

SOLVED EXAMPLES

Ex. 1. Express each of the following as a fraction :

(i) 56%

(ii) 4%

(iii) 0.6%

(iv) 0.08%

$$\text{Sol. } (i) \frac{56}{100} = \frac{14}{25}$$

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

$$(iii) \frac{0.6}{100} = \frac{6}{1000} = \frac{3}{500}$$

$$(iv) \frac{0.08}{100} = \frac{8}{10000} = \frac{1}{1250}$$

Ex. 2. Express each of the following as a decimal :

(i) 6%

(ii) 28%

(iii) 0.2%

(iv) 0.04%

$$\text{Sol. } (i) \frac{6}{100} = 0.06$$

$$(ii) \frac{28}{100} = 0.28$$

$$(iii) \frac{0.2}{100} = \frac{0.2}{100} = 0.002$$

$$(iv) \frac{0.04}{100} = \frac{0.04}{100} = 0.0004$$

Ex. 3. Express each of the following as rate percent :

(i) $\frac{23}{36}$

(ii) $6\frac{3}{4}$

(iii) 0.004

$$\text{Sol. } (i) \frac{23}{36} = \left(\frac{23}{36} \times 100 \right)\% = \left(\frac{575}{9} \right)\% = 63\frac{8}{9}\%$$

$$(ii) 0.004 = \frac{4}{1000} = \left(\frac{4}{1000} \times 100 \right)\% = 0.4\%$$

$$(iii) 6\frac{3}{4} = \frac{27}{4} = \left(\frac{27}{4} \times 100 \right)\% = 675\%$$

Ex. 4. Evaluate :

(i) 28% of 450 + 45% of 280

(Bank P.O. 2003)

(ii) $16\frac{2}{3}\%$ of 600 gm - $33\frac{1}{3}\%$ of 180 gm

(R.R.B. 1998)

$$\text{Sol. } (i) 28\% \text{ of } 450 + 45\% \text{ of } 280 = \left(\frac{28}{100} \times 450 + \frac{45}{100} \times 280 \right) = (126 + 126) = 252.$$

(ii) $16\frac{2}{3}\%$ of 600 gm - $33\frac{1}{3}\%$ of 180 gm

$$= \left[\left(\frac{50}{3} \times \frac{1}{100} \times 600 \right) - \left(\frac{100}{3} \times \frac{1}{100} \times 180 \right) \right] \text{ gm} = (100 - 60) \text{ gm} = 40 \text{ gm.}$$

Ex. 5. (i) 2 is what percent of 50 ?

(S.S.C. 2000)

(ii) $\frac{1}{2}$ is what percent of $\frac{1}{3}$?

(S.S.C. 2002)

(iii) What percent of 7 is 84 ?

(iv) What percent of 2 metric tonnes is 40 quintals ?

(v) What percent of 6.5 litres is 130 ml ?

$$\text{Sol. } (i) \text{Required percentage} = \left(\frac{2}{50} \times 100 \right)\% = 4\%$$

$$(ii) \text{Required percentage} = \left(\frac{1}{2} \times \frac{3}{1} \times 100 \right)\% = 150\%$$

$$(iii) \text{Required percentage} = \left(\frac{84}{7} \times 100 \right)\% = 1200\%$$

(iv) 1 metric tonne = 10 quintals.

$$\therefore \text{Required percentage} = \left(\frac{40}{2 \times 10} \times 100 \right)\% = 200\%.$$

$$(v) \text{Required percentage} = \left(\frac{130}{6.5 \times 1000} \times 100 \right)\% = 2\%.$$

Ex. 6. Find the missing figures :

$$(i) ?\% \text{ of } 25 = 2.125 \quad (ii) 9\% \text{ of } ? = 6.3 \quad (iii) 0.25\% \text{ of } ? = 0.04$$

$$\text{Sol. } (i) \text{Let } x\% \text{ of } 25 = 2.125. \text{ Then, } \frac{x}{100} \times 25 = 2.125 \Leftrightarrow x = (2.125 \times 4) = 8.5.$$

$$(ii) \text{Let } 9\% \text{ of } x = 6.3. \text{ Then, } \frac{9}{100}x = 6.3 \Leftrightarrow x = \left(\frac{6.3 \times 100}{9} \right) = 70.$$

$$(iii) \text{Let } 0.25\% \text{ of } x = 0.04. \text{ Then, } \frac{0.25}{100}x = 0.04 \Leftrightarrow x = \left(\frac{0.04 \times 100}{0.25} \right) = 16.$$

Ex. 7. Which is greatest in $16\frac{2}{3}\%$, $\frac{2}{15}$ and 0.17 ?

$$\text{Sol. } 16\frac{2}{3}\% = \left(\frac{50}{3} \times \frac{1}{100} \right) = \frac{1}{6} = 0.166, \frac{2}{15} = 0.133. \text{ Clearly, } 0.17 \text{ is the greatest.}$$

Ex. 8. If the sales tax be reduced from $3\frac{1}{2}\%$ to $3\frac{1}{3}\%$, then what difference does it make to a person who purchases an article with marked price of Rs. 8400 ?

(S.S.C. 2002)

$$\begin{aligned} \text{Sol. Required difference} &= \left(3\frac{1}{2}\% \text{ of Rs. 8400} \right) - \left(3\frac{1}{3}\% \text{ of Rs. 8400} \right) \\ &= \left(\frac{7}{2} - \frac{10}{3} \right)\% \text{ of Rs. 8400} = \frac{1}{6}\% \text{ of Rs. 8400} \\ &= \text{Rs.} \left(\frac{1}{6} \times \frac{1}{100} \times 8400 \right) = \text{Rs.} 14. \end{aligned}$$

Ex. 9. An inspector rejects 0.08% of the meters as defective. How many will he examine to reject 2 ?

(M.A.T. 2000)

Sol. Let the number of meters to be examined be x .

$$\text{Then, } 0.08\% \text{ of } x = 2 \Leftrightarrow \left(\frac{8}{100} \times \frac{1}{100} \times x \right) = 2 \Leftrightarrow x = \left(\frac{2 \times 100 \times 100}{8} \right) = 2500.$$

Ex. 10. Sixty-five percent of a number is 21 less than four-fifth of that number. What is the number ?

Sol. Let the number be x .

$$\text{Then, } \frac{4}{5}x - (65\% \text{ of } x) = 21 \Leftrightarrow \frac{4}{5}x - \frac{65}{100}x = 21 \Leftrightarrow 15x = 2100 \Leftrightarrow x = 140.$$

Ex. 11. Difference of two numbers is 1660. If 7.5% of one number is 12.5% of the other number, find the two numbers.

Sol. Let the numbers be x and y . Then, $7.5\% \text{ of } x = 12.5\% \text{ of } y \Leftrightarrow x = \frac{125}{75}y = \frac{5}{3}y$.

$$\text{Now, } x - y = 1660 \Rightarrow \frac{5}{3}y - y = 1660 \Rightarrow \frac{2}{3}y = 1660 \Rightarrow y = \left(\frac{1660 \times 3}{2} \right) = 2490.$$

\therefore One number = 2490, Second number = $\frac{5}{3}y = 4150$.

Ex. 12. In expressing a length 81.472 km as nearly as possible with three significant digits, find the percentage error. (S.S.C. 1997)

$$\text{Sol. Error} = (81.5 - 81.472) \text{ km} = 0.028.$$

$$\therefore \text{Required percentage} = \left(\frac{0.028}{81.472} \times 100 \right)\% = 0.034\%.$$

Ex. 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 the total valid votes. Find the total number of votes enrolled in that election. (S.S.C. 2003)

Sol. Let the total number of votes enrolled be x . Then,

Number of votes cast = 75% of x . Valid votes = 98% of (75% of x).

$$\therefore 75\% \text{ of } [98\% \text{ of } (75\% \text{ of } x)] = 9261$$

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

Ex. 14. Shobha's Mathematics Test had 75 problems i.e., 10 arithmetic, 30 algebra and 35 geometry problems. Although she answered 70% of the arithmetic, 40% of the algebra and 60% of the geometry problems correctly, she did not pass the test because she got less than 60% of the problems right. How many more questions she would have needed to answer correctly to earn a 60% passing grade? (C.D.S. 2002)

$$\text{Sol. Number of questions attempted correctly} = (70\% \text{ of } 10 + 40\% \text{ of } 30 + 60\% \text{ of } 35) \\ = (7 + 12 + 21) = 40.$$

$$\text{Questions to be answered correctly for 60% grade} = 60\% \text{ of } 75 = 45.$$

$$\therefore \text{Required number of questions} = (45 - 40) = 5.$$

Ex. 15. If 50% of $(x - y)$ = 30% of $(x + y)$, then what percent of x is y ? (S.S.C. 2003)

$$\text{Sol. } 50\% \text{ of } (x - y) = 30\% \text{ of } (x + y) \Leftrightarrow \frac{50}{100} (x - y) = \frac{30}{100} (x + y)$$

$$\Leftrightarrow 5(x - y) = 3(x + y) \Leftrightarrow 2x = 8y \Leftrightarrow x = 4y.$$

$$\therefore \text{Required percentage} = \left(\frac{y}{x} \times 100 \right)\% = \left(\frac{y}{4y} \times 100 \right)\% = 25\%.$$

Ex. 16. Mr. Jones gave 40% of the money he had, to his wife. He also gave 20% of the remaining amount to each of his three sons. Half of the amount now left was spent on miscellaneous items and the remaining amount of Rs. 12,000 was deposited in the bank. How much money did Mr. Jones have initially?

Sol. Let the initial amount with Mr. Jones be Rs. x . Then,

$$\text{Money given to wife} = \text{Rs. } \frac{40}{100} x = \text{Rs. } \frac{2x}{5}. \text{ Balance} = \text{Rs. } \left(x - \frac{2x}{5} \right) = \text{Rs. } \frac{3x}{5}.$$

$$\text{Money given to 3 sons} = \text{Rs. } \left[3 \times \left(\frac{20}{100} \times \frac{3x}{5} \right) \right] = \text{Rs. } \frac{9x}{25}.$$

$$\text{Balance} = \text{Rs. } \left(\frac{3x}{5} - \frac{9x}{25} \right) = \text{Rs. } \frac{6x}{25}.$$

$$\text{Amount deposited in bank} = \text{Rs. } \left(\frac{1}{2} \times \frac{6x}{25} \right) = \text{Rs. } \frac{3x}{25}.$$

$$\therefore \frac{3x}{25} = 12000 \Leftrightarrow x = \left(\frac{12000 \times 25}{3} \right) = 100000.$$

So, Mr. Jones initially had Rs. 1,00,000 with him.

Short-cut Method : Let the initial amount with Mr. Jones be Rs. x .

Then, $\frac{1}{2} [100 - (3 \times 20)]\%$ of $(100 - 40)\%$ of $x = 12000$.

$$\Leftrightarrow \frac{1}{2} \times \frac{40}{100} \times \frac{60}{100} \times x = 12000 \Leftrightarrow \frac{3}{25} x = 12000 \Leftrightarrow x = \left(\frac{12000 \times 25}{3} \right) = 100000.$$

Ex. 17. 10% of the inhabitants of a village having died of cholera, a panic set in, during which 25% of the remaining inhabitants left the village. The population is then reduced to 4050. Find the number of original inhabitants. (S.S.C. 2002)

Sol. Let the total number of original inhabitants be x .

Then, $(100 - 25)\%$ of $(100 - 10)\%$ of $x = 4050$

$$\Leftrightarrow \left(\frac{75}{100} \times \frac{90}{100} \times x \right) = 4050 \Leftrightarrow \frac{27}{40} x = 4050 \Leftrightarrow x = \left(\frac{4050 \times 40}{27} \right) = 6000.$$

Number of original inhabitants = 6000.

Ex. 18. A salesman's commission is 5% on all sales upto Rs. 10,000 and 4% on all sales exceeding this. He remits Rs. 31,100 to his parent company after deducting his commission. Find the total sales. (R.R.B. 2001)

Sol. Let his total sales be Rs. x . Now, (Total Sales) - (Commission) = Rs. 31,100.

$$\therefore x - [5\% \text{ of } 10000 + 4\% \text{ of } (x - 10000)] = 31100$$

$$\Leftrightarrow x - \left[\frac{5}{100} \times 10000 + \frac{4}{100} (x - 10000) \right] = 31100 \Leftrightarrow x - 500 - \frac{(x - 10000)}{25} = 31100$$

$$\Leftrightarrow x - \frac{x}{25} = 31200 \Leftrightarrow \frac{24x}{25} = 31200 \Leftrightarrow x = \left(\frac{31200 \times 25}{24} \right) = 32500.$$

\therefore Total sales = Rs. 32,500.

Ex. 19. Raman's salary was decreased by 50% and subsequently increased by 50%. How much percent does he lose? (Hotel Management, 2003)

Sol. Let original salary = Rs. 100.

New final salary = 150% of (50% of Rs. 100) = Rs. $\left(\frac{150}{100} \times \frac{50}{100} \times 100 \right)$ = Rs. 75.

\therefore Decrease = 25%.

Ex. 20. Paulson spends 75% of his income. His income is increased by 20% and he increased his expenditure by 10%. Find the percentage increase in his savings.

Sol. Let original income = Rs. 100. Then, expenditure = Rs. 75 and savings = Rs. 25.

New income = Rs. 120, New expenditure = Rs. $\left(\frac{110}{100} \times 75 \right)$ = Rs. $\frac{165}{2}$.

New savings = Rs. $\left(120 - \frac{165}{2} \right)$ = Rs. $\frac{75}{2}$.

Increase in savings = Rs. $\left(\frac{75}{2} - 25 \right)$ = Rs. $\frac{25}{2}$.

\therefore Increase% = $\left(\frac{25}{2} \times \frac{1}{25} \times 100 \right)\% = 50\%$.

Ex. 21. The salary of a person was reduced by 10%. By what percent should his reduced salary be raised so as to bring it at par with his original salary? (S.S.C. 2004)

Sol. Let the original salary be Rs. 100. New salary = Rs. 90.

Increase on 90 = 10. Increase on 100 = $\left(\frac{10}{90} \times 100 \right)\% = 11\frac{1}{9}\%$.

Ex. 22. When the price of a product was decreased by 10%, the number sold increased by 30%. What was the effect on the total revenue? (R.B.I. 2003)

Sol. Let the price of the product be Rs. 100 and let original sale be 100 pieces.

Then, Total Revenue = Rs. $(100 \times 100) = \text{Rs. } 10000$.

New revenue = Rs. $(90 \times 130) = \text{Rs. } 11700$.

$$\therefore \text{Increase in revenue} = \left(\frac{1700}{10000} \times 100 \right)\% = 17\%$$

Ex. 23. 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.

Sol. Let the original fraction be $\frac{x}{y}$.

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

Ex. 24. In the new budget, the price of kerosene oil rose by 25%. By how much percent must a person reduce his consumption so that his expenditure on it does not increase?

$$\text{Sol. Reduction in consumption} = \left[\frac{R}{(100 + R)} \times 100 \right]\% = \left(\frac{25}{125} \times 100 \right)\% = 20\%$$

Ex. 25. The population of a town is 1,76,400. If it increases at the rate of 5% per annum, what will be its population 2 years hence? What was it 2 years ago?

$$\text{Sol. Population after 2 years} = 176400 \times \left(1 + \frac{5}{100} \right)^2 = \left(176400 \times \frac{21}{20} \times \frac{21}{20} \right) = 194481.$$

$$\text{Population 2 years ago} = \frac{176400}{\left(1 + \frac{5}{100} \right)^2} = \left(176400 \times \frac{20}{21} \times \frac{20}{21} \right) = 160000.$$

Ex. 26. The value of a machine depreciates at the rate of 10% per annum. If its present value is Rs. 1,62,000, what will be its worth after 2 years? What was the value of the machine 2 years ago?

Sol. Value of the machine after 2 years

$$= \text{Rs.} \left[162000 \times \left(1 - \frac{10}{100} \right)^2 \right] = \text{Rs.} \left(162000 \times \frac{9}{10} \times \frac{9}{10} \right) = \text{Rs. } 131220.$$

Value of the machine 2 years ago

$$= \text{Rs.} \left[\frac{162000}{\left(1 - \frac{10}{100} \right)^2} \right] = \text{Rs.} \left(162000 \times \frac{10}{9} \times \frac{10}{9} \right) = \text{Rs. } 200000.$$

Ex. 27. During one year, the population of a town increased by 5% and during the next year, the population decreased by 5%. If the total population is 9975 at the end of the second year, then what was the population size in the beginning of the first year? (Hotel Management, 2003)

Sol. Population in the beginning of the first year

$$= \frac{9975}{\left(1 + \frac{5}{100} \right) \left(1 - \frac{5}{100} \right)} = \left(9975 \times \frac{20}{21} \times \frac{20}{19} \right) = 10000.$$

Ex. 28. If A earns $33\frac{1}{3}\%$ more than B, how much percent does B earn less than A?

$$\text{Sol. Required percentage} = \left[\frac{\left(\frac{100}{3} \right)}{\left(100 + \frac{100}{3} \right)} \times 100 \right] \% = \left(\frac{100}{400} \times 100 \right) \% = 25\%.$$

Ex. 29. If A's salary is 20% less than B's salary, by how much percent is B's salary more than A's?

$$\text{Sol. Required percentage} = \left[\frac{20}{(100 - 20)} \times 100 \right] \% = 25\%.$$

Ex. 30. How many kg of pure salt must be added to 30 kg of 2% solution of salt and water to increase it to a 10% solution? (M.A.T. 2004)

$$\text{Sol. Amount of salt in 30 kg solution} = \left(\frac{2}{100} \times 30 \right) \text{ kg} = 0.6 \text{ kg.}$$

Let x kg of pure salt be added.

$$\text{Then, } \frac{0.6 + x}{30 + x} = \frac{10}{100} \Leftrightarrow 60 + 100x = 300 + 10x \Leftrightarrow 90x = 240 \Leftrightarrow x = \frac{8}{3} = 2\frac{2}{3}.$$

Ex. 31. Due to a reduction of $6\frac{1}{4}\%$ in the price of sugar, a man is able to buy 1 kg more for Rs. 120. Find the original and reduced rate of sugar.

Sol. Let original rate be Rs. x per kg.

$$\text{Reduced rate} = \text{Rs.} \left[\left(100 - \frac{25}{4} \right) \times \frac{1}{100} x \right] = \text{Rs.} \frac{15x}{16} \text{ per kg.}$$

$$\therefore \frac{120}{\frac{15x}{16}} - \frac{120}{x} = 1 \Leftrightarrow \frac{128}{x} - \frac{120}{x} = 1 \Leftrightarrow x = 8.$$

So, original rate = Rs. 8 per kg.

$$\text{Reduced rate} = \text{Rs.} \left(\frac{15}{16} \times 8 \right) \text{ per kg} = \text{Rs.} 7.50 \text{ per kg.}$$

Ex. 32. In an examination, 35% of total students failed in Hindi, 45% failed in English and 20% in both. Find the percentage of those who passed in both the subjects.

Sol. Let A and B be the sets of students who failed in Hindi and English respectively. Then, $n(A) = 35$, $n(B) = 45$, $n(A \cap B) = 20$.

$$\text{So, } n(A \cup B) = n(A) + n(B) - n(A \cap B) = (35 + 45 - 20) = 60.$$

∴ Percentage failed in Hindi or English or both = 60%.

Hence, percentage passed = $(100 - 60)\% = 40\%$.

Ex. 33. In an examination, 80% of the students passed in English, 85% in Mathematics and 75% in both English and Mathematics. If 40 students failed in both the subjects, find the total number of students.

Sol. 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

$$= n(A \cup B) = n(A) + n(B) - n(A \cap B) = 80\% \text{ of } x + 85\% \text{ of } x - 75\% \text{ of } x$$

$$= \left(\frac{80}{100} x + \frac{85}{100} x - \frac{75}{100} x \right) = \frac{90}{100} x = \frac{9}{10} x.$$

\therefore Students who failed in both the subjects = $\left(x - \frac{9x}{10} \right) = \frac{x}{10}$.

So, $\frac{x}{10} = 40$ or $x = 400$. Hence, total number of students = 400.

EXERCISE 10

(OBJECTIVE TYPE QUESTIONS)

Directions : Mark (✓) against the correct answer :

1. The ratio $5 : 4$ expressed as a percent equals : (S.S.C. 2000)
 (a) 12.5% (b) 40% (c) 80% (d) 125%
2. 3.5 can be expressed in terms of percentage as : (R.R.B. 1998)
 (a) 0.35% (b) 3.5% (c) 35% (d) 350%
3. Half of 1 percent written as a decimal is : (S.S.C. 1999)
 (a) 0.005 (b) 0.05 (c) 0.02 (d) 0.2
4. What is 15 percent of Rs. 34 ? (I.M.T. 2002)
 (a) Rs. 3.40 (b) Rs. 3.75 (c) Rs. 4.50 (d) Rs. 5.10
5. $63\% \text{ of } 3\frac{4}{7}$ is :
 (a) 2.25 (b) 2.40 (c) 2.50 (d) 2.75
6. $88\% \text{ of } 370 + 24\% \text{ of } 210 - ? = 118$ (Bank P.O. 2003)
 (a) 256 (b) 258 (c) 268 (d) 358
7. $860\% \text{ of } 50 + 50\% \text{ of } 860 = ?$ (R.B.I. 2003)
 (a) 430 (b) 516 (c) 860 (d) 960
8. $45\% \text{ of } 750 - 25\% \text{ of } 480 = ?$ (Bank P.O. 2002)
 (a) 216 (b) 217.50 (c) 236.50 (d) 245
9. $40\% \text{ of } 1640 + ? = 35\% \text{ of } 980 + 150\% \text{ of } 850$ (S.B.I.P.O. 1997)
 (a) 372 (b) 842 (c) 962 (d) 1052
10. $218\% \text{ of } 1674 = ? \times 1800$
 (a) 0.5 (b) 4 (c) 6 (d) None of these
11. 60% of 264 is the same as : (Hotel Management, 2001)
 (a) 10% of 44 (b) 15% of 1056 (c) 30% of 132 (d) None of these
12. 270 candidates appeared for an examination, of which 252 passed. The pass percentage is :
 (a) 80% (b) $83\frac{1}{2}\%$ (c) $90\frac{1}{3}\%$ (d) $93\frac{1}{3}\%$
13. 5 out of 2250 parts of earth is sulphur. What is the percentage of sulphur in earth ?
 (a) $\frac{11}{50}$ (b) $\frac{2}{9}$ (c) $\frac{1}{45}$ (d) $\frac{2}{45}$
14. What percent of 7.2 kg is 18 gms ?
 (a) .025% (b) .25% (c) 2.5% (d) 25%
15. 0.01 is what percent of 0.1 ? (S.S.C. 2000)
 (a) $\frac{1}{100}$ (b) $\frac{1}{10}$ (c) 10 (d) 100
16. What percent of Rs. 2650 is Rs. 1987.50 ? (Hotel Management, 2002)
 (a) 60% (b) 75% (c) 80% (d) 90%

17. What percent of a day is 3 hours ? (R.R.B. 2003)
- (a) $12\frac{1}{2}\%$ (b) $16\frac{2}{3}\%$ (c) $18\frac{2}{3}\%$ (d) $22\frac{1}{2}\%$
18. It costs Re. 1 to photocopy a sheet of paper. However, 2% discount is allowed on all photocopies done after first 1000 sheets. How much will it cost to copy 5000 sheets of paper ? (IGNOU, 2003)
- (a) Rs. 3920 (b) Rs. 3980 (c) Rs. 4900 (d) Rs. 4920
19. A housewife saved Rs. 2.50 in buying an item on sale. If she spent Rs. 25 for the item, approximately how much percent she saved in the transaction ? (Section Officers', 2003)
- (a) 8% (b) 9% (c) 10% (d) 11%
20. How many litres of pure acid are there in 8 litres of a 20% solution ? (M.A.T. 2002)
- (a) 1.4 (b) 1.5 (c) 1.6 (d) 2.4
21. Rajeev buys goods worth Rs. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods. (M.A.T. 2002)
- (a) Rs. 6876.10 (b) Rs. 6999.20 (c) Rs. 6654 (d) Rs. 7000
22. Which one of the following shows the best percentage ? (Hotel Management, 1998) (M.A.T. 2002)
- (a) $\frac{384}{540}$ (b) $\frac{425}{500}$ (c) $\frac{570}{700}$ (d) $\frac{480}{660}$
23. 5% of (25% of Rs. 1600) is (S.S.C. 2002)
- (a) Rs. 5 (b) Rs. 17.50 (c) Rs. 20 (d) Rs. 25
24. 0.15% of $33\frac{1}{3}\%$ of Rs. 10,000 is (S.S.C. 2002)
- (a) Re. 0.05 (b) Rs. 5 (c) Rs. 105 (d) Rs. 150
25. 30% of 28% of 480 is the same as (Bank P.O. 2002)
- (a) 15% of 56% of 240 (b) 60% of 28% of 240 (c) 60% of 56% of 240 (d) None of these
26. What is 25% of 25% equal to ? (Bank P.O. 2002)
- (a) 0.00625 (b) 0.0625 (c) 0.625 (d) 6.25
27. What percent is 3% of 5% ? (Bank P.O. 2002)
- (a) 15% (b) 30% (c) 50% (d) 60%
28. 4598 is 95% of ? (Bank P.O. 2002)
- (a) 4800 (b) 4840 (c) 4850 (d) 4880
29. ?% of 360 = 129.6 (Bank P.O. 2002)
- (a) 36 (b) 64 (c) 72 (d) 77
30. ?% of 932 + 30 = 309.6 (Bank P.O. 2003)
- (a) 25 (b) 30 (c) 35 (d) 40
31. 45% of 1500 + 35% of 1700 = ?% of 3175 (Bank P.O. 2000)
- (a) 30 (b) 35 (c) 45 (d) None of these
32. 65% of ? = 20% of 422.50 (Bank P.O. 2003)
- (a) 84.5 (b) 130 (c) 139.425 (d) 200
33. An agent gets a commission of 2.5% on the sales of cloth. If on a certain day, he gets Rs. 12.50 as commission, the cloth sold through him on that day is worth (L.I.C. 2003)
- (a) Rs. 250 (b) Rs. 500 (c) Rs. 750 (d) Rs. 1250
34. If Rs. 2800 is $\frac{2}{7}$ percent of the value of a house, the worth of the house (in Rs.) is (L.I.C. 2003)
- (a) 8,00,000 (b) 9,80,000 (c) 10,00,000 (d) 12,00,000

35. 15% of (?)% of 582 = 17.46
 (a) 2 (b) 10 (c) 20 (d) None of these

36. $\sqrt{784} + ? = 78\%$ of 500 :
 (a) 342 (b) 352 (c) 362 (d) 372

37. If 120 is 20% of a number, then 120% of that number will be :
 (a) 20 (b) 120 (c) 360 (d) 720

38. If 35% of a number is 175, then what percent of 175 is that number ?
 (a) 35% (b) 65% (c) 280% (d) None of these

39. Two-fifth of one-third of three-seventh of a number is 15. What is 40 percent of that number ?
 (a) 72 (b) 84 (c) 136 (d) 140 (e) None of these
(Bank P.O. 2002)

40. The difference between a number and its two-fifth is 510. What is 10% of that number ?
 (a) 12.75 (b) 85 (c) 204 (d) None of these
(Bank P.O. 2003)

41. If 15% of 40 is greater than 25% of a number by 2, then the number is :
 (a) 12 (b) 16 (c) 24 (d) 32

42. Subtracting 40% of a number from the number, we get the result as 30. The number is :
 (a) 28 (b) 50 (c) 52 (d) 70

43. If 35% of a number is 12 less than 50% of that number, then the number is :
 (a) 40 (b) 50 (c) 60 (d) 80
(C.B.I. 1998)

44. The number which exceeds 16% of it by 42 is :
 (a) 50 (b) 52 (c) 58 (d) 60
(C.B.I. 1997)

45. What percentage of numbers from 1 to 70 have squares that end in the digit 1 ?
 (a) 1 (b) 14 (c) 20 (d) 21
(M.B.A. 2002)

46. By how much percent is four-fifth of 70 lesser than five-seventh of 112 ?
 (a) 24% (b) 30% (c) 36% (d) 42%

47. If a number x is 10% less than another number y and y is 10% more than 125, then x is equal to :
 (a) 123.75 (b) 140.55 (c) 143 (d) 150
(S.S.C. 2002)

48. If 75% of a number is added to 75, then the result is the number itself. The number is :
 (a) 50 (b) 60 (c) 300 (d) 400
(Section Officers', 2001)

49. A number, when 35 is subtracted from it, reduces to its 80 percent. What is four-fifth of that number ?
 (a) 70 (b) 90 (c) 120 (d) 140
(B.S.R.B. 1998)

50. Which of the following multipliers will cause a number to be increased by 29.7% ?
 (a) 1.297 (b) 12.97 (c) 129.7 (d) 1297

51. The sum of two numbers is 2490. If 6.5% of one number is equal to 8.5% of the other, then the numbers are :
 (a) 989, 1501 (b) 1011, 1479 (c) 1401, 1089 (d) 1411, 1079
(IGNOU, 2003)

52. 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%
(Hotel Management, 1997)

- 53.** If 25% of a number is subtracted from a second number, the second number reduces to its five-sixth. What is the ratio of the first number to the second number ?
 (a) 1 : 3 (b) 2 : 3 (c) 3 : 2 (d) Data inadequate
 (S.B.I.P.O. 1999)
- 54.** The difference of two numbers is 20% of the larger number. If the smaller number is 20, then the larger number is :
 (a) 25 (b) 45 (c) 50 (d) 80
 (S.S.C. 2000)
- 55.** When any number is divided by 12, then dividend becomes $\frac{1}{4}$ th of the other number. By how much percent first number is greater than the second number ?
 (a) 150 (b) 200 (c) 300 (d) Data inadequate
 (Bank P.O. 2000)
- 56.** If one number is 80% of the other and 4 times the sum of their squares is 656, then the numbers are :
 (a) 4, 5 (b) 8, 10 (c) 16, 20 (d) None of these
 (Hotel Management, 1998)
- 57.** Two numbers A and B are such that the sum of 5% of A and 4% of B is two-third of the sum of 6% of A and 8% of B. Find the ratio of A : B.
 (M.B.A. 2002)
 (a) 2 : 3 (b) 1 : 1 (c) 3 : 4 (d) 4 : 3
- 58.** Three candidates contested an election and received 1136, 7636 and 11628 votes respectively. What percentage of the total votes did the winning candidate get ?
 (a) 57% (b) 60% (c) 65% (d) 90%
 (I.M.T. 2002)
- 59.** The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is :
 (C.B.I. 1997)
 (a) 4.37% (b) 5% (c) 6% (d) 8.75%
- 60.** A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation ?
 (S.S.C. 1999)
 (a) 34% (b) 44% (c) 54% (d) 64%
- 61.** A tempo is insured to the extent of $\frac{4}{5}$ of its original value. If the premium on it at the rate of 1.3 percent amounts to Rs. 910, the original value of the tempo is :
 (a) Rs. 78,500 (b) Rs. 80,000 (c) Rs. 82,500 (d) Rs. 87,500
- 62.** When 15% is lost in grinding wheat, a country can export 30 lakh tons of wheat. On the other hand, if 10% is lost in grinding, it can export 40 lakh tons of wheat. The production of wheat in the country is :
 (a) 20 lakh tons (b) 80 lakh tons (c) 200 lakh tons (d) 800 lakh tons
- 63.** In a competitive examination in State A, 6% candidates got selected from the total appeared candidates. State B had an equal number of candidates appeared and 7% candidates got selected with 80 more candidates got selected than A. What was the number of candidates appeared from each State ?
 (S.B.I.P.O. 2000)
 (a) 7600 (b) 8000 (c) 8400 (d) Data inadequate
- 64.** The price of a car is Rs. 3,25,000. It was insured to 85% of its price. The car was damaged completely in an accident and the insurance company paid 90% of the insurance. What was the difference between the price of the car and the amount received ?
 (a) Rs. 32,500 (b) Rs. 48,750 (c) Rs. 76,375 (d) Rs. 81,250
 (Bank P.O. 2003)

65. Gauri went to the stationers and bought things worth Rs. 25, out of which 30 paise went on sales tax on taxable purchases. If the tax rate was 6%, then what was the cost of the tax free items ? (M.A.T. 2003)
 (a) Rs. 15 (b) Rs. 15.70 (c) Rs. 19.70 (d) Rs. 20
66. 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 ? (S.S.C. 2004)
 (a) 45% (b) $45\frac{5}{11}\%$ (c) $54\frac{6}{11}\%$ (d) 55%
67. After deducting a commission of 5%, a T.V. set costs Rs. 9595. Its marked price is :
 (a) Rs. 10,000 (b) Rs. 10,075 (c) Rs. 10,100 (d) Rs. 10,500
68. A fruit seller had some apples. He sells 40% apples and still has 420 apples. Originally, he had : (S.S.C. 2003)
 (a) 588 apples (b) 600 apples (c) 672 apples (d) 700 apples
69. A person who spends $66\frac{2}{3}\%$ of his income is able to save Rs. 1200 per month. His monthly expenses (in Rs.) are : (S.S.C. 1999)
 (a) Rs. 1200 (b) Rs. 2400 (c) Rs. 3000 (d) Rs. 3200
70. In an examination, 35% of the students passed and 455 failed. How many students appeared for the examination ? (S.S.C. 2000)
 (a) 490 (b) 700 (c) 845 (d) 1300
71. 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
72. A student has to obtain 33% of the total marks to pass. He got 125 marks and failed by 40 marks. The maximum marks are : (C.B.I. 2003)
 (a) 300 (b) 500 (c) 800 (d) 1000
73. In an election a candidate who gets 84% of the votes is elected by a majority of 476 votes. What is the total number of votes polled ? (Hotel Management, 2003)
 (a) 672 (b) 700 (c) 749 (d) 848
74. In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got, was : (R.R.B. 2003)
 (a) 2700 (b) 2900 (c) 3000 (d) 3100
75. At an election involving two candidates, 68 votes were declared invalid. The winning candidate secures 52% and wins by 98 votes. The total number of votes polled is : (a) 2382 (b) 2450 (c) 2518 (d) None of these
76. 10% of the voters did not cast their vote in an election between two candidates. 10% of the votes polled were found invalid. The successful candidate got 54% of the valid votes and won by a majority of 1620 votes. The number of voters enrolled on the voters' list was : (S.S.C. 2003)
 (a) 25000 (b) 33000 (c) 35000 (d) 40000
77. 8% of the people eligible to vote are between 18 and 21 years of age. In an election, 85% of those eligible to vote, who were between 18 and 21, actually voted. In that election, the number of persons between 18 and 21, who actually voted, was what percent of those eligible to vote ? (R.R.B. 1998)
 (a) 4.2 (b) 6.4 (c) 6.8 (d) 8
78. In an election, 30% of the voters voted for candidate A whereas 60% of the remaining voted for candidate B. The remaining voters did not vote. If the difference between

those who voted for candidate A and those who did not vote was 1200, how many individuals were eligible for casting vote in that election ?

- (a) 10,000 (b) 45,000 (c) 60,000 (d) 72,000

79. Two tailors X and Y are paid a total of Rs. 550 per week by their employer. If X is paid 120 percent of the sum paid to Y, how much is Y paid per week ?

- (a) Rs. 200 (b) Rs. 250 (c) Rs. 300 (d) None of these
(N.I.F.T. 2000)

80. While purchasing one item costing Rs. 400, I had to pay the sales tax at 7% and another costing Rs. 6400, the sales tax was 9%. What percent of the sales tax I had to pay, taking the two items together on an average ?

- (a) 8% (b) $8\frac{13}{17}\%$ (c) $8\frac{15}{17}\%$ (d) $8\frac{1}{2}\%$

81. 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
(Hotel Management, 1998)

82. 1100 boys and 700 girls are examined in a test; 42% of the boys and 30% of the girls pass. The percentage of the total who failed is :

- (a) 58% (b) $62\frac{2}{3}\%$ (c) 64% (d) 78%

83. In a certain school, 20% of students are below 8 years of age. The number of students above 8 years of age is $\frac{2}{3}$ of the number of students of 8 years age which is 48. What is the total number of students in the school ?

- (a) 72 (b) 80 (c) 120 (d) 150 (e) None of these
(Bank P.O. 2003)

84. 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
(Hotel Management, 1998)

85. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks was 56% of the sum of their marks. The marks obtained by them are :

- (a) 39, 30 (b) 41, 32 (c) 42, 33 (d) 43, 34
(S.S.C. 2004)

86. If x is 90% of y , then what percent of x is y ?

- (a) 90% (b) $101\frac{1}{9}\%$ (c) $111\frac{1}{9}\%$ (d) 190%

87. $x\%$ of y is $y\%$ of :

- (a) x (b) $100x$ (c) $\frac{x}{100}$ (d) $\frac{y}{100}$
(S.S.C. 1997)

88. If 20% of $a = b$, then $b\%$ of 20 is the same as :

- (a) 4% of a (b) 5% of a (c) 20% of a (d) None of these
(Hotel Management, 1998)

89. If $x\%$ of y is the same as $\frac{4}{5}$ of 80, then the value of xy is :

- (a) 320 (b) 400 (c) 640 (d) None of these
(S.S.C. 2002)

90. If $x\%$ of y is 100 and $y\%$ of z is 200, then find a relation between x and z .

- (a) $z = \frac{x}{2}$ (b) $z = 2x$ (c) $z = \frac{x}{4}$ (d) $z = 4x$
(S.S.C. 2002)

91. If $p\%$ of p is 36, then p is equal to : (S.S.C. 2000)
 (a) 15 (b) 60 (c) 600 (d) 3600

92. If $x\%$ of y is equal to z , what percent of z is x ? (S.S.C. 1999)
 (a) $\frac{y^2}{100}$ (b) $\frac{y}{100^2}$ (c) $\frac{100}{y}$ (d) $\frac{100^2}{y}$

93. If x is 80% of y , then what percent of $2x$ is y ? (C.B.I. 1998)
 (a) 40% (b) $62\frac{1}{2}\%$ (c) $66\frac{2}{3}\%$ (d) 80%

94. Subtracting 6% of x from x is equivalent to multiplying x by how much ?
 (a) 0.094 (b) 0.94 (c) 9.4 (d) 94

95. $(x\% \text{ of } y + y\% \text{ of } x) = ?$
 (a) $x\% \text{ of } y$ (b) $y\% \text{ of } x$ (c) 2% of xy (d) $xy\% \text{ of } 3$

96. If A is 150 percent of B, then B is what percent of $(A + B)$? (d) $xy\% \text{ of } 3$
 (a) $33\frac{1}{3}\%$ (b) 40% (c) $66\frac{2}{3}\%$ (d) 75%

97. If 8% of $x = 4\%$ of y , then 20% of x is . (d) None of these
 (a) 10% of y (b) 16% of y (c) 80% of y

98. If 20% of A = B and 40% of B = C, then 60% of $(A + B)$ is : (d) None of these
 (a) 30% of C (b) 60% of C (c) 75% of C

99. If $x\%$ of a is the same as $y\%$ of b , then $z\%$ of b is : (d) None of these
 (a) $\frac{xy}{z}\%$ of a (b) $\frac{yz}{x}\%$ of a (c) $\frac{xz}{y}\%$ of a

100. If A = $x\%$ of y and B = $y\%$ of x , then which of the following is true ?
 (a) A is smaller than B. (b) A is greater than B.
 (c) Relationship between A and B cannot be determined.
 (d) If x is smaller than y , then A is greater than B.
 (e) None of these (Bank P.O. 2003)

101. $33\frac{1}{3}\%$ 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

Directions (Questions 102 to 106) : A survey of magazine reading habits of the people living in five cities P, Q, R, S and T is summarised in a table given below. The Column I in the table gives percentage of magazine-readers in each city who read only one magazine a week. The Column II gives the total number of magazine-readers who read two or more magazines a week. Read the table and then answer these questions : (S.S.C. 1999)

City	I	II
P	75	6000
Q	80	3500
R	60	3000
S	55	2700
T	25	4200

Q3. In an examination, 35% candidates failed in one subject and 42% failed in another subject while 15% failed in both the subjects. If 2500 candidates appeared at the examination, how many passed in either subject but not in both?

(a) 325

(b) 1175

(c) 2125

(d) None of these

ANSWERS

- | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (d) | 2. (d) | 3. (a) | 4. (d) | 5. (a) | 6. (b) | 7. (c) | 8. (b) | 9. (c) |
| 10. (d) | 11. (b) | 12. (d) | 13. (b) | 14. (d) | 15. (c) | 16. (b) | 17. (a) | 18. (d) |
| 19. (b) | 20. (c) | 21. (a) | 22. (b) | 23. (c) | 24. (b) | 25. (b) | 26. (b) | 27. (d) |
| 28. (b) | 29. (a) | 30. (b) | 31. (d) | 32. (b) | 33. (b) | 34. (b) | 35. (c) | 36. (c) |
| 37. (d) | 38. (d) | 39. (e) | 40. (b) | 41. (b) | 42. (b) | 43. (d) | 44. (a) | 45. (c) |
| 46. (b) | 47. (a) | 48. (c) | 49. (d) | 50. (a) | 51. (d) | 52. (a) | 53. (b) | 54. (a) |
| 55. (b) | 56. (b) | 57. (d) | 58. (a) | 59. (b) | 60. (b) | 61. (d) | 62. (c) | 63. (b) |
| 64. (c) | 65. (c) | 66. (b) | 67. (c) | 68. (d) | 69. (b) | 70. (b) | 71. (b) | 72. (b) |
| 73. (b) | 74. (a) | 75. (c) | 76. (a) | 77. (c) | 78. (c) | 79. (b) | 80. (c) | 81. (a) |
| 82. (b) | 83. (e) | 84. (a) | 85. (c) | 86. (c) | 87. (a) | 88. (a) | 89. (d) | 90. (b) |
| 91. (b) | 92. (d) | 93. (b) | 94. (b) | 95. (c) | 96. (b) | 97. (a) | 98. (d) | 99. (c) |
| 100. (e) | 101. (d) | 102. (d) | 103. (a) | 104. (c) | 105. (a) | 106. (c) | 107. (b) | 108. (d) |
| 109. (b) | 110. (d) | 111. (a) | 112. (b) | 113. (b) | 114. (d) | 115. (a) | 116. (c) | 117. (c) |
| 118. (c) | 119. (d) | 120. (c) | 121. (d) | 122. (c) | 123. (a) | 124. (c) | 125. (e) | 126. (c) |
| 127. (c) | 128. (d) | 129. (b) | 130. (d) | 131. (c) | 132. (c) | 133. (c) | 134. (d) | 135. (c) |
| 136. (a) | 137. (d) | 138. (b) | 139. (b) | 140. (b) | 141. (a) | 142. (b) | 143. (e) | 144. (b) |
| 145. (c) | 146. (c) | 147. (b) | 148. (c) | 149. (d) | 150. (c) | 151. (b) | 152. (d) | 153. (b) |
| 154. (d) | 155. (b) | 156. (b) | 157. (b) | 158. (d) | 159. (c) | 160. (d) | 161. (a) | 162. (c) |
| 163. (b) | 164. (d) | 165. (d) | 166. (c) | 167. (c) | 168. (b) | 169. (c) | 170. (d) | 171. (c) |
| 172. (d) | 173. (d) | 174. (b) | 175. (c) | 176. (b) | 177. (b) | 178. (c) | 179. (d) | 180. (b) |
| 181. (a) | 182. (c) | 183. (c) | 184. (c) | 185. (c) | 186. (b) | 187. (a) | 188. (c) | 189. (c) |
| 190. (b) | 191. (c) | 192. (c) | 193. (a) | 194. (c) | 195. (a) | 196. (a) | 197. (c) | 198. (c) |
| 199. (b) | 200. (d) | 201. (c) | 202. (a) | 203. (b) | | | | |

SOLUTIONS

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

$$2. \ 3.5 = \frac{35}{10} = \left(\frac{35}{10} \times 100 \right)\% = 350\%.$$

$$3. \ \frac{1}{2}\% = \left(\frac{1}{2} \times \frac{1}{100} \right) = \frac{0.5}{100} = 0.005.$$

$$4. \ 15\% \text{ of Rs. } 34 = \text{Rs.} \left(\frac{15}{100} \times 34 \right) = \text{Rs. } 5.10.$$