Chapter 9: Percentage
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Exercise 9A

Question 1:
Solution:

(i) $48\% = \frac{48}{100} = \frac{12}{25}$

(ii) $220\% = \frac{220}{100} = \frac{11}{5}$

(iii) $2.5\% = \frac{2.5}{100} = \frac{25}{1000} = \frac{1}{40}$

Question 2:
Solution:

(i) $6\% = \frac{6}{100} = 0.06$

(ii) $72\% = \frac{72}{100} = 0.072$

(iii) $125\% = \frac{125}{100} = 1.25$

Question 3:
Solution:

(i) $\frac{9}{25}$

$= \left(\frac{9}{25} \times 100\right)\%$

$= (9 \times 4)\%$

$= 36\%$

(ii) $\frac{3}{125}$

$= \left(\frac{3}{125} \times 100\right)\%$

$= 2.4\%$

(iii) $\frac{12}{5}$

$= \left(\frac{12}{5} \times 100 \right)\%$

$= 240\%$

Question 4:

Solution:

$4:5 = \frac{4}{5} = \left(\frac{4}{5} \times 100 \right) = 80\%$

Question 5:

Solution:

$125\% = \frac{125}{100} = \frac{5}{4} = 5:4$

Question 6:

Solution: We have,

$6\frac{2}{3}\% = \frac{20}{3}\% = \left(\frac{20}{3} \times \frac{1}{100} \right) = \frac{1}{15} = 0.06$

Also, $\frac{3}{20} = 0.15$

The third number is 0.14.

Clearly, 0.15 is the largest.

Hence, $\frac{3}{20}$ is the largest.

Question 7:

Solution:

(i) Required percentage $= \left(\frac{96}{100} \times 100 \right)\% = 64\%$

(ii) Required percentage $= \left(\frac{200}{5 \times 100} \times 100 \right)\% = 4\%$

(iii) Required percentage $= \left(\frac{250}{2 \times 100} \times 100 \right)\% = 12.5\%$

Question 8:

Solution:

$4\frac{1}{2}\% = \frac{9}{2 \times 100}$

$\therefore \frac{9}{200}$ of Rs.3600 = $\frac{9}{200} \times 3600 = Rs.162$.

Question 9:

Solution:

Let the number be x.

16% of x is 72.

$\Rightarrow \frac{16}{100} \times x = 72$

$\Rightarrow 16x = 72 \times 100$

$\Rightarrow 16x = 7200$

$\Rightarrow x = \frac{7200}{16} = 450$

Therefore, the required number is 450.

Question 10:

Solution:

Let Rs. x be his monthly income.

His savings = 18% of Rs. x

$= Rs.\left(x \times \frac{18}{100} \right)$

$= Rs.\frac{9x}{50}$

Now, $\frac{9x}{50} = 1890$

$\Rightarrow x = Rs.\left(1890 \times \frac{50}{9} \right)$

$\Rightarrow x = Rs.10500$

Therefore, his monthly income is Rs.10500.

Question 11:

Solution:

Let x be the total number of games played.

Percentage of games won = 35% of x

$= \left(x \times \frac{35}{100} \right)$

$= \frac{35x}{100}$

Now, $\frac{35x}{100} = 7$

$\Rightarrow x = \left(7 \times \frac{100}{35}\right)$

$\Rightarrow x = 20$

Therefore, the total number of games played is 20.

Question 12:

Solution:

Let Rs. x be Amit's old salary.

His salary after increment will be Rs. $\left(x + \frac{20}{100}x\right)$

According to the question, we have:

$\Rightarrow x + \frac{20}{100}x = 15300$

$\Rightarrow \frac{100x + 20x}{100} = 15300$

$\Rightarrow \frac{120x}{100} = 15300$

$\Rightarrow 120x = 15300 \times 100$

$\Rightarrow x = \frac{15300 \times 100}{120}$

$\Rightarrow x = 12750$

Therefore, the old salary is Rs.12,750.

Question 13:

Solution:

Let x be the number of days the school was opened.

Number of days Sonal attended school = 204 days

Percentage of her attendance = 85% of x

$= \left(x \times \frac{85}{100}\right)$

$= \frac{85x}{100}$

Now, $\frac{85x}{100} = 204$

$\Rightarrow x = \left(204 \times \frac{100}{85}\right)$

$\Rightarrow x = 240$

Therefore, the school was opened for 240 days.

Question 14:

Solution:

Let B's income be Rs.100

Then, A's income = Rs. 80

Therefore, B's income is more than A's income by = $\frac{(100-80)}{80}\times 100\%$

$=\frac{20}{80}\times 100\% = 25\%$

$= Rs.125$

Therefore, B's income is more than that of A's by (125-100)%, i.e., 25%.

Question 15:

Solution:

Let the consumption of petrol originally be 1 unit and let its cost be Rs.100.

New cost of 1 unit of petrol = Rs.110

Now, Rs.110 will yield 1 unit of petrol.

i.e., Rs.100 will yield $\left(\frac{1}{110}\times 100\right), i.e., \frac{10}{11}$ units of petrol.

Now, reduction in consumption = $\left(1-\frac{10}{11}\right)=\frac{1}{11} units$

Percentage of reduction = $\left(\frac{1}{11}\times\frac{1}{1}\times 100\right)\% = 9\frac{1}{11}\%$

Therefore, a motorist must reduce the consumption of petrol by $9\frac{1}{11}\%$.

Question 16:

Solution:

Let x be the population of the town a year ago. Then, present population = 108% of x

$=\left(x\times\frac{108}{100}\right)=\frac{27x}{25}$

Now, $\frac{27x}{25}=54000$

$\Rightarrow x=\left(54000\times\frac{25}{27}\right)$

$\Rightarrow x = 50000$

Hence, the population of the town a year ago was 50000.

Question 17:

Solution:

Let Rs. x be the value of the machine last year.

Then, the present value = 80% of Rs. x

$= Rs.\left(x \times \frac{80}{100} \right)$

$= Rs.\frac{4x}{5}$

Now, $\frac{4x}{5} = 160000$

$\Rightarrow x = \left(160000 \times \frac{5}{4} \right)$

$\Rightarrow x = 40000 \times 5 = 200000$

Hence, the value of the machine last year was Rs.200000.

Question 18:

Solution:

Mass of the alloy = 1 kg

Percentage of copper = 40%

Percentage of nickel = 32%

Percentage of zinc = {100-(40+32)}% = 28%

Therefore, mass of zinc in 1 kg of alloy = $\left(\frac{28}{100} \times 1 \right) kg$

$= 0.28 kg$

$= 0.28 \times 1000 g$

$= 280 g$

Question 19:

Solution:

Amount of protein = 12% of 2600

$= \left(2600 \times \frac{12}{100} \right)$

$= 312 Cal$

Amount of fats = 25% of 2600

$= \left(2600 \times \frac{25}{100} \right)$

$= 650 Cal$

Amount of carbohydrates = 63% of 2600

$$= \left(2600 \times \frac{63}{100} \right)$$
$$= 1638 Cal$$

Question 20:

Solution:

Let x be the amount of gunpowder.

Amount of nitre = 75%

Let x kg be the amount of gunpowder containing 9 kg of nitre.

i.e., (75% of x) = 9 kg

$$\Rightarrow \left(x \times \frac{75}{100} \right) = 9$$
$$\Rightarrow \frac{75x}{100} = 9$$
$$\Rightarrow x = \left(9 \times \frac{100}{75} \right)$$
$$\Rightarrow x = 12 kg$$

Hence, 12 kg of gunpowder contains 9 kg of nitre.

Now, amount of sulphur = 10%

Let x kg be the amount of gunpowder containing 2.5 kg of sulphur.

i.e., (10% of x) = 2.5 kg

$$\Rightarrow \left(x \times \frac{10}{100} \right) = 2.5$$
$$\Rightarrow \frac{10x}{100} = 2.5$$
$$\Rightarrow \frac{x}{10} = 2.5$$
$$\Rightarrow x = 25 kg$$

Hence, 25 kg of gunpowder contains 2.5 kg of sulphur.

Question 21:

Solution:

Let x be the amount of money received by C.

Then, amount of money B gets = (50% of Rs. x)

Amount of money A gets = (50% of B)

= (25% of Rs. x)

Now, x + (50% of Rs. x) + (25% of Rs. x) = Rs.7000

$\Rightarrow x+\left(x\times\frac{50}{100}\right)+\left(x\times\frac{25}{100}\right)=7000$

$\Rightarrow x+\frac{50x}{100}+\frac{25x}{100}=7000$

$\Rightarrow \frac{175x}{100}=7000$

$\Rightarrow x=7000\times\frac{100}{175}$

$\Rightarrow x=Rs.4000$

Therefore, C gets Rs.4000

Amount of money B gets = (50% of Rs. x)

= 50% 0f 4000

$= 4000\times\frac{50}{100}=Rs.2000$

Amount of money A gets = (25% of Rs. x)

= 25% 0f 4000

$= 4000\times\frac{25}{100}=Rs.1000$

Question 22:

Solution:

22 carat gold contains 22 parts pure gold out of 24 parts.

Also, 24 carat gold is given to be 100% pure.

Therefore, percentage of pure gold in 22 carat gold = $\left(\frac{22}{24}\times100\right)\%=91\frac{2}{3}\%$

Hence, 22 carat gold contains $91\frac{2}{3}\%$ of pure gold.

Question 23:

Solution:

Let the original salary be Rs.100.

Then, after increment of 25% the salary becomes

$=100\left(1+\frac{25}{100}\right)=100\left(\frac{125}{100}\right)=Rs.125$

To restore the original salary, let the new salary be decreased by x%.

Thus, we get

$$125\left(1-\frac{x}{100}\right)=100$$

$$\Rightarrow\left(1-\frac{x}{100}\right)=\frac{100}{125}=\frac{4}{5}$$

$$\Rightarrow\frac{x}{100}=\frac{1}{5}$$

$$\Rightarrow x=\frac{100}{x}=20\%$$

Therefore, the new salary must be reduced by 20% to restore the original salary.

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Exercise 9B

OBJECTIVE QUESTIONS

Question 1.
(a) 30% (b) 40% (c) 45% (d) 60%
Solution:(d) 60%

$$\frac{3}{5}\times100=60\%$$

Question 2.
Solution:(b) 0.008

$$0.8\%=\frac{0.8}{100}=\frac{8}{1000}=0.008$$

Question 3.
Solution:(c) 120%

$$6:5=\frac{6}{5}\times100=120\%$$

Question 4.
Solution:(d) 180

$$\frac{5}{100}x=9$$

$$\therefore x=\frac{9\times100}{5}=180$$

Question 5.

Solution: (c) $133\frac{1}{3}\%$

$$\frac{x}{100}\times 90 = 120$$

$$\therefore x = \frac{120\times 100}{90} = \frac{400}{3} = 133\frac{1}{3}\%$$

Question 6.

Solution:(d) 2.5%

$$250g = \frac{250}{1000}kg$$

$$\frac{x}{100}\times 10 = \frac{250}{1000}$$

$$\therefore x = \frac{250\times 100}{10\times 1000} = 2.5\%$$

Question 7.

Solution: (b) 600

$$\frac{40x}{100} = 240$$

$$\therefore x = \frac{240\times 100}{40} = 600$$

Question 8.

Solution: (c) 15

$$\frac{x}{100}\times 400 = 60$$

$$\therefore x = \frac{60\times 100}{400} = 15\%$$

Question 9.

Solution:(d) 560

$$\frac{\left(\frac{180x}{100}\right)}{2} = 504$$

$$\therefore \frac{180x}{100} = 504\times 2$$

$$\therefore x = \frac{504\times 2\times 100}{180} = 560$$

Question 10.

Solution:(a) Rs.160

$\frac{20}{100}\times 800 = Rs.160$

Question 11.

Solution: (c) 175

$\frac{56}{100}x = 98$

$\therefore x = \frac{98\times 100}{56} = 175$

Question 12.

Solution:(b) decreases by 1%

Let x be the first number.

Increase by 10% = $x + \frac{x}{10} = \frac{11x}{10}$

Now decrease by 10% = $\frac{11x}{10} - \frac{\left(\frac{11x}{10}\right)}{10} = \frac{99x}{100}$

So, decrease % is $x - \frac{99x}{100} = \frac{x}{100}$ i.e., 1%

Question 13.

Solution: (a)$18\frac{3}{4}\%$

4 hours 30 min = (4 × 60) +30= 270 min

Total min of a day = 24 × 60 = 1440 min

$\frac{270}{1440}\times 100 = \frac{75}{4} = 18\frac{3}{4}\%$

Question 14.

Solution:(c) 1200

Per cent examinees passed = 65%

Therefore, per cent of failures = 100 – 65 = 35%

$\frac{35}{100}x = 420$

$\therefore x = \frac{420\times 100}{35} = 1200$

Question 15.

Solution:

Let the number be x.

So, 20% of $x = \frac{20}{100}x = \frac{x}{5}$

Now,

$$x - \frac{x}{5} = 40$$

$$\frac{4x}{5} = 40$$

$$x = \frac{40 \times 5}{4} = 50$$

Question 16.

Solution:(c) 120

$$27\frac{1}{2}\% = \frac{55}{2}\% = \frac{55}{2} \times \frac{1}{100} = \frac{11}{40}$$

$$x - \frac{11x}{40} = 87$$

$$\therefore \frac{29x}{40} = 87$$

$$\therefore x = \frac{87 \times 40}{29} = 120$$

Question 17.

Solution:(c) 0.25%

$$\frac{x}{100} \times 20 = 0.05$$

$$\therefore x = \frac{0.05 \times 100}{20} = 0.25\%$$

Question 18.

Solution:(d) 300%

$$\frac{1}{3} \times 1206 = 402$$

$$\frac{x}{100} \times 134 = 402$$

$$\therefore x = \frac{402 \times 100}{134} = 300\%$$

Question 19.
Solution: (a) x

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

Question 20.
Solution: (b) 10%

$$\frac{x}{100} \times \frac{2}{7} = \frac{1}{35}$$

$$\therefore x = \frac{1 \times 7 \times 100}{35 \times 2} = 10\%$$

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TEST PAPER 9

A. Question 1.
Solution:

(i) 24% = $\frac{24}{100} = \frac{6}{25}$

(ii) 105% = $\frac{105}{100} = 1.05$

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

(iv) 56% = $\frac{56}{100} = \frac{14}{25} = 14:25$

Question 2.
Solution: Let the number be x.

$$\frac{34}{100} x = 85$$

$$\therefore x = \frac{85 \times 100}{34} = 250$$

Question 3.
Solution:
Let Rs. x be the value of the machine last year.
Then, the present value = 90% of Rs. x

$= Rs.\left(x \times \frac{90}{100} \right)$

$= Rs.\frac{9x}{10}$

Now, $\frac{9x}{10} = 54000$

$\Rightarrow x = \left(54000 \times \frac{10}{9} \right)$

$\Rightarrow x = 6000 \times 10 = 60000$

Hence, the value of the machine last year was Rs.60000.

Question 4.

Solution:

Mass of the alloy = 1 kg

Percentage of copper = 30%

Percentage of nickel = 42%

Percentage of zinc = {100-(30+42)}% = 28%

Therefore, mass of zinc in 1 kg of alloy = $\left(\frac{28}{100} \times 1 \right) kg$

$= 0.28kg$

$= 0.28 \times 1000g$

$= 280g$

Question 5.

Solution:

Let x be the total number of students.

Number of boys = 60% of x = $\frac{60x}{100}$

Number of girls = 14

So, Total number of students = no. of boys + no. of girls

$\therefore x = \frac{60x}{100} + 14$

$\therefore x - \frac{60x}{100} = 14$

$\therefore \frac{40x}{100} = 14$

$\therefore x = \frac{14 \times 100}{40} = 35$

Question 6.
Solution:
We have,

$$8\frac{1}{3}\% = \frac{25}{3}\% = \left(\frac{25}{3} \times \frac{1}{100}\right) = \frac{1}{12} = 0.08$$

Also, $\frac{4}{25} = 0.16$

The third number is 0.15.
Clearly, 0.16 is the largest.
Hence, $\frac{4}{25}$ is the largest.

B. Question 7.
Solution: (d) 10%

$$\frac{x}{100} \times \frac{2}{9} = \frac{1}{45}$$

$$\therefore x = \frac{1 \times 9 \times 100}{45 \times 2} = 10\%$$

Question 8.
Solution: (c) 120

$$x - \frac{30x}{100} = 84$$

$$\therefore \frac{70x}{100} = 84$$

$$\therefore x = \frac{84 \times 100}{70} = 120$$

Question 9.
Solution: (b) 15%

$$\frac{x}{100} \times 320 = 48$$

$$\therefore x = \frac{48 \times 100}{320} = 15\%$$

Question 10.
Solution: (d) 120%

$$\frac{x}{100} \times 45 = 54$$

$$\therefore x = \frac{54 \times 100}{45} = 120\%$$

Question 11.
Solution: (c) 80
Let the number be x.
So, 25% of $x = \frac{25}{100}x = \frac{x}{4}$
Now,
$x - \frac{x}{4} = 60$
$\frac{3x}{4} = 60$
$x = \frac{60 \times 4}{3} = 80$

Question 12.
Solution: (c) 240
$\frac{5}{100}x = 12$
$\therefore x = \frac{12 \times 100}{5} = 240$

C. Question 13.
Solution:
(i) $7\frac{1}{2}$% of Rs.1200 = Rs.90
(ii) 240 ml is 8% of 3L.
(iii) If x% of 35 is 42, then x = 120.
(iv) $\frac{12}{5} = 240\%$
(v) 120 = (150)% of 80.

D. Question 14.
Solution:
(i) 6% of 8 is 48. - F
(ii) 6:5 = 30% -F
(iii) $\frac{3}{5} = 60\%$ - T
(iv) 6 hours = 25% of a day. - T