Chapter

16 PERCENTAGE AND ITS APPLICATIONS

Section-A
PERCENTAGE

Solved Examples

Ex. 1. ***Shatabdi Express has a capacity of 500 seats of which 10% are in Executive class and the rest being Chair cars. During one journey, the train was booked 85% of its capacity. If Executive class was booked to 96% of its capacity, then how many chair car seats were empty during that journey ?***

Sol. Seats in Executive class = 10% of total seats $= \frac{10}{100} \times 500 = 50$

$\therefore$ Seats in Chair car = 450

Total seats booked = 85% of 450 $= \frac{85}{100} \times 450 = 425$

Total seats booked in Executive class = 96% of 50 $= \frac{96}{100} \times 50 = 48$

$\therefore$ Seats booked in Chair car = (425 – 48) = 377

Empty seats in Chair car = 450 – 377 = 73.

Ex. 2. ***In an examination, a student who gets 20% of maximum marks fail by 5 marks. Another student who scores 30% of the maximum marks gets 20 marks more than the pass marks. What is the necessary percentage required for passing ?***

Sol. Let the maximum marks be x. Then,

Pass mark for the 1st student $= \frac{20}{100} \times x + 5$

Pass mark for the 2nd student $= \frac{30}{100} \times x - 20$

Since pass marks are same for both the students, $\frac{20x}{100} + 5 = \frac{30x}{100} - 20$

$\Rightarrow \frac{10x}{100} = 25 \quad \Rightarrow \quad x = 250$

$\therefore$ Pass mark $= \frac{20}{100} \times 250 + 5 = 55$

Pass percentage $= \frac{55}{250} \times 100 = 22\%$.

Ex. 3. ***What per cent of numbers from 1 to 70 have squares that end in the digit 1 ?***

Sol. The numbers from 1 to 70 that have their squares ending in digit 1 are :

1, 9, 11, 19, 21, 29, 31, 39, 41, 49, 51, 59, 61, 69 *i.e.*, 14 in numbers.

$\therefore$ Required percentage $= \frac{14}{70} \times 100 = 20\%$.

Ex. 4. ***Entry fee in an exhibition was Re 1. Later this was reduced by 25% which increased the sale by 20%. Find the percentage increase in the number of visitors.***

Sol. Let the number of visitors be x. Then, as entry fee = Re 1, Sale = $x \times$ Re 1 = Re x

Reduced entry fee = Re 0.75, Increased sale = x + 20% of x = Rs 1.2 x

Then, increased number of visitors $= \frac{\text{Rs } 1.2x}{\text{Re } 0.75} = 1.6x$

$\therefore$ % increase $= \left(\frac{(1.6x - x)}{x} \times 100 \right)\% = (0.6 \times 100)\% = 60\%$.

Ex. 5. ***The cost of manufacturing a TV set is made up of material costs, labour costs and overhead costs. These costs are in the ratio 4 : 3 : 2. If materials costs and labour costs rise by 10% and 8% respectively, while the overhead costs reduce by 5%, what is the percentage increase in the total cost of the TV set ?***

Sol. Let the cost of the T.V. be Rs x. Then,

Material cost $= \frac{4x}{9}$, Labour cost $= \frac{3x}{9}$, Overhead costs $= \frac{2x}{9}$

New material cost $= \frac{110}{100} \times \frac{4x}{9} = \frac{44x}{90}$

New labour cost $= \frac{108}{100} \times \frac{3x}{9} = \frac{9x}{25}$

New overhead costs $= \frac{95}{100} \times \frac{2x}{9} = \frac{19x}{90}$

Increase in the cost of T.V. $= \left(\frac{44x}{90} - \frac{4x}{9} \right) + \left(\frac{9x}{25} - \frac{3x}{9} \right) + \left(\frac{19x}{90} - \frac{2x}{9} \right)$

$= \frac{4x}{90} + \frac{2x}{75} - \frac{x}{90} = \frac{20x + 12x - 5x}{450} = \frac{27x}{450}$

$\therefore$ % increase in cost $= \frac{\frac{27x}{450}}{x} \times 100\% = \frac{2700}{450}\% = 6\%$.

Ex. 6. ***The price of rice is reduced by 2%. How many kilograms of rice can now be bought for the money which was sufficient to buy 49 kg of rice earlier ?***

Sol. Let the price of rice be Rs x per kg. Then,

Cost of 49 kg rice = Rs 49 x

New price of rice = 98% of Rs x = Rs $\frac{98x}{100}$

$\therefore$ New quantity of rice bought $= \frac{49x \times 100}{98x} = 50$ kg.

Ex. 7. ***What is the ratio in which two sugar solutions of concentrations 15% and 40% are to be mixed to get a solution of concentration 30% ?***

Sol. Let the required ratio be $x : y$. Then, $\frac{15x}{100}+\frac{40y}{100}=\frac{30(x+y)}{100}$

$\Rightarrow 15x + 40y = 30x + 30y \Rightarrow 10y = 15x \Rightarrow \frac{x}{y}=\frac{10}{15}=\frac{2}{3} \Rightarrow x : y = 2 : 3.$

Ex. 8. ***A man spends 75% of his income. This income is increased by 20% and he increases his expenditure by 10%. By what per cent are his savings increased ?***

Sol. Let the income of the person be Rs x.

Then, his savings = Rs $\frac{x}{4}$

Expenditure = $x-\frac{x}{4}=$ Rs $\frac{3x}{4}$

Increased income = $\frac{120}{100}\times x=$ Rs $\frac{6x}{5}$

Increased expenditure = $\frac{110}{100}\times\frac{3x}{4}=$ Rs $\frac{33x}{40}$

$\therefore$ Increased savings = $\frac{6x}{5}-\frac{33x}{40}=\frac{48x-33x}{40}=\frac{3x}{8}$

$\therefore$ % increase in savings = $\frac{\left(\frac{3x}{8}-\frac{x}{4}\right)}{\frac{x}{4}}\times 100=\left(\frac{x}{8}\times\frac{4}{x}\times 100\right)\%=50\ \%.$

Ex. 9. ***A number is increased by 20% and then again by 20%. By what per cent should the increased number be reduced so as to get back the original number ?***

Sol. Let the original number be 100.

An increase of 20% followed by another increase

of 20% $=\frac{120}{100}\times\frac{120}{100}\times 100=144$

$\therefore$ Required decrease = 44

Required % decrease $=\frac{44}{144}\times 100\%=\frac{275}{9}\%=30\frac{5}{9}\%.$

Ex. 10. ***A reduction of 20% in the price of sugar enables a purchaser to obtain $2\frac{1}{2}$ kg more for Rs 160. Find the original price per kg of sugar.***

Sol. Let the original price per kg of sugar be Rs x.

Then, the reduced price per kg = Rs $\frac{4x}{5}$

Quantity of sugar that can be bought for Rs 160 originally = Rs $\frac{160}{x}$

Quantity of sugar that can be bought for Rs 160 with reduced price = Rs $\frac{160}{4x/5}=160\times\frac{5}{4x}$

Given, $160\times\frac{5}{4x}=\frac{160}{x}+\frac{5}{2}$

$\Rightarrow \frac{200}{x}-\frac{160}{x}=\frac{5}{2} \Rightarrow \frac{40}{x}=\frac{5}{2} \Rightarrow x = 16$

$\therefore$ Original price per kg = Rs 16.

Question Bank–16(a)

1. The sum of two numbers is 4000. 10% of one number is $6\frac{2}{3}$ % of the other. The difference of the number is
(a) 600 (b) 800
(c) 1025 (d) 1175

2. The difference of the squares is of two numbers is 80% of the sum of their squares. The ratio of the larger number to the smaller number is
(a) 5 : 2 (b) 2 : 5
(c) 3 : 1 (d) 1 : 3

3. 50 g of an alloy of gold and silver contains 80% gold (by weight). The quantity of gold, that is to be mixed up with this alloy, so that it may contain 95% gold is
(a) 200 g (b) 150 g
(c) 50 g (d) 10 g

4. A candidate who gets 20% marks in an examination fails by 30 marks but another candidate who gets 32%, gets 42 marks more than the pass marks. The percentage of pass marks is
(a) 52% (b) 50%
(c) 33% (d) 25%

5. In expressing a length 81.472 km as nearly as possible with three significant digits, the per cent error is
(a) 0.34% (b) 0.034%
(c) 0.0034% (d) 0.0038%

6. A reduction of 25% in the price of an article enables a man to buy 50 kilograms more for Rs 500. What is the reduced price per kilogram ?
(a) Rs 3 (b) Rs 2.50
(c) Rs 2.05 (d) Rs 2.40

7. A reduction of 20% in the price of oranges enables a man to buy 5 oranges more for Rs 10. The price per orange before reduction was :
(a) 20 paise (b) 40 paise
(c) 50 paise (d) 60 paise

8. 37.85% and 92% alcoholic solutions are mixed to get 35 litres of an 89% alcoholic solution. How many litres of each solution are there in the new mixture ?
(a) 10 L of the 1st, 25 L of the 2nd
(b) 20 L of the 1st, 15 L of the 2nd
(c) 15 L of the 1st, 20 L of the 2nd
(d) None

9. From 5 litres of 20% solution of alcohol in water, 2 litres of solution is taken out and 2 litres water is added to it. The strength of alcohol in the new solution is
(a) 12% (b) 15%
(c) 16% (d) 18%

10. The number of employees working in a farm is increased by 25% and the wages per head are decreased by 25%. If it results in x% decrease in total wages, then the value of x is
(a) 0 (b) 25
(c) 20 (d) $\frac{25}{4}$

11. If the price of a book is first decreased by 25% and then increased by 20%, the net change in the price of the book is
(a) 10% decrease (b) 5% decrease
(c) No change (d) 5% increase

12. The price of an article was increased by r %. Later the new price was decreased by r%. If the latest price was Re 1, then the original price was
(a) Re 1 (b) Rs $\left(\frac{1-r^2}{100}\right)$
(c) Rs $\frac{\sqrt{1-r^2}}{100}$ (d) Rs $\frac{10000}{10000-r^2}$

13. The price of a commodity has been increased by 60%. By what per cent must a consumer reduce the consumption of the commodity so as not to increase his expenditure on the commodity
(a) 30% (b) 35%
(c) 27.5% (d) 37.5%

14. The price of an article is reduced by 25% but the daily sale of the article is increased by 30%. The net effect on the daily sale receipts is
(a) $2\frac{1}{2}$ % decrease (b) $2\frac{1}{2}$% increase
(c) 2% decrease (d) 2% increase

15. If the altitude of a triangle is increased by 10% while its area remains the same, its corresponding base will have to be decreased by
(a) 10% (b) 9%
(c) $9\frac{1}{11}$% (d) $11\frac{1}{9}$%

16. In the expression xy^2 , the values of both variables x and y are decreased by 20%. By this the value of the expression will be decreased by
(a) 40% (b) 80%
(c) 48.8% (d) 51.2%

17. In a hotel, 60% had vegetarian lunch while 30% had non-vegetarian lunch and 15% had both types of lunch. If 96 people were present, how many did

not eat either type of lunch ?
(a) 20 (b) 24
(c) 26 (d) 28

18. A student took five papers in an examination, where the full marks were the same for each papers, this marks in these papers were in the proportion 6 : 7 : 8 : 9 : 10. In all the papers together, the candidate obtained 60% of the total marks. Then, the number of papers in which he got more than 50% marks is
(a) 1 (b) 3
(c) 4 (d) 5

19. In an examination, 70% of the candidates passed in English, 80% passed in Mathematics and 10% failed in both these subjects. If 144 candidates passed in both, then the total number of candidates was
(a) 125 (b) 200
(c) 240 (d) 375

20. In a medical certificate, by mistake a candidate gave his height as 25% more than the actual. In the interview panel, he clarified his height was 5 feet 5 inches. Find the percentage correction made by the candidate from his stated height to his actual height.
(a) 28.56 (b) 20
(c) 25 (d) 24

21. A 20% hike in bus fare resulted in a 10% fall in passenger traffic, still the daily collection at the bus depot increased by Rs 150. The daily collection at the depot after the fare hike is
(a) Rs 1600 (b) Rs 1750
(c) Rs 2025 (d) Rs 1875

22. If A's salary is 25% higher than B's salary, then how much per cent is B's salary lower than that of A's ?
(a) 16% (b) 20%
(c) 25% (d) $33\frac{1}{3}\%$

23. In an examination in which full marks were 800, A gets 20% more than B, B gets 20% more than C, and C gets 15% less than D. If A got 576, what percentage of full marks did D get (approximately) ?
(a) 45.7 (b) 51.2
(c) 58.8 (d) 61.7

24. A father gives 1% of his monthly salary to his two sons as pocket money. The elder son gets 80% of the total amount given to the two sons and he spends 80% of his share. If he saves Rs 20 every month, then the monthly salary of the father is
(a) Rs 10000 (b) Rs 11500
(c) Rs 12000 (d) Rs 12500

25. In an examination Mohit obtained 20% more marks than Sushant but are 10% less than Rajesh. If the marks obtained by Sushant are 1080, find the percentage of marks obtained by Rajesh, if the full marks are 2000.
(a) 72% (b) 86.66%
(c) 78.33% (d) 75%

26. Mira's expenditure and savings are in the ratio 3 : 2. Her income increases by 10%. Her expenditure also increases by 12%. By how much % do her savings increase ?
(a) 7% (b) 9%
(c) 10% (d) 13%

27. A tax payer is exempted of income tax for the first Rs 100000 of his annual income but for the rest of the income, he has to pay a tax at the rate of 20%. If he paid Rs 3160 as income tax for a year, his monthly income is
(a) Rs 11580 (b) Rs 103160
(c) Rs 13610 (d) Rs 9650

28. Mrs. Sharma invests 15% of her monthly salary, *i.e.,* Rs 4428 in Mutual funds. Later she invests 18% of her monthly salary on Pension plans; also she invests another 9% of her salary on Insurance policies. What is the total monthly amount invested by Mrs. Sharma ?
(a) Rs 1,13,356.80 (b) Rs 12,398.40
(c) Rs 56, 678.40 (d) None of these

29. A house-owner was having his house painted. He was advised that he would require 25 kg of paint. Allowing for 15% wastage and assuming that the paint is available in 2 kg cans, what would be the cost of paint purchased, if one can costs Rs 16 ?
(a) Rs 240 (b) Rs 180
(c) Rs 120 (d) Rs 360

30. Vishal goes to a shop to buy a radio costing Rs 2568. The rate of sales tax is 7%. He tells the shop keeper to reduce the price of radio to such an extent that he has to pay Rs 2568 inclusive of sales tax. Find the reduction needed in the price of the radio.
(a) Rs 179 (b) Rs 170
(c) Rs 168 (d) Rs 169

Answers

1. (b)	**2.** (c)	**3.** (b)	**4.** (d)	**5.** (b)	**6.** (b)	**7.** (c)	**8.** (d)	**9.** (a)	**10.** (d)
11. (a)	**12.** (d)	**13.** (d)	**14.** (a)	**15.** (c)	**16.** (c)	**17.** (b)	**18.** (c)	**19.** (c)	**20.** (b)
21. (c)	**22.** (b)	**23.** (c)	**24.** (d)	**25.** (a)	**26.** (a)	**27.** (d)	**28.** (b)	**29.** (a)	**30.** (c)

Hints and Solutions

1. (b) Let one number = x

Then, the other number = $4000 - x$

Given, 10% of $x = 6\frac{2}{3}\%$ of $(4000 - x)$

$$\Rightarrow \frac{10}{100} \times x = \frac{20}{3} \times \frac{1}{100} \times (4000 - x)$$

$$\Rightarrow 10x = \frac{20}{3} \times 4000 - \frac{20x}{3}$$

$$\Rightarrow 10x + \frac{20x}{3} = \frac{20}{3} \times 4000 \Rightarrow \frac{50x}{3} = \frac{20}{3} \times 4000$$

$$\Rightarrow x = \frac{20 \times 4000}{50} = 1600$$

The two numbers are 1600 and 2400.

$\therefore$ Their difference = 2400 – 1600 = 800.

2. (c) Let the two numbers be x and y.

Then, $x^2 - y^2 = 80\%$ of $(x^2 + y^2)$

$$\Rightarrow x^2 - y^2 = \frac{4}{5}(x^2 + y^2) \Rightarrow x^2 - \frac{4}{5}x^2 = \frac{4}{5}y^2 + y^2$$

$$\Rightarrow \frac{1}{5}x^2 = \frac{9}{5}y^2 \Rightarrow \frac{x^2}{y^2} = \frac{9}{1} \Rightarrow \frac{x}{y} = \frac{3}{1} \Rightarrow x : y = 3:1.$$

3. (b) In 50 gm of an alloy of gold and silver, the quantity of gold = 40 gm and the quantity of silver = 10 gm.

Let x gm of gold be mixed in 50 gm of an alloy of gold and silver such that quantity of gold becomes 95%.

Then, $40 + x = 95\%$ of $(x + 50)$

$$40 + x = \frac{19}{20}(x + 50)$$

$$\Rightarrow 800 + 20x = 19x + 950 \Rightarrow x = 150.$$

4. (d) Let the maximum marks be M. Then,

Pass marks = 20% of M + 30 = 32% of M – 42

$$\Rightarrow 12\% \text{ of } M = 72 \Rightarrow M = \frac{72 \times 100}{12} = 600$$

$\therefore$ Pass marks = 20% of 600 + 30 = 150

$$\Rightarrow \text{Percentage of pass marks} = \frac{150}{600} \times 100\% = 25\%.$$

5. (b) 81.472 km = 81472 meters

= 81500 meters with three significant digits

$$\therefore \text{Error\%} = \frac{81500 - 81472}{81472} \times 100 = 0.034\%.$$

6. (b) Let the original price per kg of the article be Rs x.

Then, the reduced price per kg = $\frac{75}{100} \times$ Rs x

$$= \text{Rs } \frac{3x}{4}$$

Amount of article that can be bought for Rs 500 originally = $\frac{500}{x}$ kg

Amount of article that can be bought for Rs 500 by reduced price = $\frac{500}{3x/4}$ kg $= \frac{500 \times 4}{3x}$ kg

Given, $\frac{500 \times 4}{3x} = \frac{500}{x} + 50$

$$\Rightarrow \frac{2000 - 1500}{3x} = 50 \Rightarrow \frac{500}{3x} = 50$$

$$\Rightarrow x = \frac{500}{50 \times 3} = \text{Rs } \frac{10}{3}$$

$\therefore$ Reduced price = $\frac{3}{4} \times$ Rs $\frac{10}{3}$ = Rs 2.50

7. (c) Similar to Q. No. 6.

8. (d) Let x litres of the 37.85% alcoholic solution and $(35 - x)$ litres of 92% alcoholic solution be required to get 35 L of 89% solution. Then, 37.85% of x + 92% of $(35 - x)$ = 89% of 35

$$\Rightarrow \frac{37.85x}{100} + \frac{92 \times 35}{100} - \frac{92 \times x}{100} = \frac{89}{100} \times 35$$

$$\Rightarrow 54.15x = 105 \Rightarrow x = \frac{105}{54.15} = 1.94 \text{ L (approx.)}$$

9. (a) Quantity of alcohol in 3 litres of solution

$$= \frac{20}{100} \times 3 = \frac{3}{5} \text{L}$$

Strength of alcohol in new solution = $\frac{315}{5} \times 100$

$$= 12\%$$

10. (d) Let the number of workers = x, wage per employee = Rs y

Then, total wages = Rs xy

Number of workers after increase = $1.25x$

Reduced wage per employee = Rs $0.75y$

$\therefore$ Total wages = $1.25x \times$ Rs $0.75y = 0.9375xy$

$\therefore$ Required % decrease $= \dfrac{xy - 0.9375xy}{xy} \times 100$

$= 0.0625 \times 100 = 6.25$

$= \dfrac{25}{4}\%$

11. (a) Let the original price of the book be Rs 100.
Decreased price of the book = Rs 75
Increased price of the book after 20% increase

$= \dfrac{120}{100} \times \text{Rs } 75 = \text{Rs } 90$

$\therefore$ Net change in price = Rs 10 decrease

$\therefore$ % change $= \dfrac{10}{100} \times 100 = 10\%$ decrease.

12. (d) Let the original price of the article be Rs x. Then,
Increased price of the article $= \left(\dfrac{100+r}{100}\right) \times x$
Decreased price of the article after r % decrease

$= \left(\dfrac{100-r}{100}\right)\left(\dfrac{100-r}{100}\right) \times x$

$= \left(\dfrac{10000-r^2}{10000}\right) \times x$

Given $\dfrac{10000-r^2}{10000} \times x = 1$

$\Rightarrow x = \dfrac{10000}{10000-r^2}$

13. (d) Let the price of the commodity be Rs x and its consumption be y. Then
Expenditure = Rs xy

Increased price = $\text{Rs}\dfrac{160}{100}x = \text{Rs } 1.6x$

Expenditure remaining the same = Rs xy

$\therefore$ Reduced consumption $= \dfrac{xy}{1.6x} = \dfrac{10y}{16} = \dfrac{5}{8}y$

% reduction in consumption $= \dfrac{y - 5/8\, y}{y} \times 100$

$= \dfrac{3}{8} \times 100\% = 37.5\%$

14. (a) Let the price of the article be Rs x and daily sale be y units.
Then, daily sale receipts = Rs xy

Reduced price of the article = Rs $\dfrac{3}{4}x$

Increased daily sale = Rs $\dfrac{13}{10}y$

$\therefore$ Daily sale receipts $= \text{Rs}\dfrac{3}{4}x \times \dfrac{13}{10}y = \text{Rs}\dfrac{39}{40}xy$

$\therefore$ % reduction $= \dfrac{xy - \dfrac{39}{40}xy}{xy} \times 100\%$

$= \dfrac{100}{40}\% = 2.5\%$.

15. (c) Let the altitude of the triangle be h and corresponding base = b. Then, its area = $\dfrac{1}{2}bh$,
Increased altitude = $1.1h$,
Area remaining same = $\dfrac{1}{2}bh$

$\therefore$ Reduced base $= \dfrac{\frac{1}{2}bh}{1.1h} \times 2 = \dfrac{b}{2.2} \times 2 = \dfrac{10b}{11}$

$\therefore$ % reduction $= \dfrac{b - \frac{10}{11}b}{b} \times 100 = \dfrac{100}{11}\%$

$= 9\dfrac{1}{11}\%$

16. (c) New value of $x = \dfrac{80}{100}x = 0.8x$

New value of $y^2 = \dfrac{80}{100}y \times \dfrac{80}{100}y = 0.64y^2$

$\therefore$ New value of expression $= 0.8x \times 0.64y^2$

$= 0.512xy^2$

$\therefore$ % reduction in the value

$= \dfrac{xy - 0.512xy^2}{xy^2} \times 100\%$

$= (0.488 \times 100)\% = 48.8\%$

17. (b) Number of people having either or both type of lunches

$= \dfrac{60}{100} \times 96 + \dfrac{30}{100} \times 96 - \dfrac{15}{100} \times 96 = \dfrac{75 \times 96}{100} = 72$

Number of people who did not eat either type of lunch = 96 – 72 = 24

18. (c) Let the marks obtained in 5 subjects be $6x$, $7x$, $8x$, $9x$ and $10x$.
Average score = 60%

$\therefore$ $\dfrac{6x + 7x + 8x + 9x + 10x}{5} = \dfrac{60}{100} \Rightarrow \dfrac{40x}{5} = \dfrac{60}{100}$

$\Rightarrow x = \frac{60 \times 5}{100 \times 40} = \frac{3}{40} = 0.075$

$\therefore$ The marks are 0.45, 0.525, 0.6, 0.675 and 0.75, *i.e.*, 45%, 52.5%, 60%, 67.5% and 75%.

$\therefore$ Number of papers in which the marks exceed 50% = 4.

19. (c) Let the total number of candidates be x.
Given, 70% of x passed in English
80% of x passed in Maths
144 passed in English and Maths both
10% of x failed in English and Maths both
$\therefore$ 90% of x passed in English and Maths both.
$\therefore$ 90% of x = 70% x + 80% of x – 144

$\Rightarrow$ 60% of $x = 144 \Rightarrow x = \frac{144 \times 100}{60} = 240.$

20. (b) Actual height = 5 feet 5 inches
= 5 × 12 inches + 5 inches
= 65 inches.

Height given by mistake = $\frac{125}{100} \times 65$ inches
$= 81.25$ inches

$\therefore$ Required percentage error

$= \frac{(81.25 - 65)}{81.25} \times 100\%$

$= \left(\frac{16.25}{81.25} \times 100\right)\% = 20\%.$

21. (c) Let the original bus fare per person be Rs x, daily passenger traffic be y.
Daily collection at the depot = Rs xy
Increased bus fare = Rs 1.2x,
Reduced passenger traffic = 0.9y
Daily collection at the depot = Rs 1.2x × 0.9y
= 1.08xy

Given, $1.08xy = xy + 150 \Rightarrow xy = \frac{150}{0.08} = 1875$

$\therefore$ Increased daily collection = Rs 1875 + Rs 150
= Rs 2025.

22. (b) Let B's salary be Rs 100. Then,
A's salary = Rs 1 25

$\therefore$ Required % = $\frac{25}{125} \times 100\% = 20\%$

23. (c) $A = \frac{120}{100} B, B = \frac{120}{100} C, C = \frac{85}{100} D$

$\Rightarrow B = \frac{5}{6} A, C = \frac{5}{6} B, D = \frac{20}{17} D$

$\therefore B = \frac{5}{6} \times 576 = 480; C = \frac{5}{6} \times 480 = 400;$

$D = \frac{20}{17} \times 400 = \frac{8000}{17}$

So, required percentage = $\left(\frac{8000}{17} \times \frac{1}{800} \times 100\right)\%$
$= 58.82\%.$

24. (d) Let the father's salary be Rs x. Then,
Part of salary given to the two sons as pocket money = $\frac{x}{100}$

Share of the elder son = $\frac{80}{100} \times \frac{x}{100} = \frac{4x}{500}$

Expenditure of the elder son = $\frac{80}{100} \times \frac{4x}{500}$
$= \frac{16x}{2500}$

$\therefore$ Savings of the elder son $= \frac{4x}{500} - \frac{16x}{2500} = \frac{4x}{2500}$

Given, $\frac{4x}{2500} =$ Rs 20

$\Rightarrow x =$ Rs $\frac{20 \times 2500}{4} =$ Rs 12500.

25. (a) Sushant's marks = 1080

Mohit's marks = $\frac{120}{100} \times 1080 = 1296$

Let Rajesh's marks be x. Then,

$\frac{90x}{100} = 1296 \Rightarrow x = 1440$

$\therefore$ Percentage of Rajesh's marks = $\frac{1440}{2000} \times 100\%$
$= 72\%.$

26. (a) Let Mira's expenditure and savings be 3x and 2x respectively.
Then, her income = 5x

Increased income = $\frac{110}{100} \times 5x = 5.5x$

Increased expenditure = $\frac{112}{100} \times 3x = 3.36x$

$\therefore$ Increased savings = $5.5x - 3.36x = 2.14x$

$\therefore$ % increase in savings $= \left(\frac{2.14x - 2x}{2x} \times 100\right)\%$

$= \left(\frac{0.14x}{2x} \times 100\right)\% = 7\%.$

27. (d) Let the annual income of the person be Rs x. Then, 20% of (x – 1,00,000) = 3160

$\Rightarrow x - 1,00,000 = \frac{3160 \times 100}{20} = 15800$

$\Rightarrow x = 115800$

$\therefore$ Monthly income = Rs $\frac{115800}{12} =$ Rs 9650

28. (b) Let Mrs. Sharma's monthly salary be Rs x. Then, 15% of x = Rs 4428

$\Rightarrow x = \text{Rs } \frac{4428 \times 100}{15} = \text{Rs } 29520$

$\therefore$ Total monthly amount invested by Mrs. Sharma = (15% + 18% + 9%) of Rs 29520

$= 42\%$ of Rs $29250 = \frac{42}{100} \times 29250$

= Rs 12398.40.

29. (a) Paint required = 25 kg + 15% of 25 kg

= 25 kg + 0.15 × 25 kg = 28.75 kg

$\therefore$ Number of 2 kg cans of paint required = 15

Cost of paint purchased = 15 × Rs 16 = Rs 240

30. (c) Let the reduced price of the radio be Rs x. Then, x + 7% of x = 2568

$\Rightarrow \frac{107}{100} \times x = 2568 \Rightarrow x = \frac{2568 \times 100}{107} = 2400$

$\therefore$ Reduction needed in the price of radio

= Rs 2568 – Rs 2400 = Rs 168.

Self Assessment Sheet–16(a)

1. A solution of salt and water contains 15% salt by weight 30 kg of water evaporates and the solution now contains 20% of the salt. The original quantity of the solution is

(a) 100 kg (b) 110 kg

(c) 115 kg (d) 120 kg

2. Ram ordered for 6 black toys and some additional brown toys. The price of a black toy is $2\frac{1}{2}$ times that of a brown toy. While preparing the bill, the clerk interchanged the number of black toys with the number of brown toys which increased the bill by 45%. The number of brown toys is:

(a) 8 (b) 6

(c) 15 (d) 12

3. In an election, 10% of the people in the voter's list did not participate. 60 votes were declared invalid. There are only two candidates *A* and *B*. *A* defeated *B* by 308 votes. It has found that 47% of the people listed in the voters' list voted for *A*. Find the total number of votes polled.

(a) 6200 (b) 5580

(c) 6000 (d) 7200

4. Prices register an increase of 10% on food grains and 15% on other items of expenditure. If the ratio of an employee's expenditure on food grains and other items be 2 : 5, by how much should his salary be increased in order that he may maintain the same level of consumption as before, his present salary being Rs 2590.

(a) Rs 323.75 (b) Rs 350

(c) Rs 360.50 (d) Rs 351.50

5. In a recent survey 25% houses contained two or more people. Of those houses containing only one person 20% were having only a male. What is percentage of all houses which contain exactly one female and no males?

(a) 55% (b) 65%

(c) 60% (d) 50%

6. One kg of tea and one kg of sugar together cost Rs 95. If the price of tea falls by 10% and that of sugar rises by 20%, then the price of one kg of each combined comes to Rs 90. The original price of tea in Rs per kg is :

(a) Rs 72 (b) Rs 55

(c) Rs 60 (d) Rs 80

7. On decreasing the price of a colour TV by 30%, its sale is increased by 20%. The effect on the revenue is :

(a) 16% decrease (b) 16% increase

(c) 20% increase (d) 20% decrease

8. There are some coins and rings of either gold or silver in a box. 60% of the objects are coins. 40% of the rings are of gold and 30% of the coins are of silver. What is the percentage of gold articles?

(a) 16 (b) 27

(c) 58 (d) 70

9. The income of *A* is 20% higher than that of '*B*'. The income of '*B*' is 25% less than that of '*C*'. What per cent less is '*A*' s income from '*C*' s income?

(a) 7% (b) 8%

(c) 10% (d) 12.5%

10. A reduction of 25% in the price of rice enables a person to buy 100 kg more rice for Rs 600. The reduced price per kg of rice is :

(a) Rs 30 (b) Rs 25

(c) Rs 35 (d) Rs 15

Answers

1. (d) **2.** (c) **3.** (b) **4.** (d) **5.** (c) **6.** (d) **7.** (a) **8.** (d) **9.** (c) **10.** (d)

Section-B

PROFIT AND LOSS

KEY FACTS

1. Profit or Gain = S.P. – C.P.

2. $\text{Gain\%} = \dfrac{\text{Gain}}{\text{C.P.}} \times 100$

3. Loss = C.P. – S.P.

4. $\text{Loss\%} = \dfrac{\text{Loss}}{\text{C.P.}} \times 100$

5. $\text{S.P.} = \dfrac{(100 + \text{Gain\%})}{100} \times \text{C.P.}$

6. $\text{S.P.} = \dfrac{(100 - \text{Loss\%})}{100} \times \text{C.P.}$

7. $\text{C.P.} = \dfrac{100}{(100 + \text{Gain\%})} \times \text{S.P.}$

8. $\text{C.P.} = \dfrac{100}{(100 - \text{Loss\%})} \times \text{S.P.}$

9. Loss or gain is always calculated on C.P.

10. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain\%} = \left[\frac{\text{Error}}{\text{True value} - \text{Error}} \times 100\right]\%$$

Solved Examples

Ex. 1. ***A vendor purchased 40 dozen bananas for Rs 250. Out of these, 30 bananas were rotten and could not be sold. At what rate per dozen should he sell the remaining bananas to make a profit of 20% ?***

Sol. C.P. of bananas = Rs 250, Gain required = 20%

$\therefore$ S.P. of bananas $= \dfrac{250 \times 120}{100} = \text{Rs } 300$

Number of good bananas = $(400 \times 12 - 30) = 450$

$\therefore$ S.P. of 450 bananas = Rs 300

$\Rightarrow$ S.P. of 12 bananas = Rs $\dfrac{300}{450} \times 12 = \text{Rs } 8$

$\therefore$ The remaining bananas should be sold at Rs 8 per dozen to make a profit of 20%.

Ex. 2. ***If 6 articles are sold for Re 1 then there is a loss of 20%. In order to gain 20%, what must be the number of articles sold for Re 1 ?***

Sol. S.P. of 6 articles = Re 1, Loss = 20 %

$\therefore$ C.P. of 6 articles $= \dfrac{1 \times 100}{(100 - 20)} = \dfrac{100}{80} = \dfrac{5}{4} = 1.25$

If the gain is 20%, then S.P. of 6 articles $= \dfrac{1.25 \times 120}{100} = \text{Rs } 1.50$

$\therefore$ For Re 1, 4 articles are sold.

Ex. 3. ***The price of a jewel passing through three hands rises on the whole by 65%. If the first and the second sellers earned 20% and 25% profit respectively, then what is the profit earned by the third seller ?***

Sol. Let the original price of the jewel be Rs P and the profit earned by the third seller be x%.

S.P. of 1st seller = Rs $\frac{120}{100} \times P$ = C.P. of 2nd seller

S.P. of 2nd seller = Rs $\frac{125}{100} \times \frac{120P}{100}$ = C.P. of 3rd seller

$\therefore$ S.P. of 3rd seller = Rs $\frac{(100+x)}{100} \times \frac{125}{100} \times \frac{120P}{100}$

Given, $\frac{(100+x)}{\cancel{100}} \times \frac{\overset{5}{\cancel{125}}}{\cancel{100}_{4}} \times \frac{\overset{30}{\cancel{120}}\,P}{\cancel{100}_{20}} = \frac{165P}{\cancel{100}}$

$\Rightarrow (100+x) = \frac{2}{3} \times 165 = 110 \Rightarrow x = 110 - 100 = 10\%$.

Ex. 4. ***A sold a watch to B at 20% gain and B sold it to C at a loss of 10%. If C bought the watch for Rs 216, at what price did A purchase it ?***

Sol. Let the C.P. of A = Rs x

Gain = 20%

$\therefore$ S.P. of $A = \frac{120}{100} \times$ Rs x = Rs $\frac{120x}{100}$

C.P. of B = Rs $\frac{120x}{100}$

Loss = 10%

$\therefore$ S.P. of $B = \frac{90}{100} \times \frac{120x}{100}$ = Rs $\frac{27x}{25} \Rightarrow$ C.P. of $C = \frac{27x}{25}$

Given, $\frac{27x}{25} = 216 \quad \Rightarrow \quad x$ = Rs 200.

Ex. 5. ***A man sold two steel chairs for Rs 500 each. On one, he gains 20% and on the other he loss 12%. How much does he gain or loses in the whole transaction ?***

Sol. Total S.P. = 2 × Rs 500 = Rs 1000

Total C.P. = $\left(\frac{500 \times 100}{20} + \frac{500 \times 100}{80}\right)$ = Rs $\left(\frac{1250}{3} + \frac{6250}{11}\right)$ = Rs $\frac{32500}{33}$

$\therefore$ Gain = $1000 - \frac{32500}{33} = \frac{33000 - 32500}{33} = \frac{500}{33}$

$\therefore$ Gain% = $\frac{\frac{500}{33}}{\frac{32500}{33}} \times 100 = \frac{500}{32500} \times 100 = 1.53\%$ (approx.)

Ex. 6. ***A dishonest shopkeeper claims to sell his goods at cost price but uses a weight of 800 gm in place of the standard 1 kg weight. What is his gain per cent ?***

Sol. Let the C.P. = Rs 100 per kg

= Rs 100 per 1000 gm = Rs 1 per gm.

The shopkeeper uses 800 gm weight as a 1 kg weight, so

His gain = Cost of 200 gm = Rs 20

$\therefore$ His gain% = $\frac{20}{80} \times 100 = 25\%$.

Ex. 7. ***A fair price shopkeeper takes 10% profit on his goods. He lost 20% goods during theft. What is his loss per cent ?***

Sol. Suppose the number of items = 100 and C.P. of each item = Re 1
Total C.P. = Rs 100
Then, number of items remaining after theft = 80

$$\text{S.P. of 1 item} = \frac{1\times 110}{100} = \text{Rs } 1.10$$

$\therefore$ S.P. of 80 items = 80 × Rs 1.1 = Rs 88
$\Rightarrow$ Loss = Rs 100 – Rs 88 = Rs 12

$$\text{Loss\%} = \frac{12}{100}\times 100 = 12\%.$$

Ex. 8. ***Three items are purchased at Rs 450 each. One of them is sold at a loss of 10%. At what price should the other two be sold so as to gain 20% on the whole transaction. What is the gain% on these two items ?***

Sol. C.P. of one item = Rs 450
$\Rightarrow$ C.P. of three items = 3 × Rs 450 = 1350
Gain on the whole transaction = 20%

$$\therefore \text{ S.P. of the three items} = \frac{1350\times 120}{100} = \text{Rs } 1620$$

C.P. of 1 item = Rs 450, Loss = 10%

$$\therefore \text{ S.P. of that item} = \frac{450\times 90}{100} = \text{Rs } 405$$

$\therefore$ S.P. of the remaining two items = Rs 1620 – Rs 405 = Rs 1215
C.P. of these two remaining items = 2 × Rs 450 = Rs 900
$\therefore$ Gain on these two items = Rs 315

$$\text{Gain \%} = \frac{315}{900}\times 100 = 35\%.$$

Ex. 9. ***By selling 90 ball pens for Rs 160 a person loses 20%. How many ball pens should be sold for Rs 96 so as to have a profit of 20% ?***

Sol. S.P. of 90 ball pens = Rs 160, Loss = 20%

$$\therefore \text{ C.P. of 90 ball pens} = \text{Rs } \frac{160\times 100}{(100-20)} = \text{Rs } \frac{160\times 100}{80} = \text{Rs } 200$$

$$\therefore \text{ C.P. of 1 ball pen} = \text{Rs } \frac{20}{9}$$

Suppose x ball pens are sold to earn a profit of 20%.

Then, C.P. of x ball pens = Rs $\frac{20}{9}x$

S.P. of x ball pens = Rs 96

$$\therefore \text{ Profit} = \text{Rs}\left(96-\frac{20}{9}x\right)$$

Given, profit % = 20%

$$\therefore \frac{\left(96-\frac{20}{9}x\right)}{\frac{20x}{9}}\times 100 = 20 \quad \Rightarrow \left(96-\frac{20x}{9}\right)\times 5 = \frac{20x}{9}$$

$\Rightarrow \quad 96 - \frac{20x}{9} = \frac{4x}{9} \Rightarrow \frac{24x}{9} = 96 \quad \Rightarrow \quad x = \frac{96 \times 9}{24} = 36.$

$\therefore$ 36 ball pens should be sold for Rs 96 to earn a profit of 20%.

Ex. 10. ***A person sells an article for Rs 75 and gains as much per cent as the cost price of the article. What is the cost price of the article ?***

Sol. Let the C.P. of the article be Rs x. Then,

Gain = x%

$\therefore$ S.P. $= \frac{(100 + x) \times x}{100} = \frac{100x + x^2}{100}$

Given, $\frac{x^2 + 100x}{100} = 75 \Rightarrow x^2 + 100x - 7500 = 0$

$\Rightarrow x^2 + 150x - 50x - 7500 = 0 \Rightarrow x(x + 150) - 50(x + 150) = 0$

$\Rightarrow (x - 50)(x + 150) = 0 \Rightarrow x = 50$ or -150

Neglecting negative value $x = 50$.

Question Bank–16(b)

1. If an article is sold for Rs 178 at a loss of 11%, what should be its selling price in order to earn a profit of 11% ?

(a) Rs 222.50 (b) Rs 267

(c) Rs 222 (d) Rs 220

2. If I would have purchased 11 articles for Rs 10 and sold all the articles at the rate of Rs 11 for 10, the profit per cent would have been

(a) 10% (b) 11%

(c) 21% (d) 100%

3. By selling 100 pencils, a shopkeeper gains the S.P. of 20 pencils. His gain per cent is

(a) 25% (b) 20%

(c) 15% (d) 12%

4. An article is sold at a loss of 10%. Had it been sold for Rs 9 more, there would have been a gain of $12\frac{1}{2}$% on it. The cost price of the article is

(a) Rs 40 (b) Rs 45

(c) Rs 50 (d) Rs 35

5. A shopkeeper sells a pair of sunglasses at a profit of 25%. If he had bought it at 25% less and sold it for Re 10 less, then be would have gained 40%. The cost price of the pair of sunglasses is

(a) Rs 25 (b) Rs 50

(c) Rs 60 (d) Rs 70

6. If a man reduces the selling price of a fan from Rs 400 to Rs 380, his loss increases by 4%. What is the cost price of the fan in rupees.

(a) 600 (b) 480

(c) 500 (d) 450

7. Mukesh purchased 40 kg of wheat at Rs 12.50 per kg and 25 kg of wheat at Rs 15.10 per kg. He mixed the two qualities of wheat for selling. At what rate should it be sold to gain 10% ?

(a) Rs 13.25 (b) Rs 13.50

(c) Rs 14.75 (d) Rs 14.85

8. A sells a box to B at a profit of 15%, B sells the same to C for Rs 1012 and makes a profit of 10%. A's cost price is

(a) Rs 720 (b) Rs 680

(c) Rs 880 (d) Rs 800

9. A wholesale dealer sold his goods to a retail dealer at a profit of $12\frac{1}{2}$%. The retail dealer gained 20% by selling the goods for Rs 3240. The cost price of the whole sale dealer was

(a) Rs 2625 (b) Rs 2575

(c) Rs 2500 (d) Rs 2400

10. A bought a radio set and spent Rs 110 on its repairs. He then sold it to B at 20% profit, B sold it to C at a loss of 10% and C sold it for Rs 1188 at a profit of 10%. What is the amount for which A bought the radio set ?

(a) Rs 850 (b) Rs 890

(c) Rs 1000 (d) Rs 950

11. A dishonest dealer uses a scale of 90 cm instead of a metre scale and claims to sell at cost price. His profit is
(a) 9% (b) 10%
(c) $10\frac{9}{11}\%$ (d) $11\frac{1}{9}\%$

12. A dishonest shopkeeper pretends to sell his goods at cost price but uses false weights and gains $11\frac{1}{9}\%$. For a weight of 1 kg he uses
(a) a weight of 875 gm (b) a weight of 900 gm
(c) a weight of 950 gm (d) a weight of 850 gm

13. A horse and a carriage together cost Rs 8000. If by selling the horse at a profit of 10% and the carriage at a loss of 10%, a total profit of 2.5% is made, then what is the cost price of the horse ?
(a) Rs 3000 (b) Rs 6000
(c) Rs 2000 (d) Rs 5000

14. A television and a washing machine were sold for Rs 12500 each. If the television was sold at a gain of 30% and the washing machine at a loss of 30%, then the entire transaction resulted in
(a) 9% gain (b) 9% loss
(c) 11% gain (d) Neither gain nor loss

15. Shridhar bought two buffaloes for Rs 30,000. By selling one at a loss of 15% and the other at a gain of 19%, he found that selling price of both buffaloes is the same. Find the cost price of each (in Rs).
(a) 10000; 20000 (b) 15000; 15000
(c) 17500; 12500 (d) 16000, 14000

16. On selling each of the two radios for Rs 5000, a person neither gained nor lost. If he had sold one radio at 25% gain, then at what per cent loss did she sell the radio ?
(a) $16\frac{2}{3}\%$ (b) $18\frac{2}{9}\%$
(c) 25% (d) $26\frac{2}{3}\%$

17. A person sold his watch for Rs 144. If the percentage of his profit was equal to the cost price, then the watch would have cost him
(a) Rs 100 (b) Rs 90
(c) Rs 85 (d) Rs 80

18. A shopkeeper sold one-fourth of his goods at a loss of 10%. He sold the remaining at a higher per cent of profit to get $12\frac{1}{2}\%$ profit on the whole transaction. The higher profit per cent is
(a) $17\frac{1}{2}\%$ (b) $33\frac{1}{3}\%$
(c) $22\frac{1}{2}\%$ (d) 20%

19. A man buys a field of agricultural land for Rs 3,60,000. He sells one-third at a loss of 20% and $\frac{2}{5}$th at a gain of 25%. At what price must he sell the remaining field so as to make an overall profit of 10% ?
(a) Rs 1,00,000 (b) Rs 1,15,000
(c) Rs 1,20,000 (d) Rs 1,25,000

20. A person purchases 90 clocks and sells 40 clocks at a gain of 10% and 50 clocks at a gain of 20%. If he sold all of them at a uniform profit of 15%, then he would have got Rs 40 less. The cost price of each clock is :
(a) Rs 50 (b) Rs 60
(c) Rs 80 (d) Rs 90

21. Mani bought two horses at Rs 20,000 each. He sold one horse at 15% gain. But he had to sell the second horse at a loss. If he had suffered a loss of Rs 1800 on the whole transaction, find the selling price of the second horse.
(a) 20% (b) 10%
(c) 24% (d) 25%

22. Vineet calculates his profit percentage on the selling price while Roshan calculates his profit on the cost price. They find that the difference of their profits is Rs 275. If the selling price of both of them are the same, and Vineet gets 25% profit and Roshan gets 15% profit, then find their selling price.
(a) Rs 2100 (b) Rs 2300
(c) Rs 2350 (d) Rs 2250

23. If 7% of the sale price of an article is equivalent to 8% of its cost price and 9% of its sale price exceeds 10% of its cost price by Re 1, then what is the cost of the article?
(a) Rs 400 (b) Rs 350
(c) Rs 300 (d) Rs 280

24. A shopkeeper sells tea at 10% profit and uses a weight which is 20% less than the actual measure. His gain per cent is
(a) 30% (b) 35%
(c) $37\frac{1}{2}\%$ (d) 32%

25. Some lollipops are bought at 11 for a rupee and the same number at 9 a rupee. If the whole lot is sold at 10 a rupee, find the gain or loss per cent.
(a) 2% gain (b) 2% loss
(c) 1% gain (d) 1% loss

26. Rajeshwar bought 16 dozen ball point pens and sold them by and by. Due to a calculation mistake in fixing selling price, he lost an amount equal to S.P. of 4 dozen pens. Find the loss per cent. Find the S.P. of one dozen pens, if he purchased these 16 dozen pens for Rs 240.

(a) Rs 18 (b) Rs 10

(c) Rs 12 (d) Rs 14

27. On selling a pen at 5% loss and a book at 15% gain, Karim gains Rs 7. If he sells the pen at 5% gain and the book at 10% gain, then he gains Rs 13. The actual price of the book is

(a) Rs 100 (b) Rs 80

(c) Rs 10 (d) Rs 400

28. A man purchased a scooter for Rs 6250 and sold it at 8% profit. He purchased another scooter for Rs 3750. After selling it, he found that he has gained 2% on the whole. Then in the sale of the second scooter, he has

(a) 8% loss (b) 8% gain

(c) 10% gain (d) 6% loss

29. Albert buys 4 horses and 9 cows for Rs 13400. If he sells the horses at 10% profit and the cows at 20% profit, then he earns a total profit of Rs 1880. The cost of a horse is

(a) Rs 1000 (b) Rs 2000

(c) Rs 2500 (d) Rs 3000

30. A cloth merchant sold half of his cloth at 20% profit, half of the remaining at 20% loss and the rest was sold at the cost price. In the whole transaction, his gain or loss will be

(a) Neither gain nor loss (b) 5% loss

(c) 5% gain (d) 10% gain

Answers

1. (c)	**2.** (c)	**3.** (a)	**4.** (a)	**5.** (b)	**6.** (c)	**7.** (d)	**8.** (d)	**9.** (d)	**10.** (b)
11. (d)	**12.** (b)	**13.** (d)	**14.** (b)	**15.** (c)	**16.** (a)	**17.** (d)	**18.** (d)	**19.** (c)	**20.** (c)
21. (c)	**22.** (b)	**23.** (b)	**24.** (c)	**25.** (d)	**26.** (c)	**27.** (a)	**28.** (a)	**29.** (b)	**30.** (c)

Hints and Solutions

1. (c) S.P. = Rs 178, Loss = 11%

$$\therefore \quad \text{C.P.} = \frac{178\times100}{(100-11)} = \frac{178\times100}{89} = 200$$

Now C.P. = Rs 200, Profit = 11%

$$\therefore \quad \text{S.P.} = \frac{200\times111}{100} = \text{Rs } 222.$$

2. (c) C.P. of 11 articles = Rs 10

C.P. of 1 article = Rs $\frac{10}{11}$

S.P. of 10 articles = Rs 11

$\Rightarrow$ S.P. of 1 article = Rs $\frac{11}{10}$

$$\therefore \quad \text{Profit \%} = \frac{\frac{11}{10}-\frac{10}{11}}{\frac{10}{11}}\times100 = \frac{\frac{121-100}{110}}{\frac{10}{11}}\times100$$

$$= \frac{21\times11}{110\times10}\times100 = 21\%.$$

3. (a) S.P. of 100 pencils – C.P. of 100 pencils = S.P. of 20 pencils

$\Rightarrow$ S.P. of 80 pencils = C.P. of 100 pencils

Let C.P. of 1 pencil = Re 1. Then,

S.P. of 80 pencils = Rs 100

C.P. of 80 pencils = Rs 80

$$\therefore \quad \text{Profit \%} = \frac{100-80}{80}\times100 = \frac{20}{80}\times100 = 25\%$$

4. (a) Let the C.P. of the article be Rs x. Then,

$$\text{S.P. at a loss of 10\%} = \frac{x\times90}{100} = \text{Rs } \frac{90x}{100}$$

$$\text{S.P. at a gain of } 12\frac{1}{2}\% = \frac{x\times112.5}{100} = \text{Rs } \frac{112.5x}{100}$$

Given, $\frac{112.5x}{100} - \frac{90x}{100} = 9$

$$\Rightarrow \quad \frac{22.5x}{100} = 9 \quad \Rightarrow \quad x = \frac{900}{22.5} = \text{Rs } 40.$$

5. (b) Let the C.P. of the pair of sunglasses be Rs x.

$$\text{Then S.P.} = \frac{x\times125}{100} = \text{Rs } \frac{5x}{4}$$

New C.P. $= \text{Rs}\left(\frac{75}{100}\times x\right) = \text{Rs}\ \frac{3x}{4}$

New S.P. $= \text{Rs}\left(\frac{5x}{4}-10\right)$

Given, $\frac{5x}{4}-10 = \frac{140}{100}\times\frac{3x}{4} \Rightarrow \frac{5x}{4}-\frac{21x}{20}=10$

$\Rightarrow \frac{25x-21x}{20}=10 \Rightarrow 4x=200 \Rightarrow x=\text{Rs } 50.$

6. (c) Let the C.P. = Rs x. Then,

First loss % $= \frac{(x-400)}{x}\times 100 = \frac{100x-40000}{x}\%$

Second loss% $= \frac{(x-380)}{x}\times 100 = \frac{100x-38000}{x}\%$

Given, $\frac{(100x-38000)}{x}-\frac{(100x-40000)}{x}=4$

$\Rightarrow 100x - 38000 - 100x + 40000 = 4x$

$\Rightarrow 2000 = 4x \Rightarrow x = 500.$

7. (d) C.P. of the wheat $= 40\times \text{Rs } 12.50 + 25\times \text{Rs } 15.10$
$= \text{Rs } 877.5$

Gain = 10%

$\therefore$ S.P. of the wheat $= \text{Rs}\ \frac{877.5\times 110}{100} = \text{Rs } 965.25$

$\therefore$ S.P. per kg of wheat $= \frac{965.25}{65} = \text{Rs } 14.85$

8. (d) Let A's C.P. = Rs x, Profit = 15%

$\therefore$ A's S.P. $= \frac{x\times 115}{100} = \text{Rs}\ \frac{23x}{25}$

B's C.P. $= \text{Rs}\ \frac{23x}{20}$, Profit = 10%

$\therefore$ B's S.P. $= \frac{23x}{20}\times\frac{110}{100} = \frac{253x}{250}$

Given, $\frac{253x}{200}=1012 \Rightarrow x = \frac{1012\times 200}{253} = \text{Rs } 800.$

9. (d) Let the C.P. of the wholesale dealer = Rs x. Then,

S.P. of the wholesale dealer $= \frac{x\times 112.5}{100}$

$= \text{Rs}\ \frac{112.5x}{100}$

C.P. of the retail dealer $= \text{Rs}\ \frac{112.5x}{100}$, Gain = 20%

$\therefore$ S.P. of the retail dealer $= \frac{112.5x}{100}\times\frac{120}{100}$

Given, $\frac{112.5x}{100}\times\frac{12}{10}=3240$

$\Rightarrow x = \text{Rs}\ \frac{3240\times 1000}{112.5\times 12} = \text{Rs } 2400.$

10. (b) Let A's C.P. = Re x. Then,

A's S.P. = B's C.P. $= \text{Rs}\left(\frac{120}{100}\times x\right)$

B's S.P. = C's C.P. $= \text{Rs}\left(\frac{90}{100}\times\frac{120}{100}\times x\right)$

C's S.P. $= \text{Rs}\left(\frac{110}{100}\times\frac{90}{100}\times\frac{120}{100}\times x\right)$

Given, $\frac{110}{100}\times\frac{90}{100}\times\frac{120}{100}\times x = 1188$

$\Rightarrow x = \frac{1188\times 1000}{11\times 9\times 12} = 1000.$

Amount spent by A on repairs = Rs 110

$\therefore$ Amount for which A bought the radio set
= Rs 1000 – Rs 110
= Rs 890.

11. (d) Let the cost price of the cloth be Rs 100 per metre, *i.e.*, Re 1 per cm.
Since the shopkeeper uses 90 cm scale for 100 cm scale,
His gain = Cost of 10 cm = Rs 10

$\therefore$ Gain % $= \frac{10}{90}\times 100 = \frac{100}{9}\% = 11\frac{1}{9}\%.$

12. (b) Let the error (difference between 1 kg and false weight) be x gm. Then,

$\frac{x}{(1000-x)}\times 100 = \frac{100}{9} \Rightarrow \frac{x}{(1000-x)}=\frac{1}{9}$

$\Rightarrow 9x = 1000 - x \Rightarrow 10x = 1000 \Rightarrow x = 100$

$\therefore$ Weight used = (1000 – 100) gm = 900 gm.

13. (d) Let C.P. of the horse = Rs x. Then,
C.P. of the carriage = Rs $(8000 - x)$

S.P. of the horse $= \frac{x\times 110}{100} = \text{Rs}\ \frac{11x}{10}$

S.P. of the carriage $= \frac{(8000-x)\times 90}{100} = 7200 - \frac{9x}{10}$

Total C.P. = Rs 8000, Total profit = 2.5%

$\therefore$ Total S.P. $= 8000 \times \frac{102.5}{100} =$ Rs 8200

Given, $\frac{11x}{10} + 7200 - \frac{9x}{10} = 8200$

$\Rightarrow \frac{2x}{10} = 1000 \Rightarrow x =$ Rs 5000.

14. (b) S.P. of the T.V. and washing machine
$= 2 \times$ Rs 12500 = Rs 25000

C.P. of the T.V. = Rs $12500 \times \frac{100}{130}$

C.P. of the washing machine = Rs $12500 \times \frac{100}{70}$

$\therefore$ Total C.P. = Rs $12500\left(\frac{100}{130} + \frac{100}{70}\right)$

= Rs $12500 \times \frac{200}{91}$

$\therefore$ Reqd. loss % = $\frac{\frac{2500000}{91} - 25000}{\frac{2500000}{91}} \times 100$

$= \frac{2500000 - 2275000}{2500000} \times 100$

$= \frac{225000}{2500000} \times 100 = 9\%.$

15. (c) Let the cost price of one buffalo be Rs x. Then,
Cost price of the other buffalo = Rs $(30000 - x)$

S.P. of first buffalo = $\frac{(100-15)}{100} \times x =$ Rs $\frac{85x}{100}$

S.P. of second buffalo = $\frac{(100+19)}{100} \times (30000 - x)$

$= \frac{119}{100} \times (30000 - x)$

$\because$ Selling price of both buffalos is the same,

$\frac{85x}{100} = \frac{119(30000 - x)}{100}$

$\Rightarrow 5x = 7\,(30000 - x) \Rightarrow 12x = 210000$

$\therefore x = \frac{210000}{12} =$ Rs 17500

$\therefore$ Cost price of the other buffalo = Rs 12500.

16. (a) **1st radio**.
S.P. = Rs 5000, Gain = 25%

$\therefore$ C.P. = Rs $\frac{5000 \times 100}{125} =$ Rs 4000

2nd radio.
S.P. = Rs 5000, Loss = x% (say)

$\therefore$ C.P. $= \frac{5000 \times 100}{(100 - x)}$

Since the person neither gained nor lost,
Total C.P. = Total S.P.

$\Rightarrow 4000 + \frac{500000}{(100 - x)} = 10000$

$\Rightarrow \frac{500000}{(100 - x)} = 6000$

$\Rightarrow 500000 = 600000 - 6000x$

$\Rightarrow 6000\,x = 100000$

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

17. (d) Let C.P. = Rs x, S.P. = Rs 144, Profit = x%

$\therefore$ $x + x\%$ of $x = 144$

$\Rightarrow x + \frac{x}{100} \times x = 144$

$\Rightarrow x^2 + 100x - 14400 = 0$

$\Rightarrow x^2 + 180x - 80x - 14400 = 0$

$\Rightarrow x\,(x + 180) - 80\,(x + 180) = 0$

$\Rightarrow (x + 180)\,(x - 80) = 0$

$\Rightarrow x = -180$ or 80

Neglecting negative values, $x = 80$.

18. (d) Let C.P. = Rs c

$\therefore$ C.P. of $\frac{1}{4}$th of the goods = Rs $\frac{c}{4}$

Loss = 10%

$\therefore$ S.P. of $\frac{1}{4}$th of the goods $= \frac{\frac{c}{4} \times 90}{100} =$ Rs $\frac{9c}{40}$

C.P of $\frac{3}{4}$th of the goods = Rs $\frac{3c}{4}$

Let profit on this remaining part = P%. Then,

S.P. of $\frac{3}{4}$th of the goods $= \frac{\frac{3c}{4} \times (100 + P)}{100}$

$= \frac{3c}{400}(100 + P)$

Profit on the whole transaction = 12.5%

$\therefore$ S.P. of the whole = Rs $\frac{c \times 112.5}{100}$

$\therefore \quad \frac{9c}{40}+\frac{3c}{4}+\frac{3c\times P}{400}=\frac{112.5c}{100}$

$\Rightarrow \quad \frac{90+300+3p}{400}=\frac{112.5}{100}$

$\Rightarrow \quad \frac{390+3P}{4}=112.5 \quad \Rightarrow \quad 390+3P=450$

$\Rightarrow \quad 3P=60 \quad \Rightarrow \quad P=20.$

19. (c) S.P. of the whole field $=\frac{360000\times110}{100}=$ Rs 396000

S.P. of the $\frac{1}{3}$rd part of the field $=\frac{360000}{3}\times\frac{80}{100}$

= Rs 96000

S.P. of the $\frac{2}{5}$th part of the field

$=360000\times\frac{2}{5}\times\frac{125}{100}=$ Rs 180000

S.P. of the remaining field

= 396000 – (96000 + 180000)

= Rs 120000.

20. (c) Let the C.P. of each clock be Rs x. Then,

C.P. of 90 clocks = Rs $90x$

$\therefore \quad \left(\frac{110}{100}\times40x\right)+\left(\frac{120}{100}\times50x\right)-\left(\frac{115}{100}\times90x\right)=40$

$\Rightarrow \quad 44x+60x-103.5x=40$

$\Rightarrow \quad 0.5x=40 \quad \Rightarrow \quad x=80$

21. (c) **1st horse.**

C.P. = Rs 20000, Gain = 15%

$\therefore \quad$ S.P. $=20000\times\frac{115}{100}=$ Rs 23000

2nd horse.

C.P. = Rs 20000, Loss = x%

$\therefore \quad$ S.P. $=20000\times\frac{(100-x)}{100}=$ Rs $(20000-200x)$

Total loss = Total C.P. – Total S.P.

$= 40000-(23000+20000-200x)$

$1800 = -3000+200x$

$\Rightarrow \quad 200x=4800 \quad \Rightarrow \quad x=24\%$

22. (b) Let the selling price of Vineet and Roshan be Rs x. Then,

Cost price of Vineet $=\frac{125x}{100}$

Cost price of Roshan $=\frac{100x}{115}$

According to the question,

$\left(\frac{125x}{100}-x\right)-\left(x-\frac{100x}{115}\right)=275$

$\Rightarrow \quad \frac{25x}{100}-\frac{15x}{115}=275 \quad =275$

$\Rightarrow \quad \frac{575x-300x}{2300}=275$

$\Rightarrow \quad \frac{275x}{2300}=275 \quad \Rightarrow \quad x=2300.$

23. (b) Suppose C.P. = Rs x and S.P. = Rs y

$\Rightarrow$ 7% of y = 8% of x , *i.e.*, $7y=8x$ …(i)

and 9% of y = 10% of x + 1, *i.e.*,

$9y=10x+1$ … (ii)

From (i) we have $y=\frac{8x}{7}$. Putting the value of y in (2), we get

$9\times\frac{8x}{7}=10x+100 \quad \Rightarrow \quad 72x=70x+700$

$\Rightarrow \quad 2x=700 \quad \Rightarrow \quad x=350$

24. (c) Let the marked weight be 1 kg

But the real weight he uses= 80% of 1 kg

= 800 gm

Let the C.P. of 1 gm be Rs 1. Then,

C.P. of 800 gm = Rs 800 and

C.P. of 1000 gm = Rs 1000

$\therefore \quad$ S.P. $=1000\times\frac{110}{100}=$ Rs 1100

Gain = Rs 1100 – Rs 800 = Rs 300

Gain% $=\frac{300}{800}\times100=\frac{300}{8}\%=37\frac{1}{2}\%.$

25. (d) LCM of 9, 10 and 11 = 990

So, let us assume that 990 lollipops of each kind are bought.

Now, C.P. of 990 lollipops of first kind

$=$ Rs $\left(\frac{1}{11}\times990\right)=$ Rs 90

C.P. of 990 lollipops of second kind

$$= \text{Rs}\left(\frac{1}{9}\times 990\right) = \text{Rs } 110$$

$$\text{S.P. of 1980 lollipops} = \text{Rs}\left(\frac{1}{10}\times 1980\right) = \text{Rs } 198$$

Total C.P. = Rs 90 + Rs 110 = Rs 200

$\because$ C.P. > S.P. , Loss = Rs 200 – Rs 198 = Rs 2

$$\therefore \text{Loss\%} = \frac{\text{Loss}}{\text{C.P.}}\times 100 = \frac{2}{200}\times 100 = 1\%.$$

26. (c) Let the S.P. of one dozen pens be Re x. Then,

S.P of 16 dozen pens = Rs $16x$

Loss = S.P. of 4 dozen pens = Rs $4x$

$\therefore$ C.P. = S.P. + Loss = Rs $16x$ + Rs $4x$ = Rs $20x$

$$\therefore \text{Loss per cent} = \left(\frac{4x}{20x}\times 100\right) = 20\%$$

C.P. of 16 dozen pens = Rs 240, Loss = 20%

$$\therefore \text{S.P. of 16 dozen pens} = \text{Rs}\frac{240\times 80}{100} = \text{Rs } 192$$

$$\therefore \text{S.P. of 1 dozen pens} = \text{Rs}\ \frac{192}{16} = \text{Rs } 12.$$

27. (a) Let the C.P. of the pen be Rs x and C.P. of the book be Rs y.

$$\text{Then, S.P. of pen at 5\% loss} = x\times\frac{95}{100} = \text{Rs}\ \frac{95x}{100}$$

$$\text{S.P. of book at 15\% gain} = y\times\frac{115}{100} = \text{Rs}\ \frac{115y}{100}$$

$$\text{Given, } \left(\frac{95x}{100} - x\right) + \left(\frac{115y}{100} - y\right) = 7$$

$\Rightarrow -5x + 15y = 700$

$\Rightarrow -x + 3y = 140$ or $x - 3y = -140$ … (i)

$$\text{Again, S.P. of pen at 5\% gain} = x\times\frac{105}{100} = \text{Rs}\ \frac{105x}{100}$$

$$\text{S.P. of book at 10\% gain} = y\times\frac{110}{100} = \text{Rs}\ \frac{110y}{100}$$

$$\text{Given, } \left(\frac{105x}{100} - x\right) + \left(\frac{110y}{100} - y\right) = 13$$

$\Rightarrow 5x + 10y = 1300 \Rightarrow x + 2y = 260$ … (ii)

Subtracting eqn. (i) from eqn. (ii) we get

$(x + 2y) - (x - 3y) = 260 + 140$

$\Rightarrow 5y = 500 \Rightarrow y = 100.$

28. (a) Profit on the 1st scooter $= \frac{8}{100}\times$ Rs 6250

= Rs 500

Profit on both the scooters $= \frac{2}{100}\times$ Rs 10000

= Rs 200

$\therefore$ The man has a loss of Rs 300 on the second scooter.

$$\therefore \text{Loss \%} = \frac{300}{3750}\times 100 = 8\%$$

29. (b) Let the C.P. of 1 horse = Rs x and C.P. of 1 cow = Rs y. Then,

$4x + 9y = 13400$ … (i)

Also, 10% of $4x$ + 20% of $9y$ = 1880

$$\frac{2}{5}x + \frac{9}{5}y = 1880 \Rightarrow 2x + 9y = 9400 \quad \ldots(ii)$$

Subtracting eqn. (ii) from eqn. (i) we get

$(4x + 9y) - (2x + 9y) = 13400 - 9400$

$\Rightarrow 2x = 4000 \Rightarrow x = 2000$

30. (c) Let the C.P. of the whole stock = Rs x. Then,

$$\text{C.P. of } \frac{1}{2} \text{ stock} = \text{Rs}\frac{x}{2}, \text{ C.P. of } \frac{1}{2} \text{ of remaining stock} = \text{Rs}\ \frac{x}{4}$$

$$\therefore \text{Total S.P.} = \text{Rs}\left[\left(\frac{120\times x/2}{100}\right) + \left(\frac{80\times x/4}{100}\right) + \frac{x}{4}\right]$$

$$= \text{Rs}\left[\frac{3x}{5} + \frac{x}{5} + \frac{x}{4}\right]$$

$$= \text{Rs}\left(\frac{12x + 4x + 5x}{20}\right) = \text{Rs}\ \frac{21x}{20}$$

$$\text{Gain} = \text{Rs}\ \left(\frac{21x}{20} - x\right) = \text{Rs}\ \frac{x}{20}$$

$$\therefore \text{Gain\%} = \left(\frac{x}{20}\times\frac{1}{x}\times 100\right)\% = 5\%.$$

Self Assessment Sheet–16(b)

1. An article is sold for Rs 500 and hence a merchant loses some amount. Had the article been sold for Rs 700, the merchant would have gained three times the former loss. The cost price of the article is:
(a) Rs 525 (b) Rs 550
(c) Rs 600 (d) Rs 650

2. A man purchased a table and a chair for Rs 2000. He sold the table at a profit of 20% and the chair at a profit of 30%. His total profit was 23%. Find the cost price of the table.
(a) Rs 1400 (b) Rs 600
(c) Rs 1100 (d) Rs 1200

3. A retailer bought some apples rate of 7 apples for Rs 4 and sold them rate of 8 apples for Rs 5. If he gains Rs 30 on that day, the quantity of apples sold by him on that day is:
(a) 555 (b) 560
(c) 565 (d) 570

4. A merchant buys 1260 kg of corn, $\frac{1}{4}$ of which he sells at a gain of 5%, $\frac{1}{3}$ at a gain of 8% and the remainder at a gain of 12%. If he had sold the whole at a gain of 10%, he would have gained Rs 27.30 more. Find the cost price per kg.
(a) Rs 5 (b) Rs 2
(c) Rs 3 (d) Rs 2.50

5. An article is sold at a profit of 20%. If both the cost price and selling price were to be Rs 20 less, the profit would be 10% more. Find the cost price of the article.
(a) Rs 120 (b) Rs 80
(c) Rs 60 (d) Rs 75

6. A shopkeeper sells 100 kg of sugar partly at 10% profit and the remaining at 20% profit. If he gains 12% on the whole transaction, how much sugar did he sell at 20% profit?
(a) 25 kg (b) 40 kg
(c) 20 kg (d) 30 kg

7. A manufacturer sells his goods to a wholesaler at 10% gain; the whole saler to the retailer at 20% gain and the retailer to the customer at 30% gain. Find what per cent the customer has to pay more on the manufactured price?
(a) 60% (b) $66\frac{2}{3}\%$
(c) $48\frac{1}{5}\%$ (d) $71\frac{3}{5}\%$

8. A woman buys toffees at Rs 2.50 a dozen and an equal number at Rs 3 a score. She sells them at Rs 3.60 a score and thus makes a profit of Rs 10. How many toffees did she buy?
(a) 10000 (b) 12000
(c) 5000 (d) 6000

9. Three tables are purchased for Rs 2500 each. First is sold at a profit of 8%, the second is sold at a loss of 3%. If their average selling price is Rs 2575, find the profit per cent on the third.
(a) 6% (b) 5%
(c) 4% (d) 8%

10. A man sells a TV at a profit of 25% of the cost. Had he sold it at a profit of 25% of the selling price, his profit would have increased by 5% of the cost price plus Rs 100. Find the cost of the TV?
(a) Rs 6000 (b) Rs 8000
(c) Rs 10,000 (d) Rs 7500

Answers

1. (b)	**2.** (a)	**3.** (b)	**4.** (b)	**5.** (c)	**6.** (c)	**7.** (d)	**8.** (b)	**9.** (c)	**10.** (b)

Section-C

DISCOUNT

KEY FACTS

1. **Discount** is the per cent of rebate offered on the **marked price** (printed or list price) of goods.

$$\text{Discount} = \frac{\text{Discount rate}}{100} \times \text{M.P.}$$

2. The customer or the buyer pays the difference between the marked price and the discount. Thus, S.P. = M.P. – Discount

3. $\text{M.P.} = \dfrac{\text{S.P.} \times 100}{(100 - \text{Discount}\%)}$

4. **Successive Discounts:** When two or more discounts are allowed one after the other, then such discounts are known as successive discounts. In successive discounts, one discount is subtracted from the marked price to get net price after the 1st discount. This net price becomes the marked price and the second discount is calculated on it and subtracted from it to get the net price after second discount and so on.

Solved Examples

Ex. 1. ***A shopkeeper offers 10% discount on the marked price of his articles and still makes a profit of 20%. What is the actual cost of the article marked Rs 500 for him ?***

Sol. M.P. = Rs 500, Discount = 10%

$\therefore$ S.P. = Rs 500 – 10% of Rs 500 = 90% of Rs 500 = $\dfrac{90}{100} \times \text{Rs } 500 = \text{Rs } 450$

Profit = 20%

C.P. = Rs $\left(\dfrac{450 \times 100}{120}\right)$ = Rs 375.

Ex. 2. ***The marked price of a watch is Rs 1600. After two successive discounts it is sold for Rs 1224. If the rate of first discount is 10%. What is the rate of second discount ?***

Sol. M.P. = Rs 1600, First discount = 10%

$\therefore$ Net price = Rs 1600 – 10% of Rs 1600 = Rs 1600 – Rs 160 = Rs 1440

S.P. = Rs 1224

$\therefore$ Second discount = Rs 1440 – Rs 1224 = Rs 216

$\therefore$ Rate of second discount = $\dfrac{216}{1440} \times 100 = 15\%$

Ex. 3. ***On an article with marked price Rs 20000, a customer has a choice between the successive discounts of 20%, 20% and 10% and three successive discounts of 40%, 5% and 5%. How much can he save by choosing the better offer ?***

Sol. M.P. = Rs 20000

S.P. after choosing 1st set of successive discounts = 80% of 80% of 90% of Rs 20000

$= \dfrac{80}{100} \times \dfrac{80}{100} \times \dfrac{90}{100} \times \text{Rs } 20000 = \text{Rs } 11520$

S.P. after choosing 2nd set of successive discounts = 60 % of 95% of 95% of Rs 20000

$= \dfrac{60}{100} \times \dfrac{95}{100} \times \dfrac{95}{100} \times \text{Rs } 20000 = \text{Rs } 10830$

$\therefore$ The second offer is better and the customer can save (Rs 11520 – Rs 10830) = Rs 690.

Ex. 4. ***A discount series of p% and q% on an invoice is the same as a single discount of***

(a) $\left(p + q + \dfrac{pq}{100}\right)\%$ ***(b)*** $\left(p - q + \dfrac{pq}{100}\right)\%$ ***(c)*** $\left\{100 - \left(p + q + \dfrac{pq}{100}\right)\right\}\%$ ***(d)*** $\dfrac{pq}{100}\%$

Sol. Let the M.P. of the invoice = Rs 100. Then,

S.P. = $(100 - p)\%$ of $(100 - q)\%$ of Rs 100

$= \text{Rs}\left\{\frac{(100-p)}{100}\times\frac{(100-q)}{100}\times 100\right\} = \text{Rs}\ \frac{(100-p)(100-q)}{100}$

$\therefore$ Single discount $= \left\{100-\frac{(100-p)(100-q)}{100}\right\}\% = \left[\frac{10000-\{10000-100q-100p+pq\}}{100}\right]\%$

$= \frac{100q+100p-pq}{100} = \left\{(p+q)-\frac{pq}{100}\right\}\%.$

Ex. 5. ***A merchant fixes the sale price of his goods at 15% above the cost price. He sells his goods at 12% less than the fixed price. What is his percentage of profit ?***

Sol. Let the C.P. be Rs 100

$\therefore$ Marked Price = Rs 115

S.P.= Rs 115 – 12% of Rs 115 = 88% of Rs 115 = Rs 101.20

$\therefore$ Profit = Rs 1.20

Profit % = 1.2%.

Ex. 6. ***How much per cent more than the cost price should a shopkeeper marks his goods so that after allowing a discount of 20% on the marked price, he gains 10% ?***

Sol. Let the C.P. = Rs 100, Gain = 10%

$\therefore$ S.P. = Rs 110 … (i)

Let the M.P. = Rs x, Discount = 20%

$\therefore$ S.P. = 80% of $x = \frac{80x}{100}$ … (ii)

From (i) and (ii) $\frac{80x}{100}=110 \Rightarrow x = \text{Rs}\ \frac{110\times 100}{80} = \text{Rs } 137.5$

$\therefore$ Marked price = $37\frac{1}{2}\%$ above C.P.

Ex. 7. ***A shopkeeper sold a TV set for Rs 17940 with a discount of 8% and earned a profit of 19.6%. What would have been the percentage of profit earned if no discount was offered ?***

Sol. Let the marked price of the TV set be Rs x. Discount = 8%

$\therefore$ S.P. of the TV = 92 % of Rs $x = \text{Rs}\frac{92x}{100}$

Given, $\frac{92x}{100} = 17940 \Rightarrow x = \text{Rs}\ \frac{17940\times 100}{92} = \text{Rs } 19500$

S.P. = Rs 17940, Profit = 19.6%

$\therefore$ C.P. = $\text{Rs}\left(\frac{17940\times 100}{119.6}\right) = \text{Rs } 15000$

Had no discount been offered S.P. would have been Rs 19500.

$\therefore$ Profit = Rs 19500 – Rs 15000 = Rs 4500

Profit % $= \frac{4500}{15000}\times 100 = 30\%.$

Ex. 8. ***A shopkeeper fixes the marked price of an item 35% above its cost price. What is the percentage of discount allowed to gain 8% ?***

Sol. Let the C.P. = Rs 100. Then,

M.P. = Rs 135 and S.P. = $\frac{108\times 100}{100} = \text{Rs } 108$

$\therefore$ Discount = Rs 135 – Rs 108 = Rs 27

Discount% = $\frac{27}{135} \times 100 = 20\%$.

Ex. 9. ***A tradesman gives 4% discount on his marked price and gives 1 article free for buying every 15 articles and thus gains 35%. By what per cent is the marked price increased above the cost price ?***

Sol. Let the C.P. of each article be Rs x.

Then, C.P. of 16 articles = Rs $16x$

S.P. of 15 articles = 135% of Rs $16x$ = Rs $\left(\frac{135 \times 6x}{100}\right)$ = Rs $\frac{108x}{5}$

S.P. of 1 article = Rs $\left(\frac{108x}{5} \times \frac{1}{15}\right)$ = Rs $\frac{36x}{25}$

Let M.P. = Rs 100,

Then S.P. = Rs 96 after a discount of 4%

$\therefore$ If S.P. = Rs 96, then M.P. = Rs 100

If S.P. = Rs $\frac{36x}{25}$, then M.P. = Rs $\left(\frac{100}{96} \times \frac{36x}{25}\right)$ = Rs $\frac{3x}{2}$

$\therefore$ % increase in M.P. over C.P. = $\frac{\frac{3x}{2} - x}{x} \times 100 = \left(\frac{x}{2} \times \frac{1}{x} \times 100\right)\% = 50\%$.

Ex. 10. ***A manufacturer marks his goods at 40% above the cost price. He allows a discount of 10% for cash customers and 5% to credit customers. $\frac{3}{5}$ of the goods are sold for cash and the rest on credit. What is the percentage of profit when all the goods are sold and amount realised ?***

Sol. Let the C.P. of the goods be Rs 100.

$\therefore$ Marked price = Rs 140

Value of goods sold for cash = $\frac{3}{5} \times$ Rs 140 = Rs 84

Value of goods sold on credit = $\frac{2}{5} \times$ Rs 140 = Rs 56

S.P. of the goods sold on cash = 90% of Rs 84 = Rs 75.60

S.P. of the goods sold on credit = 95% of Rs 56 = Rs 53.20

$\therefore$ Total S.P. = Rs 128.80

$\Rightarrow$ Profit = 28.80 , *i.e.*, 28.8%.

Question Bank–16(c)

1. A man buys an article for Rs 80 and marks it at Rs 120. He then allows a discount of 40%. What is the loss or gain% ?

(a) 12% gain (b) 12% loss

(c) 10% gain (d) 10% loss

2. Ramesh bought a calculator with 20% discount on the tag-price. He obtained 10% profit by selling it for Rs 440. What was the tag-price ?

(a) Rs 500 (b) Rs 400

(c) Rs 480 (d) Rs 360

3. A dealer allows 25% discount on the marked price of articles and earns a profit of 20% on them. What is the marked price of the article on which he gains Rs 800?

(a) Rs 6000 (b) Rs 6400

(c) Rs 7200 (d) Rs 7000

4. Shekhar has purchased a cordless phone for Rs 3520 after getting 12% discount on the printed price. If he sold it to get 8% profit on the printed price, at what price did he sell the cordless phone ?

(a) Rs 3801.60 (b) Rs 4224

(c) Rs 4320 (d) Rs 3942.40

5. An article listed at Rs 800 is sold at successive discounts of 25% and 15%. The buyer desires to sell it off at a profit of 20% after allowing a 10% discount. What would be his list price ?

(a) Rs 620 (b) Rs 600
(c) Rs 640 (d) Rs 680

6. By selling an umbrella for Rs 300, a shopkeeper gains 20%. During a clearance sale, the shopkeeper allows a discount of 10% on the marked price. Find his gain per cent during the sale season.

(a) 10% (b) 8%
(c) 12% (d) 9%

7. What is more favourable for a buyer — A discount series of 20%, 15% and 10% or a discount series of 25%, 12% and 8% ?

(a) First (b) Second
(c) Both first and second (d) None

8. A dealer marks his goods 25% above the cost price and allows 10% discount to his customers. What is his gain per cent ?

(a) 12.5 (b) 35
(c) 15 (d) 17.5

9. By selling an article at 80% of the marked price, there is a loss of 10%. If the article is sold at the marked price, the profit per cent will be

(a) 18.4 (b) 20
(c) 12.5 (d) 15

10. The marked price of an electric iron is Rs 300. The shopkeeper allows a discount of 12% and still gains 10%. If no discount is allowed his gain percentage would have been

(a) 20 (b) 25
(c) 27 (d) 30

11. A sells a scooter priced Rs 36000. He gives a discount of 8% on the first Rs 20000 and 5% on the next Rs 10000. How much discount can he afford on the remaining Rs 6000, if he is to get as much as when 7% discount is allowed on the total ?

(a) 5% (b) 6%
(c) 7% (d) 8%

12. If 10% discount is allowed on the marked price of an article, the profit of a dealer is 20%. If he allows a discount of 20% his profit will be

(a) $4\frac{1}{3}\%$ (b) 5%
(c) $6\frac{2}{3}\%$ (d) 8%

13. A fan is listed at Rs 1500 and a discount of 20% is offered on the list price. What additional discount must be offered to the customer to bring the net price to Rs 1104.

(a) 8% (b) 10%
(c) 12% (d) 15%

14. At what per cent above the cost price must a shopkeeper mark his goods so that he gains 20% even after giving a discount of 10% on the marked price.

(a) 25% (b) 30%
(c) $33\frac{1}{3}\%$ (d) $37\frac{1}{2}\%$

15. A shopkeeper sells a badminton racket whose marked price is Rs 30 at a discount of 15% and gives a shuttle cock costing Rs 1.50 free with each racket. Even then he makes a profit of 20%. His cost price per racket is

(a) Rs 21 (b) Rs 21.25
(c) Rs 20 (d) Rs 19.75

16. The price of an article is raised by 30% and then two successive discounts of 10% each are allowed. Ultimately the price of the article is

(a) Increased by 10% (b) Increased by 5.3%
(c) Decreased by 3% (d) Decreased by 5.3%

17. A dealer buys an article listed at Rs 100 and gets successive discounts of 10% and 20%. He spends 10% of the cost price on transport. At what price should he sell the article to earn a profit of 15% ?

(a) Rs 90 (b) Rs 90.02
(c) Rs 91.08 (d) Rs 91.28

18. A shopkeeper claims to sell his articles at a discount of 10%, but marks his articles by increasing the cost of each by 20%. His gain per cent is

(a) 6% (b) 8%
(c) 10% (d) 12%

19. The marked price of a shirt and trousers are in the ratio 1:2. The shopkeeper gives 40% discount on the shirt. If the total discount on both is 30%, the discount offered on trousers is

(a) 15% (b) 20%
(c) 25% (d) 30%

20. On reducing the marked price of an article by 32 a shopkeeper gains 15%. If the cost price of the article be Rs 320 and it is sold at the marked price.What will be the gain per cent ?

(a) 10% (b) 20%
(c) 25% (d) 12%

21. A shopkeeper earns a profit of 15% after selling a book at 20% discount on the printed price. The ratio of the cost price and the printed price of the book is
(a) 16 : 23 (b) 20 : 23
(c) 23 : 16 (d) 23 : 20

22. A shopkeeper marks his goods at 20% above the cost price. He sells three - fourths of his goods at the marked price. He sells the remaining goods at 50% of the marked price. Determine his profit per cent on the whole transaction.
(a) 10% (b) 8%
(c) 5% (d) 7%

23. Two shopkeepers announce the same price of Rs 700 for a shirt. The first offers successive discounts of 30% and 6% while the second offers successive discounts of 20% and 16%. The shopkeeper who offers better discounts charges — less than the other shopkeeper.
(a) 22.40 (b) 16.80
(c) 9.80 (d) 36.40

24. A trader marked the selling price of an article at 10% above the cost price. At the time of selling, he allows certain discount and suffers a loss of 1%. He allowed a discount of
(a) 9% (b) 10%
(c) 10.5% (d) 11%

25. Peter bought an item at 20% discount on its original price. He sold it with 40% increase on the price he bought it. The new sale price is by what per cent more than the original price ?
(a) 7.5 (b) 8
(c) 10 (d) 12

26. Kunal bought a suitcase with 15% discount on the labelled price. He sold the suitcase for Rs 2880 with 20% profit on the labelled price. At what price did he buy the suitcase ?
(a) Rs 2040 (b) Rs 2400
(c) Rs 2604 (d) Rs 2640

27. A shopkeeper sold an article offering a discount of 5% and earned a profit of 23.5%. What would have been the percentage of profit earned if no discount was offered ?
(a) 24.5 (b) 25
(c) 28.5 (d) 30

28. A shopkeeper sold an article for Rs 6750 after giving a discount of 10% on the labelled price. He would have earned a profit of 50%, had there been no discount. What was the actual percentage of profit earned ?
(a) 36 (b) 40
(c) 44 (d) 35

29. A retailer gets a discount of 40% on the printed price of an article. The retailer sells it at the printed price. What is the gain or loss per cent ?
(a) 12% gain (b) 12% loss
(c) 10% gain (d) 10% loss

30. A trader marks his goods at 20% above the cost price. He sold half the stock at the marked price, one quarter at a discount of 20% on the marked price and the rest at a discount of 40% on the marked price. His total gain is
(a) 2% (b) 4.5%
(c) 13.5% (d) 15%

Answers

1. (d)	**2.** (a)	**3.** (b)	**4.** (c)	**5.** (d)	**6.** (b)	**7.** (b)	**8.** (a)	**9.** (c)	**10.** (b)
11. (c)	**12.** (c)	**13.** (a)	**14.** (c)	**15.** (c)	**16.** (d)	**17.** (c)	**18.** (b)	**19.** (c)	**20.** (c)
21. (a)	**22.** (c)	**23.** (c)	**24.** (b)	**25.** (d)	**26.** (a)	**27.** (d)	**28.** (d)	**29.** (b)	**30.** (a)

Hints and Solutions

1. (d) C.P. = Rs 80, M.P. = Rs 120, Discount = 40%

$\therefore$ S.P. = 60% of Rs 120 $= \frac{60}{100} \times$ Rs 120 = Rs 72

$\therefore$ Loss = Rs 80 – Rs 72 = Rs 8

Loss % $= \frac{8}{80} \times 100 = 10\%$.

2. (a) Let the tag price of the calculator Rs x. Then,
C.P. of Ramesh after 20% discount = 80% of

$$\text{Rs } x = \text{Rs } \frac{80x}{100} = \text{Rs } \frac{4x}{5} \quad \ldots \text{(i)}$$

Also, given S.P. = Rs 440 and Profit = 10%

$$\therefore \text{ C.P.} = \text{Rs } \left(\frac{440 \times 100}{110}\right) = \text{Rs } 400 \quad \ldots \text{(ii)}$$

From (i) and (ii)

$$\therefore \frac{4x}{5} = 400 \Rightarrow x = \text{Rs } 500$$

3. (b) Let the M.P. = Rs 100, Discount = 25%

$\therefore$ S.P. = Rs 75, Profit = 20%

$\Rightarrow$ C.P. = Rs $\frac{75\times100}{120}$ = Rs 62.50

$\therefore$ Profit = Rs 75 – Rs 62.50 = Rs 12.50

If the gain is Rs 12.50, M.P. = Rs 100

If the gain is Rs 800, M.P. = Rs $\frac{100}{12.50}\times800$

= Rs 6400

4. (c) Let the printed price of the cordless phone be Rs x. Then,

x – 12% of x = 3520 $\Rightarrow$ 88% of x = 3520

$\Rightarrow$ $x = \frac{3520\times100}{88}$ = Rs 4000, Profit = 8%

S.P. = Rs 4000 + 8% of Rs 4000

= Rs 4000 + Rs 320 = Rs 4320.

5. (d) M.P = Rs 800

$\therefore$ C.P. of the buyer = 75% of 85% of Rs 800

$= \frac{75}{100}\times\frac{85}{100}\times$ Rs 800 = Rs 510

Profit = 20%

$\therefore$ S.P. of the buyer = Rs $\left(\frac{510\times120}{100}\right)$ = Rs 612

Discount = 10%

$\therefore$ List price of the buyer = Rs $\left(\frac{612\times100}{90}\right)$

= Rs 680.

6. (b) C.P. of the umbrella = Rs $\left(\frac{300\times100}{120}\right)$ = Rs 250

M.P. of the umbrella = Rs 300, Discount = 10%

$\therefore$ S.P. of the umbrella during sale = 90% of Rs 300

= Rs 270

$\therefore$ Gain % during sale season

$= \frac{\text{Rs } 270 - \text{Rs } 250}{\text{Rs } 250}\times100$

$= \frac{20}{250}\times100 = 8.$

7. (b) Let the marked price = Rs 100

S.P. for the 1st discount series

$= \frac{80}{100}\times\frac{85}{100}\times\frac{90}{100}\times100$ = Rs 61.20

S.P. for the 2nd discount series

$= \frac{75}{100}\times\frac{88}{100}\times\frac{92}{100}\times100$ = Rs 60.72

$\therefore$ The second discount series is more favourable.

8. (a) Let the C.P. of the goods be Rs 100. Then,

M.P. of the goods = Rs 125, Discount = 10%

$\therefore$ S.P. of the goods = 90% of Rs 125

$= \frac{90}{100}\times$ Rs 125 = Rs 112.5

$\therefore$ Gain% = $\frac{(112.5-100)}{100}\times100$ = 12.5%.

9. (c) Let M.P. = Rs 100, S.P. = 80% of M.P. = Rs 80

Loss = 10% $\Rightarrow$ C.P. = Rs $\frac{(80\times100)}{90}$ = Rs $\frac{800}{9}$

Had S.P. been equal to the M.P., *i.e.*, S.P. = Rs 100, then

Profit% = $\frac{\left(100-\frac{800}{9}\right)}{\frac{800}{9}}\times100 = \frac{\frac{100}{9}}{\frac{800}{9}}\times100$

$= \frac{10000}{800}$ = 12.5%

10. (b) M.P. = Rs 300, Discount = 12%

$\therefore$ S.P. = Rs 300 – 12% of Rs 300 = Rs 300 – Rs 36

= Rs 264

Gain = 10%

$\therefore$ C.P. = Rs $\left(\frac{264\times100}{110}\right)$ = Rs 240

Had there been no discount, S.P. would have been Rs 300

$\therefore$ Profit% = $\frac{(300-240)}{240}\times100 = \frac{60}{240}\times100 = 25\%$

11. (c) Discount on Rs 36000 at 7% = $\frac{7}{100}\times$ Rs 36000

= Rs 2520

Discount on Rs 20000 at 8% = $\frac{8}{100}\times$ Rs 20000

= Rs 1600

Discount on Rs 10000 at 5% = $\frac{5}{100}\times$ Rs 10000

= Rs 500

$\therefore$ Discount on remaining Rs 6000

= Rs 2520 – Rs (1600 + 500)

= Rs 2520 – Rs 2100 = Rs 420

$\therefore$ Discount % = $\frac{420}{6000}\times100 = 7\%.$

12. (c) Let the M.P. of the article = Rs 100
Discount = 10%
$\therefore$ S.P. = 90% of Rs 100 = Rs 90, Profit = 20%
$\therefore$ C.P. = Rs $\frac{90\times100}{120}$ = Rs 75
If the discount is 20%, then S.P. = 80% of Rs 100
= Rs 80
$\therefore$ Required profit % = $\frac{(80-75)}{75}\times100$
$= \frac{5}{75}\times100 = 6\frac{2}{3}\%$

13. (a) M.P. = Rs 1500, Discount = 20%
$\therefore$ S.P. = 80% of Rs 1500 = Rs 1200
Final S.P. = Rs 1104
$\therefore$ Additional discount = Rs 1200 – Rs 1104 = Rs 96
$\therefore$ Additional discount rate = $\frac{96}{1200}\times100$ = 8%

14. (c) Let the M.P. be Rs x. Discount = 10%
$\therefore$ S.P. = 90% of Rs x = Rs $\frac{9x}{10}$, Profit = 20%
C.P. = $\frac{\frac{9x}{10}\times100}{120} = \frac{3}{4}x$
$\therefore$ Reqd. per cent = $\frac{\left(x-\frac{3}{4}x\right)}{\frac{3}{4}x}\times100$
$= \frac{100}{3}\% = 33\frac{1}{3}\%$

15. (c) M.P. of the racket = Rs 30, Discount = 15%
$\therefore$ S.P. of the racket = $30\times\frac{85}{100}$ = Rs 25.50
S.P. when a shuttle cock costing Rs 1.50 is given free = Rs 25.50 – Rs 1.50 = Rs 24
Profit = 20%
$\therefore$ C.P. of the racket = Rs $\frac{24\times100}{120}$ = Rs 20.

16. (d) Let the original cost of the article be Rs x.
Raising it by 30%, M.P. = $x\times\frac{130}{100}$ = Rs $\frac{13x}{10}$
After allowing two discounts each of 10%, the price of the article = $\frac{13x}{10}\times\frac{90}{100}\times\frac{90}{100}$
= Rs $\frac{1053x}{1000}$
Per cent increase in the cost of the article
$= \frac{\left(\frac{1053x}{1000}-x\right)}{x}\times100$
$= \frac{53x}{1000x}\times100 = 5.3\%$

17. (c) Cost price of the article after discount
= 90% of 80% of Rs 100
$= \frac{90}{100}\times\frac{80}{100}\times$ Rs 100 = Rs 72
Amount spent on transport = 10% of Rs 72
= Rs 7.20
$\therefore$ Net C.P. = Rs 72 + Rs 7.20 = Rs 79.20
Profit = 15%
$\therefore$ S.P. = Rs $\left(\frac{79.2\times115}{100}\right)$ = Rs 91.08

18. (b) Let C.P. = Rs 100. Then M.P. = Rs 120
Discount = 10%
$\therefore$ S.P. = 90% of Rs 120 = $\frac{90}{100}\times$ Rs 120 = Rs 108
$\therefore$ Gain % = 8%

19. (c) Let the M.P. of a shirt be Rs x and that of trousers be Rs $2x$.
Let the discount on the trousers be y% Then,
$\frac{60}{100}\times x + \frac{(100-y)}{100}\times2x = \frac{70}{100}\times(x+2x)$
$\Rightarrow \frac{3}{5}+\frac{(100-y)}{100} = \frac{21}{10}$
$\Rightarrow \frac{100-y}{100} = \frac{21}{10}-\frac{3}{5} = \frac{21-6}{10} = \frac{15}{20} = \frac{3}{2}$
$\Rightarrow (100-y) = \frac{3}{2}\times50 = 75 \Rightarrow y = 25\%$

20. (c) C.P. = Rs 320, Gain = 15%
$\therefore$ S.P. = Rs $\left(320\times\frac{115}{100}\right)$ = Rs 368
M.P. = Rs (368 + 32) = Rs 400
$\Rightarrow$ New S.P. = Rs 400
$\therefore$ Gain% = $\left(\frac{80}{320}\times100\right)\%$ = 25%.

21. (a) Let the printed price be Rs 100. Then S.P. = Rs 80
Now S.P. = Rs 80, Gain% = 15%
$\therefore$ C.P. = Rs $\left(\frac{100}{115}\times80\right)$ = Rs $\frac{1600}{23}$
$\therefore$ C.P. : Printed price = $\frac{1600}{23}$: 100 = 1600 : 2300
= 16 : 23

22. (c) Let the C.P. = Rs 100. Then, M.P. = Rs 120

S.P. of $\frac{3}{4}$th of goods $= \frac{3}{4} \times$ Rs 120 $=$ Rs 90

S.P. of remaining $\frac{1}{4}$th of goods $= \frac{50}{100} \times \frac{1}{4} \times$ Rs 120
$=$ Rs 15

$\therefore$ Total S.P. = Rs 90 + Rs 15 = Rs 105

$\therefore$ Gain = Rs 105 – Rs 100 = Rs 5, *i.e.*,
Gain % = 5%.

23. (c) M.P. of the shirt = Rs 700
S.P. of the shirt 1st shoopkeeper
= 70% of 94% of Rs 700

$= \frac{70}{100} \times \frac{94}{100} \times$ Rs 700 $=$ Rs 460.60

S.P. of the shirt offered by the 2nd shopkeeper
= 80% of 84% of Rs 700

$= \frac{80}{100} \times \frac{84}{100} \times$ Rs 700 $=$ Rs 470.40

$\therefore$ 1st shopkeeper offers better discounts and
Required difference = Rs 470.40 – Rs 460.60
= Rs 9.80.

24. (b) Let the C.P. = Rs 100, M.P. = Rs 110

Loss = 1% $\Rightarrow$ S.P. $= \text{Rs}\left(\frac{99}{100} \times 100\right) =$ Rs 99

$\therefore$ Discount = Rs 110 – Rs 99 = Rs 11

$\therefore$ Discount per cent $= \left(\frac{11}{110} \times 100\right)\% = 10\%$

25. (d) Let the original price be Rs 100.
Then C.P. = Rs 80

S.P. = 140% of Rs 80 $= \text{Rs}\left(\frac{140}{100} \times 80\right)$
= Rs 112

$\therefore$ Required % $= \frac{(112-100)}{100} \times 100 = 12\%$.

26. (a) S.P. = Rs 2880, Profit = 20%
Let the labelled price be Rs x. Then,

120% of x = 2880 $\Rightarrow x = \frac{2880 \times 100}{120} = 2400$

$\therefore$ C.P. = 85% of Rs 2400 $= \text{Rs}\left(\frac{85}{100} \times 2400\right)$
= Rs 2040.

27. (d) Let the M.P. of the article = Rs 100
Discount = 5% $\Rightarrow$ S.P. = Rs 95

Profit = 23.5% $\Rightarrow$ C.P. $= \text{Rs}\left(\frac{95 \times 100}{123.5}\right)$

$= \text{Rs}\ \frac{95000}{1235}$

Had there been no discount, S.P. = Rs 100

Then, Profit % $= \frac{\left(100 - \frac{95000}{1235}\right)}{\frac{95000}{1235}} \times 100$

$= \frac{\left(\frac{123500 - 95000}{1235}\right)}{\frac{95000}{1235}} \times 100$

$= \frac{28500}{95000} \times 100 = 30\%$

28. (d) S.P. = Rs 6750, Discount = 10%

$\therefore$ M.P. $= \text{Rs}\left(\frac{6750 \times 100}{90}\right) =$ Rs 7500

If there was no discount S.P. = Rs 7500 and Profit % = 50%

$\therefore$ C.P. $= \text{Rs}\left(\frac{7500 \times 100}{150}\right) =$ Rs 5000

$\therefore$ Actual profit = Rs 6750 – Rs 5000 = Rs 1750

Actual profit% $= \frac{1750}{6750} \times 100 = 35\%$.

29. (b) Let the M.P. = Rs 100, Discount = 40%

$\therefore$ C.P. of the retailer = 60% of Rs 100 = Rs 60
S.P. of the retailer = Rs 100

$\therefore$ Profit % $= \frac{40}{60} \times 100 = \frac{200}{3}\% = 66\frac{2}{3}\%$

30. (a) Let the C.P. of the total stock = Rs 100
Then, M.P. of the total stock = Rs 120

$\therefore$ S.P. $= \frac{1}{2} \times 120 + \frac{1}{4} \times \frac{80}{100} \times 120 + \frac{1}{4} \times \frac{60}{100} \times 120$
= Rs (60 + 24 + 18) = Rs 102

$\therefore$ Total gain = Rs 102 – Rs 100 = Rs 2, *i.e.*, 2%.

Self Assessment Sheet–16(c)

1. Two dealers offer an article at the same list price. The first allows discount 20%, 10% and 5% and the other of 15%, 12% and 8%. Which is a better offer for the customer?

(a) 1st offer

(b) 2nd offer

(c) Both 1st offer and 2nd offer

(d) Cannot be determined

2. If a discount of 10% is given to a customer on the marked price of an article, the gain of the trader is 20%. What will be the gain per cent of the trader if the discount is increased to 15%?

(a) $12\frac{1}{2}\%$ (b) $13\frac{1}{3}\%$

(c) $14\frac{1}{4}\%$ (d) $15\frac{1}{5}\%$

3. A tradesman allows a discount of 15% on the written price. How much above the cost price should he mark his goods to make a profit of 19%?

(a) 20% (b) 40%

(c) 30% (d) 25%

4. A pen is listed for Rs 12. A discount of 15% is given on it. A second discount is given bringing the price down to Rs 8.16. The rate of second discount is:

(a) 15% (b) 18%

(c) 20% (d) 25%

5. A shopkeeper claims to sell his articles at a discount of 10%, but marks his articles by increasing the cost of each by 20%. His gain per cent is:

(a) 6% (b) 8%

(c) 10% (d) 12%

6. A seller allows a discount of 5% on a watch. If he allows a discount of 7%, he earns Rs 15 less in the profit. What is the marked price?

(a) Rs 697.50 (b) Rs 712.50

(c) Rs 750 (d) Rs 817.50

7. A shopkeeper sold an air conditioner for Rs 25935 with a discount of 9% and earned a profit of 3.74%. What would have been the percentage of profit earned if no discount was offered?

(a) 12.3% (b) 15.6%

(c) 16% (d) 14 %

8. On selling an article at a discount of 20%, the profit is 20%. Find the profit per cent if the article is sold at a discount of 10%.

(a) 25% (b) 30%

(c) 15% (d) 35%

9. A trader bought some goods at a discount of 20% of the list price. He wants to mark them at such a price that he can give a discount of 20% on the marked price and still make a profit of 25%. Find the per cent of the list price at which he should mark the goods.

(a) 25% above the list price

(b) 15% below the list price

(c) 25% below the list price

(d) 15% above the list price

10. In one shop, on article is marked 75% above the cost price, but the purchaser is allowed a discount of 20% on the marked price. In another shop a similar article is sold for Rs 58 at a gain of 45%. What did the purchased pay for this article in the first shop?

(a) Rs 60 (b) Rs 56

(c) Rs 62 (d) Rs 65

Answers

1. (a) **2.** (b) **3.** (b) **4.** (c) **5.** (b) **6.** (c) **7.** (d) **8.** (d) **9.** (b)

10. (a) [**Hint.** Find the profit % in the 1st step. Then calculate S.P. of the 1st shop using the C.P. of the second shop and the profit % you found]