining 25%). Thus, the total wealth given by him would be equivalent to 87.5% of the total. Since, this is equal to 130900 kilograms of gold, the total gold would be:
$130900 \times 8/7 = 149600$.

31. (c) $\frac{378}{125} = 3+\frac{3}{125} = 302.4\%$
Let original salary be ₹ 100
And now going through option, we get (c) as answer.

32. (d) Out of a total of 100% votes; 80% voted. 16% were invalid and 20% went to the second placed candidate. This means that the maximum the winner can get is 44%. Options a, b and c are greater than 44% and hence cannot be correct. Hence, none of these.

33. (d) Rajesh's scores in each area is 65 and 82 respectively out of 100 each. Since, the exam is of a total of 250 marks (100 + 100 + 50) he needs a total of 195 marks in order to get his target of 78% overall. Thus, he should score 195 – 65 – 82 = 195 – 147 = 48 marks in Sociology which would mean 96%

34. (d) The only values that fit this situation are *C* 25%, *B* 30%, and *A* 45%. These are the percentage of votes polled. (Note: these values can be got either through trial and error or through solving $c + c + 5 + 1.5(c + 5) = 100\%$
Then, 20% is 18000 (the difference between A & C.) Hence, 90000 people must have voted and 100000 people must have been on the voter's list.

35. (a) Let the number be N. Then, 5N should be the correct outcome. But instead the value got is 0.2N. Change in value = 5N – 0.2N = 4.8N. The percentage change in the value = 4.8N × 100/5N = 96%

36. (c) 100 → 150 → 75 (yr. 1) → 112.5 → 56.25 (yr. 2) → 84.375 → 42.1875
Now, 42.1875 = ₹ 16,875
Hence, 1 → 400
Also year 2 donation is $56.25 \times 400 = 22500$

37. (c) Total characters in her report = $25 \times 60 \times 75$
Let the new no. of pages be n
Then: $n \times 55 \times 90 = 25 \times 60 \times 75$
$n = 22.72$
This means that her report would require 23 pages. A drop of 8% in terms of the pages.

38. (c) No. of males $= \frac{11}{18}\times 7200 = 4400$

No. of males married $= \frac{40}{100}\times 4400 = 1760$

No. of females married = 1760

Required percentage $= \frac{1760}{2800}\times 100 = 62\frac{6}{7}\%$

39. (b) Let the equation be
$x^2 - 2x + 1 = 0$ ...(1)
and $x^2 - x - 2 = 0$ ...(2)

Required percentage $= \frac{1-(-2)}{1}\times 100 = 300\%$

40. (d) $\frac{5x}{100} + 600 = 1000 + \frac{5}{200}(x - 4000)$

$\frac{5x}{100} - \frac{5x}{200} = 300$

$5x = 200 \times 300$

$\Rightarrow x = 12000$

41. (e) According to question
Third number = 2400

$\therefore$ Second number $= 2400\times\frac{1}{4} = 600$

Again,

First number $\times\frac{6}{11}$ = Second number $\times\frac{22}{100}$

$\therefore$ First number $= 600\times\frac{22}{100}\times\frac{11}{6} = 242$

$\therefore$ 45% of the first number $= 242\times\frac{45}{100} = 108.9$

42. (d) Required number $= 4800\times\frac{45}{100}\times\frac{40}{100} = 864$

32. **(d)** Out of a total of 100% votes; 80% voted. 16% were invalid and 20% went to the second placed candidate. This means that the maximum the winner can get is 44%. Options a, b and c are greater than 44% and hence cannot be correct. Hence, none of these.

33. **(d)** Rajesh's scores in each area is 65 and 82 respectively out of 100 each. Since, the exam is of a total of 250 marks (100 + 100 + 50) he needs a total of 195 marks in order to get his target of 78% overall. Thus, he should score 195 – 65 – 82 = 195 – 147 = 48 marks in Sociology which would mean 96%

34. **(d)** The only values that fit this situation are C 25%, B 30%, and A 45%. These are the percentage of votes polled. (Note: these values can be got either through trial and error or through solving $c + c + 5 + 1.5(c + 5) = 100\%$

Then, 20% is 18000 (the difference between A & C.) Hence, 90000 people must have voted and 100000 people must have been on the voter's list.

$\Rightarrow x = 12000$

41. **(e)** According to question

Third number = 2400

$\therefore$ Second number $= 2400 \times \frac{1}{4} = 600$

Again,

First number $\times \frac{6}{11}$ = Second number $\times \frac{22}{100}$

$\therefore$ First number $= 600 \times \frac{22}{100} \times \frac{11}{6} = 242$

$\therefore$ 45% of the first number $= 242 \times \frac{45}{100} = 108.9$

42. **(d)** Required number $= 4800 \times \frac{45}{100} \times \frac{40}{100} = 864$

43. **(c)** Suppose the maximum mark of the test be x.

Then, $\frac{468 \times 100}{x} = \frac{336 \times 100}{700}$

$\therefore x = \frac{468 \times 100 \times 700}{336 \times 100} = 975$

44. **(e)** Let the numbers are $x, x + 1, x + 2$

sum of three consecutive numbers = 2262

$x + x + 1 + x + 2 = 2262$

$3x + 3 = 2262$

$3x = 2259$

$x = 753$

Number are 753, 754, 755

$\therefore$ 41% of 755 = 309.55

45. **(b)** Marks is subject B = 56% of 150 = 84

Total marks obtained = 54 % of Total marks

$= \frac{54}{100} \times 450$ [$\because$ Maximum marks in each subject is 150]

= 243

Total marks obtained = A + B + C

$243 = 73 + 84 + X$

$X = 86$

46. **(b)** Rohan's marks = 75

Sonia's marks = 65

Rohit's marks = 65 + 45 = 110

Raman's marks = 110 – 25 = 85

Ravi got marks = 85 + 34 = 119

Total maximum marks = 119 + 50 = 169

Percentage of Ravi's mark $= \frac{119}{169} \times 100\% = 70.4\% = 70\%$

47. **(b)** Let total monthly income of Mr. Giridhar be ₹ x.

According to question,

$\therefore x \times \frac{50}{100} \times \frac{15}{100} = 900$

x = ₹ 12000

Hence, monthly income of Mr. Giridhar = ₹ 12000.

48. **(a)** Let passing marks be represented by p.

$p \times 1.05 = 273$

$p = 260$

Lokesh passing % $= \frac{312 - 260}{260} \times 100 = 20\%$

49. **(a)** Let the monthly salary of A be x, monthly salary of B is (40000 – x).

Savings of A = (100 – 85)% of x = 0.15x

Savings of B = (100 – 95)% of (40000 – x)

= 0.05 (40000 – x)

0.15 x = 0.05 (40000 – x)

$\Rightarrow 0.15x + 0.05x = 40000 \times 0.05$

$\Rightarrow 0.2x = 2000$

$\Rightarrow x = 10000$

50. **(d)** Quantity of salt = 5% of 6l = 300 ml

Quantity of water = 6000 ml – 300 ml = 5700 ml

Quantity of water left after evaporation

= (5700 – 100) ml = 4700 ml

% of salt $= \frac{300\,\text{ml}}{(4700 + 300)\,\text{ml}} \times 100 = 6\%$