Chapter 2. Profit, Loss and Discount

Ex 2.1

Answer 1.

C.P of the watch = Rs.1750

S.P of the watch = Rs.1610

Loss = C.P. – S.P

= Rs. (1750 – 1610) = Rs.140

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

$$= \frac{140}{1750} \times 100 = 8\%$$

Answer 2.

C.P of the camera = Rs.4600

Profit = 15%

$$\frac{\text{S.P.}}{\text{C.P.}} = 1 + \frac{\text{Profit}}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{4600} = 1 + \frac{15}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{4600} = \frac{100 + 15}{100}$$

$$\Rightarrow \text{S.P.} = \frac{115}{100} \times 4600 = \text{Rs.}5290$$

Answer 3.

C.P of the watch = Rs.4050

Loss = 14%

$$\frac{\text{S.P.}}{\text{C.P.}} = 1 - \frac{\text{Loss}}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{4050} = 1 - \frac{14}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{4050} = \frac{100 - 14}{100}$$

$$\Rightarrow \text{S.P.} = \frac{86}{100} \times 4050 = \text{Rs.}3483$$

Answer 4.

C.P. of the car = Rs.75000

Amount spent on repairing = Rs.15000

$\therefore$ Total C.P. = Rs.75000 + Rs.15000

= Rs.90000

S.P. of the car = Rs.114000

$\therefore$ Gain = S.P – C.P.

= Rs. (114000 – 90000)

= Rs. 24000

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

$$= \frac{24000}{90000} \times 100 = 26.6\%$$

Answer 5.

C.P. of the furniture set = Rs.21000

Amount spent on transportation = Rs.500

Amount spent on repairing = Rs.4500

$\therefore$ Total C.P = Rs. 21000 + Rs.500 + Rs.4500

= Rs.26000

Profit% = 20%

Now,

$$\frac{\text{S.P.}}{\text{C.P.}} = 1 + \frac{\text{Profit}}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{26000} = 1 + \frac{20}{100}$$

$$\Rightarrow \frac{\text{S.P.}}{26000} = \frac{100+20}{100}$$

$$\Rightarrow \text{S.P.} = \frac{120}{100} \times 26000 = \text{Rs.}31200$$

$\therefore$ He must sell the furniture set at Rs.31200 to make a profit of 20%.

Answer 6.

One score = 20 notebooks

C.P of 20 notebooks = Rs. 240

C.P. of 1 notebook = Rs. 240 / 20 = Rs.12

∴ C.P. of 1000 notebooks = Rs. 12 x 1000 = Rs.12000

S.P of 1 notebook = Rs.15

∴ S.P of 1000 notebooks = Rs. 15 x 1000 = Rs.15000

∵ S.P. > C.P.

Profit = S.P. – C.P. = Rs. (15000 – 12000) = Rs. 3000

$$\text{Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$= \frac{3000}{12000} \times 100 = 25\%$$

Answer 7.

Cost of one box = Rs.180

∴ C.P of 25 boxes = Rs.180 x 25 = Rs.4500

One box contains = 12 bars

∴ 25 boxes contain = 12 x 25 = 300 bars

∴ S.P of 25 boxes = Rs.18 x 300 = Rs. 5400

∵ S.P. > C.P.

Profit = S.P. – C.P. = Rs. (5400 – 4500) = Rs. 900

$$\text{Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$= \frac{900}{4500} \times 100 = 20\%$$

Answer 8.

S.P of 1 kg of coffee = Rs.135

Loss % = 10%

Now,

$$\frac{S.P.}{C.P.} = 1 - \frac{Loss}{100}$$

$$\Rightarrow \frac{135}{C.P.} = 1 - \frac{10}{100}$$

$$\Rightarrow \frac{135}{C.P.} = \frac{100-10}{100}$$

$$\Rightarrow \quad C.P. = \frac{100}{90} \times 135 = Rs.150$$

$\therefore$ C.P. of 1 kg of coffee = Rs.150

$\therefore$ Loss per 1kg of coffee = C.P. – S.P

= Rs. 150 – Rs.135 = Rs. 15

Total loss incurred = Rs. 180

$$\therefore \text{Amount of coffee sold} = \frac{\text{Total loss}}{\text{loss per 1 kg of coffee}}$$

$$= \frac{180}{15} = 12 \text{ kg.}$$

Answer 9.

Cost of 8 locks = Rs.520

$\therefore$ C.P. of 1 lock = Rs. $\frac{520}{8}$ = Rs.65

Selling price of 12 locks = Rs.936

$\therefore$ S.P. of 1 lock = Rs. $\frac{936}{12}$ = Rs.Rs.78

$\because$ S.P. > C.P.

Profit = S.P. – C.P. = Rs. (78 – 65) = Rs. 13

$$Profit\% = \frac{Profit}{C.P.} \times 100$$

$$= \frac{13}{65} \times 100 = 20\%$$

Net profit = Rs.520

$$\therefore \text{Number of locks sold} = \frac{\text{Total profit}}{\text{profit per lock}}$$

$$= \frac{520}{13} = 40$$

Answer 10.

$$SP = \left(\frac{100 + \text{Profit}\%}{100}\right) \times CP$$

$$\therefore SP = \left(\frac{100+20}{100}\right) \times \text{Rs. } 3000 = \text{Rs. } 3600$$

$\therefore$ profit $= SP - CP = \text{Rs. } 600$

This profit includes tax $= \text{Rs. } 360$

$\therefore$ net profit $= \text{Rs. } 600 - 360 = \text{Rs. } 240$

$$\therefore \text{Profit}\% = \frac{\text{Profit}}{CP} \times 100 = \frac{240}{3000} \times 100 = 8$$

So, the net profit is Rs. 240 and the profit percentage is 8.

Answer 11.

CP of 800 straw at the rate of 50 paise per straw

$$= \text{Rs. } \left(\frac{50}{100} \times 800\right) = \text{Rs. } 400$$

Since profit is 50% of his outlay when only 640 articles are sold,

$$\therefore \text{SP of 640 straws} = \left(1 + \frac{50}{100}\right) \text{of Rs. } 400 = \left(\frac{150}{100}\right) \times \text{Rs. } 400 = \text{Rs. } 600$$

$$\therefore \text{SP of each article} = \text{Rs. } \frac{600}{640} = \text{Rs. } \frac{15}{16}$$

$$\therefore \text{SP of 720 straws} = \text{Rs. } \left(720 \times \frac{15}{16}\right) = \text{Rs. } 675$$

$\therefore$ Actual profit $= \text{Rs. } 675 - \text{Rs. } 400 = \text{Rs. } 275$

$$\therefore \text{Actual profit}\% = \left(\frac{\text{Profit}}{CP} \times 100\right)\% = \left(\frac{275}{400} \times 100\right)\% = 68.75\%$$

Answer 12.

SP of the first mobile $= \text{Rs. } 15000$, profit $= 25\%$

$$\therefore \text{Rs. } 15000 = \left(1 + \frac{25}{100}\right) \text{of CP} = \frac{5}{4} \text{of CP}$$

$$\Rightarrow CP = \text{Rs. } \left(15000 \times \frac{4}{5}\right) = \text{Rs. } 12000$$

SP of the second mobile $= \text{Rs. } 9945$, profit $= 10\frac{1}{2}\% = \frac{21}{2}\%$

$$\text{Rs. } 9945 = \left(1 + \frac{\frac{21}{2}}{100}\right) \text{of CP} = \frac{221}{200} \text{of CP}$$

$$\Rightarrow CP = \text{Rs. } \left(9945 \times \frac{200}{221}\right) = \text{Rs. } 9000$$

Let the CP of the third article be Rs. x.

$\therefore$ CP of all the three articles $= \text{Rs. } 12000 + \text{Rs. } 9000 + \text{Rs. } x = \text{Rs. } (21000 + x)$

$\therefore$ SP of all the three articles $= \text{Rs. } 15000 + \text{Rs. } 9945 + \text{Rs. } 5392 = \text{Rs. } 30337$

As the loss incurred on the whole transaction $= 8\frac{1}{3}\% = \frac{25}{3}\%$

$$\text{So, Rs. } 30337 = \left(1 - \frac{\frac{25}{3}}{100}\right) \text{ of Rs. } (21000 + x)$$

$$\Rightarrow 30337 = \left(1 - \frac{1}{12}\right) \times (21000 + x)$$

$$\Rightarrow 30337 = \left(\frac{11}{12}\right) \times (21000 + x)$$

$$\Rightarrow \frac{364044}{11} = 21000 + x$$

$$\Rightarrow x = \frac{133044}{11} = \text{Rs. } 12095 \text{ approximately}$$

Answer 13.

Let CP of the car at Kolkata be Rs. x.

As the car is available at 12% less price at Chennai,

$$\text{CP of the car at Chennai} = \left(1 - \frac{12}{100}\right) \text{ of Rs. } x = \text{Rs. } \frac{22}{25}x$$

Since he incurs Rs. 9000 as overhead expenses,

$$\text{total CP of the car} = \text{Rs. } \left(\frac{22}{25}x + 9000\right)$$

By selling the car at Kolkata for Rs. x, he makes a profit of 10%

$$\therefore \text{Rs. } x = \left(1 + \frac{10}{100}\right) \text{ of Rs. } \left(\frac{22}{25}x + 9000\right)$$

$$\Rightarrow x = \frac{11}{10}\left(\frac{22}{25}x + 9000\right)$$

$$\Rightarrow \frac{10}{11}x = \frac{22}{25}x + 9000$$

$$\Rightarrow \frac{10}{11}x - \frac{22}{25}x = 9000$$

$$\Rightarrow \frac{8}{275}x = 9000 \Rightarrow x = \frac{275 \times 9000}{8} \Rightarrow x = \text{Rs. } 309375$$

Ex 2.2

Answer 1.

Let the cost price be Rs. 100

So, the profit will be Rs. $\left(\frac{25}{100} \times 100\right)$ = Rs. 25

$\Rightarrow$ SP = CP + Profit = Rs. (100 + 25) = Rs. 125

When the profit is Rs. 25, the sale is Rs. 125

So, let x be the profit when the sale is Rs. 5000

$\Rightarrow x = \frac{25 \times 5000}{125}$ = Rs. 1000

Hence, the profit is Rs. 1000.

Answer 2.

Let the CP of 3 watches be Rs. x.

$\therefore$ CP of 1 watch = Rs. $\frac{x}{3}$

$\Rightarrow$ CP of 10 watches = Rs. $\frac{10x}{3}$

Loss on selling 10 watches = CP of 3 watches = Rs. x

SP of 10 watches is Rs. 1400

Loss incurred on selling 10 watches = CP of 3 watches = Rs. x

Since CP – SP = Loss

$\Rightarrow$ Rs. $\frac{10x}{3}$ – Rs. 1400 = Rs. x

$\Rightarrow \frac{10x - 4200}{3} = x$

$\Rightarrow 10x - 4200 = 3x$

$\Rightarrow 7x = 4200$

$\Rightarrow x = 600$

Hence, CP of a watch = Rs. $\frac{x}{3}$ = Rs. $\frac{600}{3}$ = Rs. 200.

Answer 3.

CP of 5 toffees = Re. 1

$$\text{SP of 5 toffees} = \left(\frac{100 + \text{Profit\%}}{100}\right) \text{ of CP}$$

$$= \left(\frac{100 + 25}{100}\right) \times \text{Re. } 1$$

$$= 125\% \times \text{Re. } 1$$

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

For Rs. $\frac{5}{4}$, toffees sold = 5

For Re. 1, toffees sold = $\left(5 \times \frac{4}{5}\right) = 4$

Hence, 4 toffees were sold to gain 25%.

Answer 4.

S.P of a tie = Rs.648

Gain = 8%

$$\frac{\text{S.P.}}{\text{C.P.}} = 1 + \frac{\text{Profit}}{100}$$

$$\Rightarrow \frac{648}{\text{C.P.}} = 1 + \frac{8}{100}$$

$$\Rightarrow \frac{648}{\text{C.P.}} = \frac{100 + 8}{100}$$

$$\Rightarrow \text{C.P.} = \frac{100}{108} \times 648 = \text{Rs.}600$$

Now, C.P. of the tie = Rs.600

Gain = 10%

$$\therefore \quad \text{Gain} = \frac{10}{100} \times \text{C.P.}$$

$$= \frac{10}{100} \times 600 = \text{Rs.}60$$

$$\therefore \quad \text{S.P.} = \text{Rs.}(600 + 60) = \text{Rs.}660$$

$\therefore$ He must sell the tie at Rs.660 to make a gain of 10%

Answer 5.

S.P. of the cupboard = Rs.6480

Loss = 10%

Now,

$$\frac{S.P.}{C.P.} = 1 - \frac{Loss}{100}$$

$$\Rightarrow \frac{6480}{C.P.} = 1 - \frac{10}{100}$$

$$\Rightarrow \frac{6480}{C.P.} = \frac{100-10}{100}$$

$$\Rightarrow \quad C.P. = \frac{100}{90} \times 6480 = Rs.7200$$

Now, C.P. of the cupboard = Rs.7200

S.P. of the cupboard = Rs.7560

$\because$ S.P. > C.P.

$\therefore$ Gain = S.P. − C.P.

= Rs.(7560−7200)

= Rs.360

$$\therefore \text{Gain\%} = \frac{gain}{C.P.} \times 100$$

$$= \frac{360}{7200} \times 100 = 5\%$$

Answer 6.

Let the S.P. of 4 pens = Rs. x

$\therefore$ S.P. of 1 pen = Rs. $\frac{x}{4}$

C.P. of 5 pens will also be Rs. x

$\therefore$ C.P. of 1 pen = Rs. $\frac{x}{5}$

As S.P. > C.P.

$\therefore$ Profit = S.P. − C.P.

$$= Rs.\left(\frac{x}{4} - \frac{x}{5}\right) = Rs.\left(\frac{5x-4x}{20}\right) = Rs.\frac{x}{20}$$

$$\text{Now, Profit\%} = \frac{\text{Profit}}{C.P.} \times 100$$

$$= \frac{x/20}{x/5} \times 100$$

$$= \frac{x}{20} \times \frac{5}{x} \times 100$$

$$= 25\%$$

Answer 7.

Initial S.P. of a computer = Rs.32200

Profit = 15%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{32200}{C.P.} = 1 + \frac{15}{100}$$

$$\Rightarrow \frac{32200}{C.P.} = \frac{100+15}{100}$$

$$\Rightarrow C.P. = \frac{100}{115} \times 32200 = Rs.28000$$

$\therefore$ C.P. of the computer = Rs.28000

If the S.P. of the computer is Rs.29960,

S.P. > C.P

$\therefore$ There would be a profit of = S.P. – C.P.

= Rs.(29960 – 28000) = Rs.1960

Answer 8.

For the first refrigerator,

S.P. = Rs.37500

Profit = 25%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{37500}{C.P.} = 1 + \frac{25}{100}$$

$$\Rightarrow \frac{37500}{C.P.} = \frac{100+25}{100}$$

$$\Rightarrow C.P. = \frac{100}{125} \times 37500 = Rs.30000$$

For the second refrigerator,

S.P. = Rs.37500

Loss = 25%

$$\frac{S.P.}{C.P.} = 1 - \frac{Loss}{100}$$

$$\Rightarrow \frac{37500}{C.P.} = 1 - \frac{25}{100}$$

$$\Rightarrow \frac{37500}{C.P.} = \frac{100-25}{100}$$

$$\Rightarrow \quad C.P. = \frac{100}{75} \times 37500 = Rs.50000$$

Total C.P. of both the refrigerators = Rs. 30000 + Rs.50000 = Rs.80000

Total S.P. of both the refrigerators=Rs. 37500 x 2 = Rs.75000

Since C.P. > S.P., so there is a loss

Loss = C.P. – S.P. =Rs. (80000 – 75000) =Rs.5000

$$Loss\% = \frac{Loss}{C.P.} \times 100$$

$$= \frac{5000}{80000} \times 100 = 6.25\%$$

Answer 9.

Let the C.P of briefcase be Rs.100

Profit = 10%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{S.P.}{100} = 1 + \frac{10}{100}$$

$$\Rightarrow \frac{S.P.}{100} = \frac{100+10}{100}$$

$$\Rightarrow S.P. = \frac{100 \times 110}{100} = Rs.110$$

When buying at 5% less,

C.P. of the briefcase = Rs.100 – 5% of Rs.100 = Rs. (100 – 5) = Rs.95

Gain % = 20%

$$Gain = \frac{20}{100} \times Rs.95 = Rs.19$$

$\therefore$ S.P. of the briefcase = Rs.95 + Rs.19 = Rs.114

$\therefore$ Difference between the two S.P's = Rs.114 – Rs.110 = Rs.4

When the difference in S.P. is Rs.4, the C.P of the briefcase is Rs.100

$\therefore$ When the difference in S.P. is Rs.120, the C.P of the briefcase is $= Rs.\left(\frac{100 \times 120}{4}\right) = Rs.3000$

Answer 10.

S.P of the shirt = Rs.1265 + Rs.55 = Rs.1320

Gain = 20%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{1320}{C.P.} = 1 + \frac{20}{100}$$

$$\Rightarrow \frac{1320}{C.P.} = \frac{120}{100}$$

$$\Rightarrow C.P. = \frac{1320 \times 100}{120} = Rs.1100$$

Answer 11.

C.P. of 200 kg sugar = Rs. (18 X 200) = Rs.3600

C.P. of 100 kg sugar = Rs. (22 X 100) = Rs.2200

∴ C.P. of 300 kg sugar = Rs. (3600 + 2200) = Rs.5800

S.P. of 300 kg sugar = Rs. (20 X 300) = Rs.6000

As S.P > C.P, so there is a profit

∴ Profit = S.P. – C.P.

= Rs. (6000 – 5800) = Rs.200

Profit % $= \frac{Profit}{C.P.} \times 100$

$= \frac{200}{5800} \times 100 = 3.44\%$

Answer 12.

S.P. of 12 glasses = Rs.600

S.P. of 1 glass = Rs. $\frac{600}{12}$ = Rs.50

Profit = 25%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{600}{C.P.} = 1 + \frac{25}{100}$$

$$\Rightarrow \frac{600}{C.P.} = \frac{125}{100}$$

$$\Rightarrow C.P. = \frac{600 \times 100}{125} = Rs.480$$

C.P. of 12 glasses = Rs.480

C.P. of 1 glass = Rs. $\frac{480}{12}$ = Rs.40

C.P. of 15 such glasses = Rs.40 X 15 = Rs.600

S.P. of 15 glasses = Rs.540

∵ C.P. > S.P.

There is a loss of C.P. – S.P = Rs. (600 – 540) =Rs.60

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

$$= \frac{60}{600} \times 100 = 10\%$$

Answer 13.

Let C.P. of an article be Rs.100

Profit = 8%

∴ S.P. = Rs.100 + 8% of Rs.100 = Rs.100 + Rs.8 = Rs.108

`1` Again, Profit = 12%

∴ S.P. = Rs.100 + 12% of Rs.100 = Rs.100 + Rs.12 = Rs.112

Difference between the two S.P. s =Rs.112 – Rs.108 = Rs.4

When difference is Rs.4, then C.P = Rs.100

∴ When difference is Rs.72, then C.P $= \frac{100 \times 72}{4} = \text{Rs.}1800$

∴ The cost price of the article is Rs.1800

First S.P

$= \text{Rs.}1800 + 8\% \text{ of Rs.}1800$

$= \text{Rs.}1800 + \frac{8}{100} \times 1800 = \text{Rs.}1800 + \text{Rs.}144 = \text{Rs.}1944$

Second S.P

$= \text{Rs.}1800 + 12\% \text{ of Rs.}1800$

$= \text{Rs.}1800 + \frac{12}{100} \times 1800 = \text{Rs.}1800 + \text{Rs.}216 = \text{Rs.}2016$

Answer 12.

S.P of retailer = Rs.12474

Profit = 5%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{12474}{C.P.} = 1 + \frac{5}{100}$$

$$\Rightarrow \frac{12474}{C.P.} = \frac{100+5}{100}$$

$$\Rightarrow C.P. = \frac{100}{105} X\, 12474 = Rs.\, 11880$$

S.P. of dealer = Rs.11880

Profit = 8%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{11880}{C.P.} = 1 + \frac{8}{100}$$

$$\Rightarrow \frac{11880}{C.P.} = \frac{100+8}{100}$$

$$\Rightarrow C.P. = \frac{100}{108} X\, 11880 = Rs.\, 11000$$

S.P of manufacturer = Rs.11000

Profit = 10%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{11000}{C.P.} = 1 + 10$$

$$\Rightarrow \frac{11000}{C.P.} = \frac{100+10}{100}$$

$$\Rightarrow C.P. = \frac{100}{110} X\, 11000 = Rs.\, 10000$$

Answer 15.

CP of the painting for Akhil = Rs. 50000

Profit = 15%

$\therefore$ Profit = 15% of Rs. 50000

$$= \frac{15}{100} \times 50000$$

$$= \text{Rs. } 7500$$

SP = CP + Profit

$$= \text{Rs. } (50000 + 7500)$$

$$= \text{Rs. } 57500$$

CP of the painting for B = Rs. 57500

Loss = 15%

$\therefore$ Loss = 15% of Rs. 57500

$$= \frac{15}{100} \times 57500$$

$$= \text{Rs. } 8625$$

SP = CP − Loss

$$= \text{Rs. } (57500 - 8625)$$

$$= \text{Rs. } 48875$$

Total gain made by Akhil $= \text{Rs. } [7500 + (50000 - 48875)]$

$$= \text{Rs. } 8625$$

Gain% in the second transaction $= \frac{\text{Gain}}{\text{CP}} \times 100$

$$= \frac{8625}{50000} \times 100$$

$$= 17.25\%$$

Answer 16.

S.P of the T.V = Rs 15730

Profit = 30%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{15730}{C.P.} = 1 + \frac{30}{100}$$

$$\Rightarrow \frac{15730}{C.P.} = \frac{100+30}{100}$$

$$\Rightarrow C.P. = \frac{100}{130} X\, 15730 = Rs.\ 12100$$

C.P. of the T.V = Rs12100

Increase in C.P = 30%

New C.P = Rs12100 + 30% of Rs12100

= Rs12100 + Rs3630 = Rs15730

S.P. of the T.V = Rs15730

Increase in S.P = 20%

New S.P = Rs15730 + 20% of Rs15730

= Rs15730 +Rs3146 = Rs18876

Profit = S.P – C.P

= Rs. (18876-15730) = Rs3146

$$Profit\% = \frac{Profit}{C.P} \times 100 = \frac{3146}{15730} \times 100 = 20\%$$

Answer 17.

Let the cost price of one of the cycles be Rs x

∴ The cost price of the other cycle = Rs (8000 – x)

For the first cycle,

C.P = Rs x

Loss = 20%

∴ Loss = 20% of Rs x = Rs 0.20 x

For the second cycle,

C.P = Rs (8000-x)

Profit = 30%

∴ Profit =30% of Rs (8000-x) =Rs 0.3 (8000-x) = Rs (2400 – 0.3x)

Given, overall profit = Rs 650

∴ (2400 – 0.3x) – 0.2x = 650

⇒0.5x = 2400 – 650 = 1750

∴ x = 1750 / 0.5 = 3500

∴ C.P of 1st cycle = Rs 3500

C.P of 2nd cycle = Rs 8000 – Rs 3500 = Rs4500

Answer 18.

C.P. of both the transistors = Rs 7200

Let C.P of the 1st transistor be Rs x

∴ C.P of the 2nd transistor is Rs (7200 – x)

For the 1st transistor,

Loss = 15%

∴ S.P = C.P – Loss

= Rs x – 15% of Rs x = Rs 0.85x

For the 2nd transistor,

Profit = 19%

∴ S.P = C.P + Profit

= Rs (7200 – x) + 19% of Rs (7200-x)

= Rs (8568 – 1.19x)

Given, both the S.P's are equal

$\therefore \quad 0.85x = 8568 - 1.19x$

$\Rightarrow 1.19x + 0.85x = 8568$

$\Rightarrow 2.04x = 8568$

$\Rightarrow x = \frac{8568}{2.04} = 4200$

$\therefore$ C.P of 1st transistor = Rs 4200

C.P of 2nd transistor = Rs 7200 – Rs 4200 = Rs3000

Answer 19.

Let the S.P of both the cycles be Rs. x each.

For the first cycle,

Profit = 20%

$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$

$\Rightarrow \frac{x}{C.P.} = 1 + \frac{20}{100}$

$\Rightarrow \frac{x}{C.P.} = \frac{100+20}{100}$

$\Rightarrow C.P. = \frac{100}{120}x = \frac{5}{6}x$

Profit = S.P – C.P = $x - \frac{5}{6}x = \left(\frac{6-5}{6}\right)x = \frac{x}{6}$

For the second cycle,

Loss = 20%

$$\frac{S.P.}{C.P.} = 1 - \frac{Loss}{100}$$

$$\Rightarrow \frac{x}{C.P.} = 1 - \frac{20}{100}$$

$$\Rightarrow \frac{x}{C.P.} = \frac{100-20}{100}$$

$$\Rightarrow C.P. = \frac{100}{80}x = \frac{5}{4}x$$

Loss = C.P – S.P = $\frac{5}{4}x - x = \left(\frac{5-4}{5}\right)x = \frac{x}{5}$

Given, total loss = Rs 180

$$\Rightarrow \frac{x}{4} - \frac{x}{6} = 180$$

$$\Rightarrow \frac{2x}{24} = 180$$

$$\Rightarrow x = 12 \text{ X } 180 = 2160$$

$\therefore$ C.P. of first bicycle = $\frac{5}{6}x = \frac{5}{6}$ X Rs.2160 = Rs. Rs.1800

$\therefore$ C.P. of second bicycle = $\frac{5}{4}x = \frac{5}{4}$ X Rs.2160 = Rs. Rs.2700

Answer 20.

S.P of 12 pens = Rs 72

$\therefore$ S.P of 1 pen = Rs $\frac{72}{12}$ = Rs 6

Gain % = 20%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{6}{C.P.} = 1 + \frac{20}{100}$$

$$\Rightarrow \frac{6}{C.P.} = \frac{100+20}{100}$$

$$\Rightarrow C.P. = \frac{100}{120} X 6 = Rs.5$$

Given, S.P = Rs 100

Gain = 25%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{100}{C.P.} = 1 + \frac{25}{100}$$

$$\Rightarrow \frac{100}{C.P.} = \frac{100+25}{100}$$

$$\Rightarrow C.P. = \frac{100}{125} X 100 = Rs.80$$

$\therefore$ Number of pens sold = $\frac{Rs.80}{Rs.5}$ = 16

Answer 21.

Let the quantity of milk purchased be x litres.

C.P of 1 litre = Rs 14

$\therefore$ C.P of x litre = Rs 14x

Quantity of water mixed = 40% of x = $\frac{40}{100}x = \frac{2}{5}x$ litres

$\therefore$ Quantity of milk now becomes = $x + \frac{2}{5}x = \frac{7}{5}x$ litres

S.P of 1 litre mixture = Rs 16

$\therefore$ S.P of $\frac{7}{5}x$ litres mixture = $16.\frac{7}{5}x$ = Rs $\frac{112}{5}x$

Profit = S.P − C.P

$= \frac{112}{5}x - 14x$

$= \frac{112x - 70x}{5} = \frac{42}{5}x$

$\therefore$ Profit % = $\frac{\text{Profit}}{\text{C.P}} \times 100$

$= \frac{42x/5}{14x} \times 100 = 60\%$

Answer 22.

Let A buy the cycle for Rs x.

For A, C.P of the cycle = Rs x + Rs 110

Profit = 20%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{S.P.}{x+110} = 1 + \frac{20}{100}$$

$$\Rightarrow \frac{S.P.}{x+110} = \frac{100+20}{100}$$

$$\Rightarrow S.P. = \frac{120}{100}(x+110) = Rs.\frac{12}{10}(x+110)$$

For B, C.P of the cycle = $Rs.\frac{12}{10}(x+110)$

Loss = 10%

$$\frac{S.P.}{C.P.} = 1 - \frac{Loss}{100}$$

$$\Rightarrow \frac{S.P}{\frac{12}{10}(x+110)} = 1 - \frac{10}{100}$$

$$\Rightarrow \frac{S.P}{\frac{12}{10}(x+110)} = \frac{100-10}{100}$$

$$\Rightarrow S.P. = \frac{90}{100}\frac{12}{10}(x+110) = Rs.\frac{9}{10}.\frac{12}{10}(x+110)$$

For C, C.P of the cycle = $Rs.\frac{9}{10}.\frac{12}{10}(x+110)$

Profit = 10%

S.P of the cycle =

$$Rs\left(1+\frac{10}{100}\right)\frac{9}{10}.\frac{12}{10}(x+110) = Rs\frac{11}{10}.\frac{9}{10}.\frac{12}{10}(x+110)$$

ATQ, $\frac{11}{10}.\frac{9}{10}.\frac{12}{10}(x+110) = 1188$

$\Rightarrow$ $x + 110 = 1000$

$\Rightarrow$ $x = 1000 - 110 = 890$

$\therefore$ A paid Rs 890 for the cycle.

Answer 23.

Cost of 40 articles = Rs 54400

$\therefore$ Cost of each article = Rs $\frac{54400}{40}$ = Rs 1360

Cost of finishing of one article = Rs 140

$\therefore$ C.P of finished article = Rs 1360 + Rs 140 = Rs 1500

$\therefore$ C.P of 40 finished articles = Rs 1500 x 40 = Rs 60000

S.P of one-fourth articles = $\frac{1}{4}$ x 40 x Rs 2100

S.P of rest of articles = $\frac{3}{4}$ x 40 x Rs 1800

$\therefore$ Total S.P = $\frac{1}{4}$ x 40 x Rs 2100 + $\frac{3}{4}$ x 40 x Rs 1800

= Rs 21000 + Rs 54000 = Rs 75000

Profit = S.P – C.P

= Rs 75000 – Rs 60000 = Rs 15000

$\therefore$ Profit % = $\frac{\text{Profit}}{\text{C.P}} \times 100$

= $\frac{15000}{60000} \times 100 = 25\%$

Answer 24.

Let the C.P of the briefcase is Rs x

Profit = 15%

$\therefore$ S.P = C.P + Profit

= Rs x + 15% of Rs x = Rs 1.15 x

In the later case, C.P = Rs x – 5% of Rs x = Rs 0.95x

S.P = Rs (1.15x – 35)

$\therefore$ Gain = S.P – C.P

= Rs (1.15x – 35) – Rs 0.95x = Rs (0.2x – 35)

Gain % = 20%

$\Rightarrow \frac{\text{gain}}{\text{C.P}} \times 100 = 20$

$\Rightarrow \left(\frac{0.2x - 35}{0.95x}\right) \times 100 = 20$

$\Rightarrow \left(\frac{0.2x - 35}{0.95x}\right) = 0.20$

$\Rightarrow 0.2x - 35 = 0.19x$

$\Rightarrow 0.01x = 35$

$\Rightarrow x = 3500$

$\therefore$ C.P of the briefcase is Rs 3500

Answer 25.

Let the number of eggs bought at 4 for Rs 5 be x.

$\therefore$ The number of eggs bought at 9 for Rs 10 are x

$\therefore$ Total number of eggs bought = x + x = 2x

When eggs are bought at 4 for Rs 5, C.P of each egg = $Rs\frac{5}{4}$

C.P of x eggs $= Rs\frac{5}{4}x$

When eggs are bought at 9 for Rs 10, C.P of each egg = $Rs\frac{10}{9}$

C.P of x eggs $= Rs\frac{10}{9}x$

$\therefore$ Total C.P $= Rs\frac{5}{4}x + Rs\frac{10}{9}x = Rs\frac{85}{36}x$

Number of eggs broken = 15% of 2x

$= \frac{15}{100} \times 2x = \frac{3x}{10}$

Eggs left $= 2x - \frac{3x}{10} = \frac{17x}{10}$

When eggs are sold at 2 for Rs 3, S.P of each egg = $Rs\frac{3}{2}$

S.P of $\frac{17}{10}x$ eggs $= Rs\frac{3}{2} \times \frac{17}{10}x = Rs\frac{51}{20}x$

$\therefore$ Gain = S.P – C.P

$= \frac{51}{20}x - \frac{85}{36}x = \left(\frac{459-425}{180}\right)x$

$= \frac{34}{180}x = Rs\ \frac{17}{90}x$

$\therefore$ Gain% $= \frac{gain}{C.P} \times 100$

$= \frac{\frac{17}{90}x}{\frac{85}{36}x} \times 100 = \frac{17}{90} \times \frac{36}{85} \times 100 = 8\%$

Also, gain = Rs 510

$\Rightarrow \frac{17}{90}x = 510$

$\Rightarrow x = \frac{90}{17} \times 510 = 2700$

$\therefore$ Number of eggs of each kind bought = 2700.

Answer 26.

Let the C.P of the shirt be Rs x

When sold at a profit of 10%, S.P = $\left(1+\frac{10}{100}\right)x$ = Rs. 1.1x

When sold at a profit of 15%, S.P = $\left(1+\frac{15}{100}\right)x$ = Rs. 1.15x

Difference between the two S.P's = Rs (1.15x – 1.10x) = Rs 0.05 x

ATQ, 0.05x = 80

$\Rightarrow \quad x = \frac{80}{0.05} = 1600$

∴ C.P of each shirt = Rs 1600

∴ S.P of 1st shirt = Rs 1.1 X 1600 = Rs 1760

∴ S.P of 2nd shirt = Rs 1.15 X 1600 = Rs 1840

Answer 27.

SP of 4 identical kites = Rs. 12

$SP = \left(\frac{100+Profit\%}{100}\right) \times CP$

$\Rightarrow 12 = \left(\frac{100+20}{100}\right) \times CP$

$\Rightarrow 1200 = (100+20) \times CP$

$\Rightarrow \frac{1200}{120} = CP$

$\Rightarrow CP = Rs.\ 10$

So, the CP of 1 kite = $Rs.\frac{10}{4} = Rs.\frac{5}{2}$

Now, SP of 6 kites = Rs. 24

So, SP of 1 kite = $Rs.\ \frac{24}{6} = Rs.4$

$Profit = SP - CP = Rs.4 - Rs.\frac{5}{2} = Rs.\frac{3}{2}$

$Profit\% = \frac{Profit}{CP} \times 100 = \frac{\frac{3}{2}}{\frac{5}{2}} \times 100 = \frac{3}{5} \times 100 = 60\%$

Hence, his gain percent is 60%.

Answer 28.

SP of 80 bananas = Rs. 240

$$SP = \left(\frac{100 - Loss\%}{100}\right) \times CP$$

$$\Rightarrow 240 = \left(\frac{100 - 25}{100}\right) \times CP$$

$$\Rightarrow 240 = \frac{75}{100} \times CP$$

$$\Rightarrow CP = \frac{240 \times 100}{75}$$

$$\Rightarrow CP = Rs.\ 320$$

So, CP of 80 bananas is Rs. 320

$$\therefore CP \text{ of 1 banana} = Rs.\ \frac{320}{80} = Rs.\ 4$$

Let the number of bananas for sold for Rs. 100 be x.

So, CP of x bananas = Rs. 4x

$$\text{Now, } SP = \left(\frac{100 + Profit\%}{100}\right) \times CP$$

$$\Rightarrow 100 = \left(\frac{100 + 25}{100}\right) \times 4x$$

$$\Rightarrow 100 = \frac{125}{100} \times 4x$$

$$\Rightarrow 100 = \frac{5}{4} \times 4x$$

$$\Rightarrow 100 = 5x$$

$$\Rightarrow x = 20$$

Hence, he should sell 20 bananas for Rs. 100 to gain 25%.

Answer 29.

For the first washing machine :

SP = Rs. 8900 and profit = 20%

$$\therefore CP = \left(\frac{100}{100 + Profit\%}\right) \times SP$$

$$\therefore CP = \left(\frac{100}{100 + 20}\right) \times 8900$$

$$\therefore CP = \frac{100}{120} \times 8900$$

$$\therefore CP = \frac{89000}{12}$$

$$\therefore CP = Rs.\ \frac{22250}{3}$$

Since in the whole transaction, there is no profit and no loss,

$\therefore$ Loss on the second washing machine

$= \text{Profit on the first washing machine}$

$= 20\% \text{ of } \frac{22250}{3}$

$= \frac{1}{5} \times \frac{22250}{3}$

$= \text{Rs. } \frac{4450}{3}$

For the second washing machine :

Loss = 15% and Loss = Rs. $\frac{4450}{3}$, so, we have to find the CP

CP of the second washing machine = Rs. $\frac{4450}{3} \times \frac{100}{15} \simeq$ Rs. 9888.87

Hence, CP of the second washing machine is Rs. 9888.87 approximately.

Answer 30.

CP of 60 kg of apples = Rs. (90 x 60) = Rs. 5400

Gain percent on the whole

= 25% of Rs. 5400

$= \frac{25}{100} \times \text{Rs. } 5400$

= Rs. 1350

CP of 40 kg of apples = Rs. (90 x 40) = Rs. 3600

Loss = 10% of 3600

$= \frac{10}{100} \times \text{Rs. } 3600$

= Rs. 360

Quantity of apples left to be sold = 60 – 40 = 20kg

CP of 20 kg apples = Rs. (90 x 20) = Rs. 1800

Profit to be made by selling 20 kg apples = Rs. 1350 + 360 = Rs. 1710

∴ SP of 20 kg apples = CP + Profit = Rs. 1800 + Rs. 1710 = Rs. 3510

∴ SP of 1 kg apples = Rs. $\frac{3510}{20}$ = Rs. 175.50

Hence, he should sell the remaining apples at Rs. 175.50 per kg to gain 25% on the whole.

Answer 31.

CP of the TV = Rs. 15000

Profit made on the TV = 20% of CP = $\frac{20}{100} \times$ Rs. 15000 = Rs. 3000

So, SP = CP + Profit = Rs. 15000 + Rs. 3000 = Rs. 18000

Since the SP includes Rs. 1000 as tax

So, the actual SP (including tax) = SP(without tax) − tax

= Rs. 18000 − Rs. 1000

= Rs. 17000

So, the net profit = SP (including tax) − CP of the TV

= Rs. 17000 − Rs. 15000

= Rs. 2000

$$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100$$

$$= \frac{2000}{15000} \times 100$$

$$= 13\frac{1}{3}\%$$

Hence, the net profit is Rs. 2000 and the profit percent is $13\frac{1}{3}\%$.

Answer 32.

Let the common multiple be x.

So, 3x litres of oil A is mixed with 2x litres of oil B.

Total mixture = 3x + 2x = 5x litres

CP of oil A = Rs. 300 per litre

So, CP of 3x litres = Rs. (300 × 3x) = Rs. 900x

CP of oil B = Rs. 400 per litre

So, CP of 2x litres = Rs. (400 × 2x) = Rs. 800x

So, total CP of the entire mixture that is, 5x litres = Rs. 1700x

Now, one - fourth of the mixture is sold at Rs. 450 per litre

that is, $\frac{1}{4}$ of (5x) = $\frac{1}{4} \times 5x = \frac{5x}{4}$ litres is sold at Rs. 450 per litre

So, SP of $\frac{5x}{4}$ litres = $\frac{5x}{4} \times 450$ = Rs. $\frac{1125x}{2}$

The remaining that is, $\frac{3}{4}$ of (5x) = $\frac{3}{4} \times 5x = \frac{15x}{4}$ litres is sold at

Rs. 500 per litre

So, SP of $\frac{15x}{4}$ litres = $\frac{15x}{4} \times 500$ = Rs. 1875x

So, SP of the entire mixture = Rs. $\frac{1125x}{2}$ + Rs. 1875x = Rs. $\frac{4875x}{2}$

Profit = SP − CP = Rs. $\frac{4875x}{2}$ − Rs. 1700x = Rs. $\frac{1475x}{2}$

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100 = \frac{\frac{1475x}{2}}{1700x} \times 100 = \frac{1475x}{3400x} \times 100 = \frac{1475}{2400} \times 100 = 43.38\% \text{ approx}$$

Hence, the profit percent on the whole is 43.38% approximately.

Ex 2.3

Answer 1.

a. MP = Rs. 850, Discount = 16%

$$\text{Discount\%} = \left(\frac{\text{discount}}{\text{MP}} \times 100\right)$$

$$\Rightarrow 16 = \left(\frac{\text{discount}}{850} \times 100\right)$$

$$\Rightarrow \frac{16 \times 850}{100} = \text{discount}$$

$$\Rightarrow \text{discount} = \text{Rs. } 136$$

$$\text{SP} = \text{MP} - \text{discount}$$

$$= \text{Rs. } 850 - \text{Rs. } 136$$

$$= \text{Rs. } 714$$

Hence, the SP is Rs. 714.

b. MP = Rs. 5500, Discount = 30%

$$\text{Discount\%} = \left(\frac{\text{discount}}{\text{MP}} \times 100\right)$$

$$\Rightarrow 30 = \left(\frac{\text{discount}}{5500} \times 100\right)$$

$$\Rightarrow \frac{30 \times 5500}{100} = \text{discount}$$

$$\Rightarrow \text{discount} = \text{Rs. } 1650$$

$$\text{SP} = \text{MP} - \text{discount}$$

$$= \text{Rs. } 5500 - \text{Rs. } 1650$$

$$= \text{Rs. } 3850$$

Hence, the SP is Rs. 3850.

Answer 2.

a. SP = Rs. 1892, Discount = 14%

$$SP = \left(1 - \frac{d}{100}\right) \text{ of } MP$$

$$\Rightarrow 1892 = \left(1 - \frac{14}{100}\right) \times MP$$

$$\Rightarrow 1892 = \frac{86}{100} \times MP$$

$$\Rightarrow MP = \frac{1892 \times 100}{86}$$

$$\Rightarrow MP = \text{Rs. } 2200$$

b. SP = Rs. 1245, Discount = 17%

$$SP = \left(1 - \frac{d}{100}\right) \text{ of } MP$$

$$\Rightarrow 1245 = \left(1 - \frac{17}{100}\right) \times MP$$

$$\Rightarrow 1245 = \frac{83}{100} \times MP$$

$$\Rightarrow MP = \frac{1245 \times 100}{83}$$

$$\Rightarrow MP = \text{Rs. } 1500$$

Answer 3.

a. MP = Rs. 1500, SP = Rs. 1320

Discount = MP − SP

⇒ Discount = Rs. 1500 − Rs. 1320

⇒ Discount = Rs. 180

$$\text{Discount percentage} = \left(\frac{\text{discount}}{MP} \times 100\right)\%$$

$$= \left(\frac{180}{1500} \times 100\right)\%$$

$$= 12\%$$

b. MP = Rs. 6840, SP = Rs. 5814

Discount = MP − SP

⇒ Discount = Rs. 6840 − Rs. 5814

⇒ Discount = Rs. 1026

$$\text{Discount percentage} = \left(\frac{1026}{6840} \times 100\right)\%$$

$$= 15\%$$

Answer 4.

MP = Rs. 5400, discount = 12%

To find the amount paid by the customer, that is, the SP

$$SP = \left(1 - \frac{d}{100}\right) \text{ of MP}$$

$$\Rightarrow SP = \left(1 - \frac{12}{100}\right) \times 5400$$

$$\Rightarrow SP = \frac{88}{100} \times 5400$$

$$\Rightarrow SP = \text{Rs. } 4752$$

Hence, the amount paid by the customer is Rs. 4752.

Answer 5.

MP = Rs. 150, discount = 8%

To find the amount paid by the customer, that is, the SP

$$SP = \left(1 - \frac{d}{100}\right) \text{ of MP}$$

$$\Rightarrow SP = \left(1 - \frac{8}{100}\right) \times 150$$

$$\Rightarrow SP = \frac{92}{100} \times 150$$

$$\Rightarrow SP = \text{Rs. } 138$$

Hence, the amount paid by the customer is Rs. 138.

Answer 6.

CP = Rs. 2400, discount = 10%, profit% = 12.5%

$$\text{profit\%} = \frac{\text{profit}}{CP} \times 100$$

$$\Rightarrow 12.5 = \frac{\text{profit}}{2400} \times 100$$

$$\Rightarrow \text{profit} = \frac{12.5 \times 2400}{100}$$

$$\Rightarrow \text{profit} = \text{Rs. } 300$$

$$SP = \text{Rs. } 2400 + \text{Rs. } 300$$

$$= \text{Rs. } 2700$$

$$SP = \left(1 - \frac{d}{100}\right) \text{ of MP}$$

$$\Rightarrow 2700 = \left(1 - \frac{10}{100}\right) \times MP$$

$$\Rightarrow 2700 = \frac{90}{100} \times MP$$

$$\Rightarrow \frac{2700 \times 100}{90} = MP$$

$$\Rightarrow MP = \text{Rs. } 3000$$

Hence, the price he should mark the article at is Rs. 3000.

Answer 7.

CP = Rs. 1750, discount = 20%, profit% = 20%

$$\text{profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$\Rightarrow 20 = \frac{\text{profit}}{1750} \times 100$$

$$\Rightarrow \text{profit} = \frac{20 \times 1750}{100}$$

$\Rightarrow$ profit = Rs. 350

SP = Rs. 1750 + Rs. 350

= Rs. 2100

$$\text{SP} = \left(1 - \frac{d}{100}\right) \text{of MP}$$

$$\Rightarrow 2100 = \left(1 - \frac{20}{100}\right) \times \text{MP}$$

$$\Rightarrow 2100 = \frac{80}{100} \times \text{MP}$$

$$\Rightarrow \frac{2100 \times 100}{80} = \text{MP}$$

$\Rightarrow$ MP = Rs. 2625

Hence, the price he should mark the article at is Rs. 2625.

Answer 8.

MP = Rs.8000, discount = 15%

$$\text{SP} = \left(1 - \frac{d}{100}\right) \text{of MP}$$

$$\Rightarrow \text{SP} = \left(1 - \frac{15}{100}\right) \times 8000$$

$$\Rightarrow \text{SP} = \frac{85}{100} \times 8000$$

$\Rightarrow$ SP = Rs. 6800

Let the cost price be Rs. x

Given that the MP = x + 25% above the CP

$\Rightarrow 8000 = x + 25\%$ of CP

$$\Rightarrow 8000 = x + \frac{25}{100} \times x$$

$$\Rightarrow 8000 = x + \frac{x}{4}$$

$$\Rightarrow 8000 = \frac{5x}{4}$$

$$\Rightarrow x = \frac{8000 \times 4}{5}$$

$\Rightarrow$ x = Rs. 6400

So, the CP is Rs. 6400.

Hence, the SP of the article is Rs. 6800 and the CP is Rs. 6400.

Answer 9.

CP = Rs. 4200, discount = 12.5%, profit% = 20%

$$\text{profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$\Rightarrow 20 = \frac{\text{profit}}{4200} \times 100$$

$$\Rightarrow \text{profit} = \frac{20 \times 4200}{100}$$

$$\Rightarrow \text{profit} = \text{Rs. } 840$$

$$\text{SP} = \text{Rs. } 4200 + \text{Rs. } 840$$

$$= \text{Rs. } 5040$$

$$\text{SP} = \left(1 - \frac{d}{100}\right) \text{ of MP}$$

$$\Rightarrow 5040 = \left(1 - \frac{12.5}{100}\right) \times \text{MP}$$

$$\Rightarrow 5040 = \frac{87.5}{100} \times \text{MP}$$

$$\Rightarrow \frac{5040 \times 100}{87.5} = \text{MP}$$

$$\Rightarrow \text{MP} = \text{Rs. } 5760$$

Hence, the price he should mark the article at is Rs. 5760.

Answer 10.

MP = Rs. 1200

$$\text{a. SP} = \left(1 - \frac{d_1}{100}\right)\left(1 - \frac{d_2}{100}\right) \text{ of MP}$$

$$\Rightarrow \text{SP} = \left(1 - \frac{15}{100}\right)\left(1 - \frac{10}{100}\right) \times 1200$$

$$\Rightarrow \text{SP} = \frac{85}{100} \times \frac{90}{100} \times 1200$$

$$\Rightarrow \text{SP} = \frac{85}{100} \times \frac{90}{100} \times 1200$$

$$\Rightarrow \text{SP} = \text{Rs. } 918$$

$$\text{b. SP} = \left(1 - \frac{d_1}{100}\right)\left(1 - \frac{d_2}{100}\right)\left(1 - \frac{d_3}{100}\right) \text{ of MP}$$

$$\Rightarrow \text{SP} = \left(1 - \frac{10}{100}\right)\left(1 - \frac{8}{100}\right)\left(1 - \frac{5}{100}\right) \times 1200$$

$$\Rightarrow \text{SP} = \frac{90}{100} \times \frac{92}{100} \times \frac{95}{100} \times 1200$$

$$\Rightarrow \text{SP} \simeq \text{Rs. } 944$$

Answer 11.

MP = Rs. 4000, SP = Rs. 3060

a. $SP = \left(1 - \frac{d_1}{100}\right)\left(1 - \frac{d_2}{100}\right)$ of MP

$\Rightarrow 3060 = \left(1 - \frac{10}{100}\right)\left(1 - \frac{d_2}{100}\right) \times 4000$

$\Rightarrow 3060 = \frac{90}{100} \times \left(1 - \frac{d_2}{100}\right) \times 4000$

$\Rightarrow 3060 = \left(1 - \frac{d_2}{100}\right) \times \frac{90}{100} \times 4000$

$\Rightarrow 3060 = \left(\frac{100 - d_2}{100}\right) \times 3600$

$\Rightarrow 100 - d_2 = \frac{3060 \times 100}{3600}$

$\Rightarrow 100 - d_2 = 85$

$\Rightarrow d_2 = 100 - 85$

$\Rightarrow d_2 = 15\%$

Hence, the second discount is 15%.

Answer 12.

Let the MP be Rs. x

a. First discount

$SP = \left(1 - \frac{d_1}{100}\right)\left(1 - \frac{d_2}{100}\right)\left(1 - \frac{d_3}{100}\right)$ of MP

$= \left(1 - \frac{25}{100}\right)\left(1 - \frac{20}{100}\right)\left(1 - \frac{15}{100}\right) \times x$

$= \frac{75}{100} \times \frac{80}{100} \times \frac{85}{100} \times x$

$= \frac{75}{100} \times \frac{80}{100} \times \frac{85}{100} \times x$

$= 0.510x$

b. Second discount :

$SP = \left(1 - \frac{d_1}{100}\right)\left(1 - \frac{d_2}{100}\right)\left(1 - \frac{d_3}{100}\right)$ of MP

$= \left(1 - \frac{20}{100}\right)\left(1 - \frac{20}{100}\right)\left(1 - \frac{20}{100}\right) \times x$

$= \frac{80}{100} \times \frac{80}{100} \times \frac{80}{100} \times x$

$= 0.512x$

Clearly, since $0.512x > 0.510x$, so, the SP of the first is less than that of the second

So, the first offer is better than the second offer.

Answer 13.

Let the MP be of the article be Rs. x and a single discount be d%
be equivalent to three given successive discounts of 20%, 10% and 5%.
Equating the two selling prices of the article we get,

$$\left(1-\frac{d}{100}\right) \text{ of Rs. } x = \left(1-\frac{20}{100}\right)\left(1-\frac{10}{100}\right)\left(1-\frac{5}{100}\right) \text{ of Rs. } x$$

$$\Rightarrow \left(1-\frac{d}{100}\right) \times x = \frac{80}{100} \times \frac{90}{100} \times \frac{95}{100} \times x$$

$$\Rightarrow 1-\frac{d}{100} = \frac{80}{100} \times \frac{90}{100} \times \frac{95}{100}$$

$$\Rightarrow 1-\frac{d}{100} = \frac{684000}{1000000}$$

$$\Rightarrow 1-\frac{684000}{1000000} = \frac{d}{100}$$

$$\Rightarrow \frac{316000}{1000000} = \frac{d}{100}$$

$$\Rightarrow d = \frac{316000 \times 100}{1000000}$$

$$\Rightarrow d = 31.6\%$$

MP of the article = Rs. 2500

$$SP = \left(1-\frac{31.6}{100}\right) \times 2500$$

$$\Rightarrow SP = \frac{68.4}{100} \times 2500$$

$$\Rightarrow SP = \text{Rs. } 1710$$

Hence, the equivalent discount is Rs. 31.6% and the SP is Rs. 1710.

Answer 14.

List price = Rs. 4000

Case 1 :

$$SP = \left(1-\frac{d}{100}\right) \text{ of MP(List price)}$$

$$\Rightarrow SP = \left(1-\frac{25}{100}\right) \times 4000$$

$$\Rightarrow SP = \frac{75}{100} \times 4000$$

$$\Rightarrow SP = \text{Rs. } 3000$$

Case 2 :

$$SP = \left(1-\frac{d_1}{100}\right)\left(1-\frac{d_2}{100}\right) \text{of MP}$$

$$SP = \left(1-\frac{15}{100}\right)\left(1-\frac{12}{100}\right) \times 4000$$

$$\Rightarrow SP = \frac{85}{100} \times \frac{88}{100} \times 4000$$

$$\Rightarrow SP = \text{Rs. } 2992$$

Since in the second case the SP is lesser, so the second offer is better.
The amount paid in the second offer is Rs. 2992.

Answer 15.

MP of the sofa = Rs. 36000, discount at Guwahati = 20%

$$SP = \left(1 - \frac{d}{100}\right) \text{ of MP}$$

$$\Rightarrow SP = \left(1 - \frac{20}{100}\right) \times 36000$$

$$\Rightarrow SP = \frac{80}{100} \times 36000$$

$\Rightarrow$ SP = Rs. 28800

So, the SP at Guwahati is Rs. 28800.

So, total expenses

= SP + travelling expenses + transportation of the article

= Rs. 28800 + Rs. 1500 + Rs. 1200

= Rs. 31500

So, the CP at Delhi = Rs. 31500

a. SP at Delhi = marked price = Rs. 36000

So, Profit = SP − CP = Rs. 36000 − Rs. 31500 = Rs. 4500

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100 = \frac{4500}{31500} \times 100 = 14\frac{2}{7}\%$$

b. discount = 5% of 36000 = $\frac{5}{100} \times 36000$ = Rs. 1800

$\Rightarrow$ SP = 36000 − 1800 = Rs. 34200

So, Profit = SP − CP = Rs. 34200 − Rs. 31500 = Rs. 2700

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100 = \frac{2700}{31500} \times 100 = 8\frac{4}{7}\%$$

Answer 16.

Let the cost price of each article bought = Rs. 100.

Let the number of articles bought = x

MP of the articles = Rs. 100 + 50% of Rs. 100

$$= \text{Rs. } 100 + \left(\frac{50}{100} \times 100\right)$$

$$= \text{Rs. } 150$$

Number of articles sold at Rs. 150 = $\frac{x}{2}$

$\therefore$ SP of $\frac{x}{2}$ articles = Rs. $\left(150 \times \frac{x}{2}\right)$ = Rs. 75x

Discount = 20% on Rs. 150

$$= \frac{20}{100} \times 150$$

$$= \text{Rs. } 30$$

$\therefore$ SP = Rs. 150 − Rs.30 = Rs. 120

Remaining number of articles sold at Rs. 120 = $x - \frac{x}{2} - \frac{x}{4} = \frac{x}{4}$

$\therefore$ SP of $\frac{x}{4}$ articles = Rs. $\left(120 \times \frac{x}{4}\right)$ = Rs. 30x

Discount = 36% on Rs. 150

$$= \frac{36}{100} \times 150$$

$$= \text{Rs. } 54$$

$\therefore$ SP = Rs. 150 − Rs.54 = Rs. 96

Number of articles sold at Rs. = $\frac{x}{4}$

$\therefore$ SP of $\frac{x}{4}$ articles = Rs. $\left(96 \times \frac{x}{4}\right)$ = Rs. 24x

Total SP of all articles = Rs. 75x + Rs. 30x + Rs. 24x = 129x

Profit = SP − CP = Rs. 129x − Rs. 100x = Rs. 29x

So, profit % = $\frac{\text{profit}}{\text{CP}} \times 100 = \frac{29x}{100x} \times 100 = 29\%$

Hence, the gain percent altogether is 29%.

Answer 17.

Let the cost price of each article bought = Rs. 100.

Let the number of articles bought = x

MP of the articles = Rs. 100 + 60% of Rs. 100

$$= \text{Rs. } 100 + \left(\frac{60}{100} \times 100\right)$$

$$= \text{Rs. } 160$$

Number of articles sold at Rs. 160 = $\frac{x}{2}$

$\therefore$ SP of $\frac{x}{2}$ articles = Rs. $\left(160 \times \frac{x}{2}\right)$ = Rs. 80x

Discount = 25% on Rs. 160

$$= \frac{25}{100} \times 160$$

$$= \text{Rs. } 40$$

$\therefore$ SP = Rs. 160 − Rs. 40 = Rs. 120

Remaining number of articles sold at Rs. 120 = $x - \frac{x}{2} - \frac{x}{4} = \frac{x}{4}$

$\therefore$ SP of $\frac{x}{4}$ articles = Rs. $\left(120 \times \frac{x}{4}\right)$ = Rs. 30x

Discount = 50% on Rs. 160

$$= \frac{50}{100} \times 160$$

$$= \text{Rs. } 80$$

$\therefore$ SP = Rs. 160 − Rs. 80 = Rs. 80

Number of articles sold at Rs. = $\frac{x}{4}$

$\therefore$ SP of $\frac{x}{4}$ articles = Rs. $\left(80 \times \frac{x}{4}\right)$ = Rs. 20x

Total SP of all articles = Rs. 80x + Rs. 30x + Rs. 20x = 130x

Profit = SP − CP = Rs. 130x − Rs. 100x = Rs. 30x

So, profit % = $\frac{\text{profit}}{\text{CP}} \times 100 = \frac{30x}{100x} \times 100 = 30\%$

Hence, the gain percent altogether is 30%.

Answer 18.

Let the CP be Rs. 100.

Given that the profit% =21% on the CP

$$\text{Profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$\Rightarrow 21\% = \frac{\text{profit}}{100} \times 100$$

$$\Rightarrow \text{profit} = \text{Rs. } 21$$

$$\text{SP} = \text{CP} + \text{Profit}$$

$$= 100 + 21$$

$$= \text{Rs. } 121$$

Let the marked price of the goods be Rs. x.

$$\text{Discount} = 12\% \text{ of MP} = \frac{12}{100} \times x = \text{Rs. } \frac{12x}{100}$$

$$\text{So, SP} = \text{MP} - \text{Discount}$$

$$\Rightarrow 121 = \text{Rs. } \left(x - \frac{12x}{100}\right)$$

$$\Rightarrow x = \text{Rs. } \frac{121 \times 100}{88}$$

$$\Rightarrow x = \text{Rs. } 137.5\%$$

If the goods were sold at the MP, that SP = MP

$$\text{So, MP} - \text{CP} = 137.7 - 100 = 37.5 = \text{profit}$$

$$\text{Profit\%} = \frac{37.5}{100} \times 100 = 37.5\%$$

Hence, the profit percent would be 37.5%.

Answer 19.

Let the CP be Rs. 100.

Given that the profit% =36% on the CP

$$\text{Profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$\Rightarrow 36\% = \frac{\text{profit}}{100} \times 100$$

$$\Rightarrow \text{profit} = \text{Rs. } 36$$

$$\text{SP} = \text{CP} + \text{Profit}$$

$$= 100 + 36$$

$$= \text{Rs. } 136$$

Let the marked price of the goods be Rs. x.

$$\text{Discount} = 15\% \text{ of MP} = \frac{15}{100} \times x = \text{Rs. } \frac{15x}{100}$$

$$\text{So, SP} = \text{MP} - \text{Discount}$$

$$\Rightarrow 136 = \text{Rs. } \left(x - \frac{15x}{100}\right)$$

$$\Rightarrow x = \text{Rs. } \frac{136 \times 100}{85}$$

$$\Rightarrow x = \text{Rs. } 160\%$$

If the goods were sold at the MP, that SP = MP

So, MP – CP = 160 – 100 = 60 = profit

$$\text{Profit\%} = \frac{60}{100} \times 100 = 60\%$$

Hence, the profit percent would be 60%.

Answer 20.

Let the CP be Rs. 100.

$$\text{So, MP} = \text{CP} + 45\% \text{ of CP} = 100 + \left(\frac{45}{100} \times 100\right) = \text{Rs. } 145$$

$$\text{Discount} = 20\% \text{ on MP}$$

$$= \frac{20}{100} \times 145$$

$$= \text{Rs. } 29$$

So, SP of the goods = MP – Discount

= Rs. 145 – Rs. 29

= Rs. 116

Profit = SP – CP = Rs. 116 – Rs. 100 = Rs. 16

When the SP is Rs. 116, the profit is Rs. 16

So, when the gain is Rs. 960,

$$\text{the SP} = \frac{116 \times 960}{16} = \text{Rs. } 6960$$

CP = SP – Profit

= Rs. 6960 – Rs. 960

= Rs. 6000

Hence, the cost price of and article on which he gains Rs. 960 is Rs. 6000.

Answer 21.

Let the CP be Rs. 100.

So, MP = CP + 25% of CP = $100 + \left(\frac{25}{100} \times 100\right)$ = Rs. 125

Discount = 10% on MP

$= \frac{10}{100} \times 125$

= Rs. 12.5

So, SP of the goods = MP – Discount

= Rs. 125 – Rs. 12.5

= Rs. 112.5

Profit = SP – CP = Rs. 112.5 – Rs. 100 = Rs. 12.5

When the SP is Rs. 112.5, the profit is Rs. 12.5

So, when the gain is Rs. 960,

the SP = $\frac{112.5 \times 575}{12.5}$ = Rs. 5175

CP = SP – Profit

= Rs. 5175 – Rs. 575

= Rs. 4600

Hence, the cost price of and article on which he gains Rs. 575 is Rs. 4600.

Answer 22.

Let the printed price of the books be Rs. x.

Discount given by the publisher = 30% of Rs. x

$$= \frac{30}{100} \times \text{Rs. } x$$

$$= \text{Rs. } \frac{30x}{100}$$

So, the distributor bought the books at Rs. $x - \text{Rs. } \frac{30x}{100} = \text{Rs. } \frac{70x}{100}$

Discount given by the distributor = Rs. 23% of Rs. x

$$= \text{Rs. } \frac{23}{100} \text{ of Rs. } x$$

$$= \text{Rs. } \frac{23x}{100}$$

So, the bookseller purchased the books at Rs. $x - \text{Rs. } \frac{23x}{100} = \text{Rs. } \frac{77x}{100}$

Profit made by the distributor = SP – CP = Rs. $\frac{77x}{100} - \text{Rs. } \frac{70x}{100} = \text{Rs. } \frac{7x}{100}$

$$\text{Profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$= \frac{\frac{7x}{100}}{\frac{70x}{100}} \times 100$$

$$= 10\%$$

SP at which the bookseller sold the books = Rs. x

So, profit = SP – CP

$$= \text{Rs. } x - \text{Rs. } \frac{77x}{100}$$

$$= \text{Rs. } \frac{53x}{100}$$

$$\text{Profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$= \frac{\frac{23x}{100}}{\frac{77x}{100}} \times 100$$

$$= 29\frac{67}{77}\%$$

Hence, the profit% made by the distributor is 10% and that made by the bookseller is $29\frac{67}{77}\%$.

Answer 23.

Given that the catalogue price of the laptop = Rs. 43200

SP after the discount = Rs. 43200 − Rs. $\frac{16}{100} \times 43200$

= Rs. 43200 − Rs. 6912

= Rs. 36288

CP = SP − Profit = Rs. 36288 − Profit

So, Profit% = $\frac{\text{profit}}{\text{CP}} \times 100$

$\Rightarrow 26 = \frac{\text{profit}}{36288 - \text{Profit}} \times 100$

$\Rightarrow 26(36288 - \text{Profit}) = \text{profit} \times 100$

$\Rightarrow 943488 - 26\ \text{profit} = 100\text{profit}$

$\Rightarrow 943488 = 126\ \text{profit}$

$\Rightarrow \text{profit} = \frac{943488}{126}$

$\Rightarrow$ profit = Rs. 7488

So, CP = Rs. 36288 − Rs. 7488 = Rs. 28800

If SP = Rs. 43200 − Rs. 9000 = Rs. 34200

Since, SP > CP, so a gain was made = Rs. 34200 − Rs. 28800 = Rs. 5400

profit% = $\frac{5400}{28800} \times 100 = 18.75\%$

Hence, the gain percent would be 18.75%.

Answer 24.

Gurmeet gives a discount of 8% on the first Rs. 20000

So, SP on Rs. 20000

= Rs. 20000 − $\frac{8}{100}$(Rs. 20000)

= Rs. 20000 − Rs. 1600

= Rs. 18400

So, SP on Rs. 20000

Gurmeet gives a discount of 5% on the first Rs. 5000

= Rs. 5000 − $\frac{5}{100}$(Rs. 5000)

= Rs. 5000 − Rs. 250

= Rs. 4750

So, actual price at which Gurmeet sells the article

= Rs. 18400 + Rs. 4750

= Rs. 23150

Manjeet gives a discount of 6% on the first Rs. 25000
So, SP on Rs. 25000

$= \text{Rs. } 25000 - \frac{6}{100}(\text{Rs. } 25000)$

$= \text{Rs. } 25000 - \text{Rs. } 1500$

$= \text{Rs. } 23500$

So, actual price at which Manjeet sells the article is Rs. 23150, and that at which Gurmeet sells the article is Rs. 23150.

Answer 25.

List price of the article = Rs. 2500
CP of the article = Rs. 2000
SP of the article at 5% discount

$= \text{Rs. } 2500 - 5\% \text{ of Rs. } 2500$

$= \text{Rs. } 2500 - \frac{5}{100} \times \text{Rs. } 2500$

$= \text{Rs. } 2375$

Since trader gets a 5% additional discount for cash payment, so, amount paid by the trader $= \text{Rs. } 2375 - 5\% \text{ of Rs. } 2375$

$= \text{Rs. } 2375 - \frac{5}{100} \times \text{Rs. } 2375$

$= \text{Rs. } 2375 - \text{Rs. } 118.75$

$= \text{Rs. } 2256.25$

Profit made by the manufacturer

$=$ List price $-$ SP

$= \text{Rs. } 2500 - \text{Rs. } 2256.25$

$= \text{Rs. } 243.75$

So, $\text{profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$

$= \frac{243.75}{2000} \times 100$

$= 12.18\%$

Hence, the amount that the trader pays is Rs. 2256.25 and the profit % that the maufacturer makes on the sale is 12.18%.

Answer 26.

Let the marked price be Rs. x

CP of the computer set = Rs. 20000

$$\text{Profit\%} = \frac{\text{profit}}{\text{CP}} \times 100$$

$$\Rightarrow 25 = \frac{\text{profit}}{20000} \times 100$$

$\Rightarrow$ profit = Rs. 5000

So, SP = CP + Profit

= Rs. 20000 + Rs. 5000

= Rs. 25000

Given that a discount of 5% is given on the MP.

So, SP = Rs. x – 5% of the MP

$$\Rightarrow \text{Rs. } 25000 = x - \frac{5}{100} \times x$$

$$\Rightarrow \text{Rs. } 25000 = \frac{95x}{100}$$

$\Rightarrow$ x = Rs. 26315.79 approx

Hence, the price that should be marked is approximately Rs. 26315.79.

Answer 27.

Total cost of production = Rs 5200

The ratio of material: labour: overheads = 5:6:2

$\therefore$ Total of the ratio = 5 + 6 + 2 = 13

$\therefore$ Cost of material = $\text{Rs}\left(\frac{5}{13} \times 5200\right) = \text{Rs}2000$

$\therefore$ Cost of labor = $\text{Rs}\left(\frac{6}{13} \times 5200\right) = \text{Rs}2400$

$\therefore$ Cost of overheads = $\text{Rs}\left(\frac{2}{13} \times 5200\right) = \text{Rs}800$

Cost price of the video game = Rs 5200

Profit = 30%

$\therefore$ Profit = 30% of Rs 5200 = Rs1560

$\therefore$ S.P = Rs 5200 + Rs1560 = Rs6760

So, marked price is Rs6760

Cost of material = Rs2000

Increase = 40%

$\therefore$ Increase = 40% of Rs 2000 = Rs800

$\therefore$ New cost of material = Rs2000 + Rs800 = Rs2800

Cost of labour = Rs2400

Increase	= 30%
∴ Increase	= 30% of Rs2400 = Rs720
∴ New cost of labour	= Rs 2400 + Rs720
	= Rs3120
Cost of overheads	= Rs800
Increase	= 10%
∴ Increase	= 10% of Rs800 = Rs80
∴ New cost of overheads	= Rs800 + Rs80 = Rs880
∴ Cost of manufacturing now	= Rs. (2800 + 3120 + 880)
	= Rs6800
Profit	= 30%

$$\frac{S.P.}{C.P.} = 1 + \frac{Profit}{100}$$

$$\Rightarrow \frac{S.P.}{6800} = 1 + \frac{30}{100}$$

$$\Rightarrow \frac{S.P.}{6800} = \frac{100+30}{100}$$

$$\Rightarrow S.P. = \frac{130}{100} X\, 6800 = Rs.8840$$

The cost of manufacturing the video game now is Rs6800,

And the marked price now is Rs8840.