5 PERCENTAGES

It is one of the most important chapters which is the backbone of calculations either involved in commercial arithmetic or in real life. Personally I do maximum arithmetical calculation using percentage and others too. So in the context of calculation it is necessary to know the clear concepts of percentage which plays a very vital role in Data Interpretation besides quantitative Aptitude section. On an average two problems *i.e.*, nearly 4–5 % problems in QA only, are being asked in CAT every year.

In other entrance/competitive exams like MAT, XAT and UPMCAT, etc there are too many questions asked from this chapter.

PERCENTAGE AND ITS APPLICATION

A fraction with denominator 100 is called a per cent. Per cent is an abbreviation for the latin word "percentum" meaning "per hundred " or "hundredhs" and is denoted by symbol %.

NOTE A fraction with denominator 10 is called as decimal.

Since per cent is a form of fraction, we can express per cent as fractions (or decimals) and *vice-versa.*

CONVERSION OF A FRACTION INTO PERCENTAGE

To convert a fraction into a percentage, multiply the fraction by 100 and put "%" sign.

EXAMPLE 1 *Convert the following fractions into percentages:*

(i) $\frac{1}{2}$ *(ii)* $\frac{3}{4}$ *(iii)* $\frac{4}{5}$ *(iv)* $\frac{7}{8}$

SOLUTION (i) $\frac{1}{2} \to \frac{1}{2} \times 100 = 50\%$

(ii) $\frac{3}{4} \to \frac{3}{4} \times 100 = 75\%$

(iii) $\frac{4}{5} \to \frac{4}{5} \times 100 = 80\%$

(iv) $\frac{7}{8} \to \frac{7}{8} \times 100 = 87.5\%$

CONVERSION OF A PERCENTAGE INTO A FRACTION

To convert a percentage into a fraction, replace the % sign with $\frac{1}{100}$ and reduce the fraction to simplest form.

EXAMPLE 2 *Express the following percentage as fraction*

(i) 20% *(ii)* 30% *(iii)* 45% *(iv)* $5\frac{1}{8}$ %

(v) 155%

SOLUTION (i) $20\% = \frac{20}{100} = \frac{1}{5}$

(ii) $30\% = \frac{30}{100} = \frac{3}{10}$

(iii) $45\% = \frac{45}{100} = \frac{9}{20}$

(iv) $5\frac{1}{8}\% = \frac{41}{8 \times 100} = \frac{41}{800}$

(v) $155\% = \frac{155}{100} = \frac{31}{20} = 1\frac{11}{20}$

CONVERSION OF A PERCENTAGE INTO A RATIO

To convert a percentage into a ratio, first convert the given percentage into a fraction in simplest form and then to a ratio.

EXAMPLE 3 *Solve the following :*

(i) 38% *(ii)* 25% *(iii)* 66.66%

SOLUTION (i) $38\% = \frac{38}{100} = \frac{19}{50} = 19:50$

(ii) $25\% = \frac{25}{100} = \frac{1}{4} = 1:4$

(iii) $66.66\% = 66\frac{2}{3}\% = \frac{200}{3 \times 100} = \frac{2}{3} = 2:3$

CONVERSION OF A RATIO INTO A PERCENTAGE

To convert a ratio into a percentage, first convert the given ratio into a fraction then to a percentage.

EXAMPLE 4 *Express the following ratios as percentage :*
(i) 1 : 5 (ii) 2 : 3 (iii) 4 : 9

SOLUTION (i) $1:5=\frac{1}{5}=\frac{1}{5}\times100=20\%$

(ii) $2:3=\frac{2}{3}=\frac{2}{3}\times100=66.66\%$

(iii) $4:9=\frac{4}{9}=\frac{4}{9}\times100=44.44\%$

CONVERSION OF A PERCENTAGE INTO A DECIMAL

To convert a percentage into a decimal remove the % sign and move the decimal point two places to the left.

EXAMPLE 5 *Convert the following percentages into decimals :*
(i) 36% (ii) 250% (iii) 57.5% (iv) $17\frac{1}{5}\%$ (v) 7%

SOLUTION (i) $36\% = 0.36$

(ii) $250\% = 2.50 = 2.5$

(iii) $57.5\% = 0.575$

(iv) $17\frac{1}{5}\% = 17.2\% = 0.172$

(v) $7\% = 0.07$

CONVERSION OF A DECIMAL INTO A PERCENTAGE

To convert a decimal into a percentage, move the decimal point two place to the right (adding zeros if necessary) and put % sign.

EXAMPLE 6 *Convert the following decimals into percentages :*
(i) 0.35 (ii) 8.12 (iii) 0.018

SOLUTION (i) $0.35 = 35\%$

(ii) $8.12 = 812\%$

(iii) $0.018 = 1.8\%$

- Work out some more examples so that all these thing rest on your fingure tips.

Remember $\frac{1}{2}=\frac{2}{4}=\frac{3}{6}=\frac{4}{8}=\ldots=50\%$ etc.

Learn and practice all the values given bellow.

CONVERSION OF FRACTION INTO PERCENTAGE

NUMERATORS

DENOMINATORS	1	2	3	4	5	6	7	8	9	10	11	12
1	100	200	300	400	500	600	700	800	900	1000	1100	1200
2	50	100	150	200	250	300	350	400	450	500	550	600
3	33.33	66.66	100	133.33	166.66	200	233.33	266.66	300	333.33	366.60	400
4	25	50	75	100	125	150	175	200	225	250	275	300
5	20	40	60	80	100	120	140	160	180	200	220	240
6	16.66	33.33	50	66.66	83.33	100	116.66	133.33	150	166.66	183.33	200
7	14.28	28.56	42.85	57.13	71.42	85.71	100	114.28	128.56	142.85	157.13	171.42
8	12.5	25	37.5	50	62.5	75	87.5	100	112.5	125	137.5	150
9	11.11	22.22	33.33	44.44	55.55	66.66	77.77	88.88	100	111.11	122.22	133.33
10	10	20	30	40	50	60	70	80	90	100	110	120
11	9.09	18.18	27.27	36.36	45.45	54.54	63.63	72.72	81.81	90.9	100	109.09
12	8.33	16.66	25	33.33	41.66	50	58.33	66.66	75	83.33	91.66	100
15	6.66	13.33	20	26.66	33.33	40	46.66	53.33	60	66.66	73.33	80

(PERCENTAGE-FRACTION CONVERSION

Exercise

1. When a number is added to another number the total becomes $333\frac{1}{3}$ per cent of the second number. What is the ratio between the first and the second number?
1) 3 : 7 2) 7 : 4
3) 7 : 3 d) Data inadequate
5) None of these

2. In a recent survey 40% houses contained two or more people. Of those houses containing only one person 25% were having only a male. What is the percentage of all houses which contain exactly one female and no males?
1) 75 2) 40
3) 15 4) Can't be determined
5) None of these

3. Four-fifths of three-eighths of a number is 24. What is 250 per cent of that number?
1) 100 2) 160 3) 120
4) 200 5) None of these

4. Two-fifths of thirty per cent of one-fourth of a number is 15.. What is 20 per cent of that number?
1) 90 2) 150 3) 100
4) 120 5) None of these

5. If x is 90% of y, what per cent of x is y?
1) 90 2) 190 3) 101.1
4) 111.1 5) None of these

6. There is ratio of 5 : 4 between two numbers. If forty per cent of the first number is 12 then what would be the 50 per cent of the second number?
1) 12 2) 24
3) 18 4) Data inadequate
5) None of these

7. When 30 per cent of a number is added to another number the second number increases to its 140 per cent. What is the ratio between the first and the second number?
1) 3 : 4 2) 4 : 3
3) 3 : 2 4) Data inadequate
5) None of these

8. Naresh's monthly income is 30% more than that of Raghu. Raghu's monthly income is 20% less than that of Vishal. If the difference between the monthly incomes of Naresh and Vishal is Rs 800, what is the monthly income of Raghu?
1) Rs 16,000 2) Rs 20,000
3) Rs 12,000 4) Data inadequate
5) None of these

9. 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?
1) 4 : 5 2) 5 : 4
3) 2 : 3 4) Data inadequate
5) None of these

10. If 25% of a number is subtracted from a second number the second number reduces to its five-sixths. What is the ratio between the first number and the second number?
1) 2 : 3 2) 3 : 2
3) 1 : 3 4) Data inadequate
5) none of these

11. 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?
1) 16 2) 14
3) 17 4) Data inadequate
5) None of these

12. Weights of two friends Ram and Shyam are in the ratio of 4 : 5. Ram's weight increases by 10% and the total weight of Ram and Shyam together becomes 82.8 kg, with an increase of 15%. By what per cent did the weight of Shyam increase?
1) 12.5% 2) 17.5% 3) 19%
4) 21% 5) None of these

13. When 50% of one number is added to a second number, the second number increases to its four-thirds. What is the ratio between the first number and the second number?
1) 3 : 2 2) 3 : 4 3) 2 : 3
4) Data inadequate 5) None of these

14. Two-fifths of one-fourth of five-eighths of a number is 6. What is 50 per cent of that number?
1) 96 2) 32 3) 24
4) 48 5) None of these

15. Pradip spends 40 per cent of his monthly income on food items, and 50 per cent of the remaining on clothes and conveyance. He saves one-third of the remaining amount after spending on food, clothes and conveyance. If he saves Rs 19,200 every year, what is his monthly income?
1) Rs 24,000 2) Rs 12,000 3) Rs 16,000
4) Rs 20,000 5) None of these

16. When 30 per cent of a number is added to another number the second number increases by its 20 per cent. What is the ratio between the first and the second number?
1) 3 : 2 2) 2 : 3
3) 2 : 5 4) Data inadequate
5) None of these

17. The ratio of A's and B's salary is 9 : 4. If A's salary is increased by 15%, then his total salary becomes Rs 5175. What is the salary of B?
1) Rs 2,000 2) Rs 4,000 3) Rs 4,500
4) Rs 2,500 5) None of these

18. If the growth in production of company A from 1994 to 1995 was 25% and that from 1995 to 1996 was 60%, then what percentage growth took place from 1994 to 1996?
1) 85% 2) 75% 3) 200%
4) 100% 5) None of these

19. Two-thirds of three-fifths of one-eighth of a certain number is 268.50. What is 30 per cent of that number?
1) 1611.0 2) 716.0 3) 1342.5
4) 596.60 5) None of these

20. If 40 per cent of a number is added to an other number then it becomes 125 per cent of itself. What will be the ratio of first and second numbers?
1) 8 : 5 2) 5 : 7
3) 5 : 8 4) Data inadequate
5) None of these

21. If $\frac{1}{8}$ of $\frac{2}{3}$ of $\frac{4}{5}$ of a number is 12 then 30 per cent of the number will be
1) 48 2) 64 3) 54
4) 42 5) None of these

22. When any number is divided by 12 then dividend becomes $\frac{1}{4}$ of the other number. By how much per cent is first number greater than the second number?
1) 200 2) 150
3) 300 4) Data inadequate
5) None of these

23. Ashok gave 40 per cent of the amount he had to Jayant. Jayant in turn gave one-fourth of what he received from Ashok to Prakash. After paying Rs 200 to the taxi driver out of the amount he got from Jayant, Prakash now has Rs 600 left with him. How much amount did Ashok have?
1) Rs 1,200 2) Rs 4,000
3) Rs 8,000 4) Data inadequate
5) None of these

24. Rajesh solved 80 per cent of the questions in an examination correctly. If out of 41 questions solved by Rajesh 37 questions are correct and of the remaining questions out of 8 questions 5 questions have been solved by Rajesh correctly then find the total number of questions asked in the examination.
1) 75 2) 65
3) 60 4) Can't be determined
5) None of these

25. 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 Rs 48456, how much amount per month would he have spent on clothes and transport?
1) Rs 4038 2) Rs 8076 3) Rs 9691.20
4) Rs 4845.60 5) None of these

26. In a class of 60 children, 30% children can speak only English, 20% Hindi and English both and the rest of the children can speak only Hindi. How many children can speak Hindi?
1) 42 2) 36 3) 30
4) 48 5) None of these

27. The ratio of males and females in a city is 7 : 8 and the percentage of children among males and females is 25% and 20% respectively. If the number of adult females in the city is 156800 what is the total population?
1) 245000 2) 367500 3) 196000
4) 171500 5) None of these

28. The income of a company increases 20% per annum. If its income is Rs 2664000 in the year 1999 what was its income in the year 1997?

1) Rs 2220000 2) Rs 2850000 3) Rs 2121000
4) Rs 1855000 5) None of these

29. The ratio of the number of students appearing for examination in the year 1998 in the states A, B and C was 3 : 5 : 6. Next year if the number of students in these states increases by 20%, 10% and 20% respectively, the ratio in states A and C would be 1 : 2. What was the number of students who appeared for the examination in the state A in 1998?
1) 7200 2) 6000
3) 7500 4) Data inadequate
5) None of these

30. Mr X, a businessman, had income in the year 1995 such that he earned a profit of 20% on his investment in the business. In the year 1996 his investment was less by Rs 5000 but still had the same income (Income = Investment + Profit) as that in 1995. Thus the per cent profit earned in 1996 increased by 6%. What was his investment in 1995?
1) Rs 100000 2) Rs 100500
3) Rs 105000 4) Data inadequate
5) None of these

31. The strength of a school increases and decreases every alternate year. It starts with increase by 10% and there after the percentage of increase or decrease is the same. Which of the following is definitely true about the strength of the school in 2000 as compared to that in 1996?
1) Increase approximately by 2%
2) Decrease approximately by 2%
3) Increase approximately by 20%
4) Decrease approximately by 20%
5) None of these

Directions (Q. 32-36) : answer these questions on the basis of the information given below:
(i) In a class of 80 students the girls and the boys are in the ratio of 3 : 5. The students can speak only Hindi or only English or both Hindi and English.
(ii) the number of boys and the number of girls who can speak only Hindi is equal and each of them is 40% of the total number of girls.
(iii) 10% of the girls can speak both the languages and 58% of the boys can speak only English.

32. How many girls can speak only English?
1) 12 2) 29 3) 18
4) 15 5) None of these

33. In all how many boys can speak Hindi?
1) 12 2) 9 3) 24
5) Data inadequate 5) None of these

34. What percentage of all the students (boys and girls together) can speak only Hindi?
1) 24 2) 40 3) 50
4) 30 5) None of these

35. In all how many students (boys and girls together) can speak both the languages?
1) 15 2) 12 3) 9
4) 29 5) None of these

36. How many boys can speak either only Hindi or only English?
1) 25 2) 38 3) 41
4) 29 5) None of these

37. In a school the number of boys and that of the girls are in the ratio of 2 : 3. If the number of boys is increased by 20% and that of girls is increased by 10%, what will be the new ratio of the number of boys to that of girls?
1) 4 : 5 2) 5 : 8
3) 3 : 4 4) Data inadequate
5) None of these

38. The production of a company has ups and downs every year. The production increases for two consecutive years consistently by 15% and in the third year it decreases by 10%. Again in the next two years it increases by 15% each year and decreases by 10% in the third year. If we start counting from the year 1994 approximately what will be the effect on the production of the Company in 1998?
1) 37% increase 2) 42% increase 3) 52% increase
4) 32% increase 5) 27% increase

39. If 40% of a number is equal to two-thirds of another number, what is the ratio of the first number to the second?
1) 7 : 3 2) 3 : 7 3) 2 : 5
4) 5 : 3 5) None of these

40. When the price of a product was increased by 15%, the number sold was decreased by 20%. What was the net effect?
1) 8% gain 2) 5% loss
3) 8% loss 4) Cannot be determined
5) None of these

41. Three-fifths of a number is 30 more than 50 per cent of that number. What is 80 per cent of that number?
1) 300 2) 60
3) 240 4) Cannot be determined
5) None of these

42. Two-fifths of one-third of three-sevenths of a number is 15. What is 40 per cent of that number?

1) 136 2) 140 3) 72
4) 84 5) None of these

43. A shopkeeper employed a servant at a monthly salary of Rs 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 Rs 6000?
1) Rs 30000 2) Rs 415000
3) Rs 31500 4) Rs 50000
5) None of these

44. An empty fuel tank to a car was filled with A type of petrol. When the tank was half empty, it was filled with B type of petrol. Again when the tank was half empty, it was filled with A type of petrol. When the tank was half empty again, it was filled with B type of petrol. At this time, what was the percentage of A type of petrol in the tank?
1) 50% 2) 40% 3) 33.5%
4) 37.5% 5) None of these

45. The numbers of students speaking English and Hindi are in the ratio of 4:5. If the number of students speaking English increased by 35% and that speaking Hindi increased by 20%, what would be the new respective ratio?
1) 19 : 20 2) 7 : 8
3) 8 : 9 4) Cannot be determined
5) None of these

46. The population of a town is 8500. It increases by 20% in the first year and by another 25% in the second year. What would be the population of the town after two years?
1) 10950 2) 12750 3) 11950
4) 12550 5) None of these

Answers and explanations

1. 3; Let the first and second numbers be x and y respectively.

Then $x + y = \frac{10}{3}y$ or, $x = \frac{7}{3}y$

$\therefore x : y = 7 : 3$

2. 5; Houses containing only one person = 100 – 40 = 60%

Houses containing only a male = $60 \times \frac{25}{100} = 15\%$

$\therefore$ Houses containing only one female
= 60 – 15 = 45%

3. 4; Let the number = x

$\frac{4}{5} \times \frac{3}{8}x = 24$

or, $x = \frac{24 \times 2 \times 5}{3} = 80$

$\therefore$ 250 per cent of the number = $\frac{250}{100} \times 80 = 200$

4. 3; Let the number = x

$\frac{2}{5} \times \frac{30}{100} \times \frac{x}{4} = 15$

or, $x = \frac{15 \times 5 \times 100 \times 4}{2 \times 30} = 500$

20% of 500 = 100

5. 4; $x = 90\%$ of $y = \frac{90}{100}y = \frac{9y}{10} \Rightarrow \frac{y}{x} = \frac{10}{9}$

Let $y = 2\%$ of $x = \frac{7}{100}x \Rightarrow \frac{y}{x} = \frac{7}{100}$

$\therefore \frac{z}{100} = \frac{10}{9} \Rightarrow z = \frac{10 \times 100}{9} = 111.1\%$

6. 1; $\frac{a}{b} = \frac{5}{4}$, $b = \frac{4}{5}a$ Given, (40% of a =) $\frac{2}{5}a = 12$

$\therefore a = 5 \times 6$ and $b = \frac{4}{5} \times 5 \times 6 = 24$

$\therefore$ 50% of $b = \frac{24}{2} = 12$

7. 2; Let the first and the second number be x and y respectively then
$y + 30\%$ of $x = 140\%$ of y
or, $y + 0.3x = 1.4y$
or, $0.3x = 0.4y$
$\therefore x : y = 0.4 : 0.3 = 4 : 3$

8. 1; $N = R + 30\%$ of $R = 1.3R$
$R = V - 20\%$ of $V = 80\%$ of $V = 0.8V$
$\therefore N = 1.3 \times 0.8V = 1.04V$
Now, $N - V = 1.04V - V = 0.04V = Rs\ 800$(given)
$\therefore V = Rs\ 2000$
$\therefore R = 0.8 \times 20000 = Rs\ 16000$

9. 1; 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

∴ x = 4000

∴ Reqd ratio of population of males and females

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

10. 1; Let the first and second number be x and y respectively.

$$x - y \times \frac{25}{100} = y \times \frac{5}{6}$$

$$\text{or, } y - \frac{x}{4} = \frac{5}{6}y$$

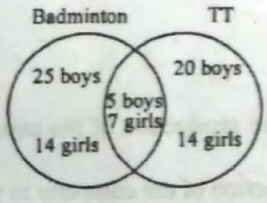
$$\text{or, } \frac{1}{6}y = \frac{x}{4}$$

∴ x : y = 2 : 3

11. 2; Let the number of boys = x

$$\text{The } x + \frac{7x}{10} = 85 \Rightarrow x = 50$$

No. of girls = 85 – 50 = 35



12. 3; Let the weights of Ram and Shyam be 4x and 5x.

Now, according to question,

$$\frac{4x \times 110}{100} + \text{Shyam's new wt} = 82.8 \quad \ldots (i)$$

$$\text{and } \frac{(4x + 5x =)9x \times 115}{100} = 82.8 \quad \ldots (ii)$$

From (ii), x = 8

Putting in (i), we get

Shyam's new wt = (82.8 – 35.2 =) 47.6

$$\% \text{ increase in Shyam's wt} = \left(\frac{47.6-40}{40} \times 100 =\right) 19\%$$

13. 3; Let the numbers be y and x respectively

$$x + 50\% \text{ of } y = \frac{4x}{3}$$

$$\text{or, } \frac{y}{2} = \frac{4x}{3} - x$$

$$\text{or, } \frac{y}{2} = \frac{x}{3}$$

$$\text{or, } \frac{y}{x} = \frac{2}{3}$$

14. 4; Let the number be x

$$\therefore \frac{2}{5} \times \frac{1}{4} \times \frac{5}{8} \times x = 6$$

$$\therefore x = \frac{6 \times 5 \times 4 \times 8}{2 \times 1 \times 5} \times \frac{1}{2} = 48$$

15. 3; Food items = 40%

$$\text{Clothes + conveyance} = \frac{1}{2} \text{ of } 60\% = 30\%$$

$$\frac{1}{3} \text{ of } 30\% = \frac{19{,}200}{12} \Rightarrow 10\% = 1600$$

∴ 100% = Rs 16,000

16. 2; $30\% \text{ of I} + \text{II} = \text{II} \times \frac{120}{100}$

$$\text{or, } \frac{3}{10}\text{I} + \text{II} = \frac{12}{10}\text{II}$$

$$\text{or, } \frac{3}{10}\text{I} = \frac{2}{10}\text{II} \Rightarrow \text{I} : \text{II} = 2:3$$

17. 1; Let the salaries of A and B be 9x and 4x

$$9x \times \frac{115}{100} = 5175$$

∴ x = 500

∴ salary of B = 500 × 4 = Rs 2000

18. 4

19. 1; Let the number be x

According to the question,

$$\frac{2}{3} \text{ of } \frac{3}{5} \text{ of } \frac{1}{8} \times x = 268.50$$

$$\therefore x = \frac{268.50 \times 3 \times 5 \times 8}{2 \times 3} = 5370$$

$$\therefore 30\% \text{ of } x = \frac{30}{100} \times 5370 = 1611$$

20. 5

21. 3; Let the number be x

$$\text{and } \frac{1}{8} \text{ of } \frac{2}{3} \text{ of } \frac{4}{5} \times x = 12$$

$$\therefore \frac{3x}{10} = 54$$

22. 4; Here, neither the remainder nor the dividend nor the second number is given, so can't be determined.

23. 3; $J = \frac{2}{5}A$, $P = \frac{1}{4} \times \frac{2}{5}A = \frac{1}{10}A$

and $\frac{1}{10}A - 200 = 600$

$\therefore \frac{1}{10}A = 800A = \text{Rs } 8{,}000$

24. 2; Suppose there are 8x questions apart from the 41 questions.

Then $\frac{37+5x}{41+8x} = 80\% = \frac{4}{5}$

$\Rightarrow 185 + 25x = 164 + 32x$

$\Rightarrow 7x = 21 \Rightarrow x = 3$

$\therefore$ Total no. of questions $= 41 + 8x = 65$

25. 1; Spent on clothes and transport $= \frac{48456}{12} = \text{Rs } 4038$

26. 1; Number of students who speak only English
$= 30\%$ of $60 = 18$

Number of students who speak Hindi and English
$= 20\%$ of $60 = 12$

$\therefore$ Number of students who speak only Hindi
$= (60 - 30 =) 30$

$\therefore$ No. of students who speak Hindi $= 30 + 12 = 42$

27. 2; Number of females $= 156800 \times \frac{100}{80} = 196000$

$\therefore$ Number of males $= \frac{7}{8} \times 196000 = 171500$

$\therefore$ Total population $= 196000 + 171500 = 367500$

28. 5; Income of company in 1997 $= \frac{2664000}{\left(1 + \frac{20}{100}\right)^2}$

$= 2664000 \times \frac{25}{36} = \text{Rs } 1850000$

29. 4; Let the number of students appearing for examination in the year 1998 in the states A, B and C be 3x, 5x and 6x respectively.

According to the question,

$\frac{3x \times \frac{120}{100}}{6x \times \frac{120}{100}} = \frac{1}{2} \Rightarrow \frac{1}{2} = \frac{1}{2}$

30. 3; Let the investment of X in 1995 be Rs x

$\therefore$ Profit $= \text{Rs } \frac{x}{5}$

$\therefore$ Income $= \text{Rs } \left(x + \frac{x}{5}\right) = \text{Rs } \frac{6}{5}x$

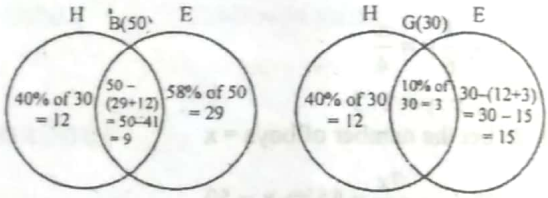
Investment of company X in 1996 would be $(x - 5000)$
From the question,

$(x - 5000) \times \frac{126}{100} = \frac{6}{5}x \Rightarrow = \text{Rs } 105000$

31. 2

(32-36): No of boys in the class $= \frac{5}{8} \times 80 = 50$

$\therefore$ No. of girls in the class $= 80 - 50 = 30$



32. 4
33. 5
34. 4
35. 2
36. 3
37. 5

38. 1; Suppose the production of the company in the year 1994 be x.
then production of the company in year 1998

$= x \times \frac{115}{100} \times \frac{115}{100} \times \frac{90}{100} \times \frac{115}{100} = 1.368x$

$\therefore$ Increase % in the production in year 1998

$= \frac{(1.368x - x) \times 100}{x} = 36.8\% \approx 37\%$

39. 4; Suppose the first number is x and the second number y.

Therefore, 40% of $x = \frac{2}{3}$ of y

$\therefore \frac{x}{y} = \frac{2}{3} \times \frac{100}{40} = \frac{5}{3}$

40. 3; Net effect $= +15 - 20 - \frac{15 \times 20}{100} = -8\%$

–ve sign indicates loss.

41. 3; Let the no. be N.

Now, $\frac{3N}{5}-\frac{N}{2}=30$ or, $\frac{N}{10}=30$

or, $N=300$

80% of $N=240$

42. 5; Let the number be 'x'.

Then, $\frac{2}{5}\times\frac{1}{3}\times\frac{3}{7}\times x=15$

or, $\frac{2x}{35}=15$

or, $x=\frac{15\times35}{2}$

$\therefore$ 40% of $x=\frac{2}{5}\times\frac{15\times35}{2}=105$

43. 1; Servant's commission amount = 6000 - 1500 = Rs 4500

ie, 15% = 4500

or, $100\%=\frac{4500}{15}\times100=$ Rs 30000

44. 4;

	Petrol A	Petrol B
I:	A	0
II:	$\frac{A}{2}$	$\frac{B}{2}$
III:	$\frac{A}{4}+\frac{A}{2}$	$\frac{B}{4}$
IV:	$\frac{A}{8}+\frac{A}{4}$	$\frac{B}{8}+\frac{B}{2}$

Now, amount of petrol A = $\frac{A}{4}+\frac{A}{8}=\frac{3A}{8}$

$\therefore$ required % = $\frac{3A}{8\times A}\times100=37.50\%$

45. 5; Reqd ratio = $\frac{4\times135}{5\times120}=9:10$

46. 2; The total population after two years

$=8500\times\frac{120}{100}\times\frac{125}{100}=12{,}750$