

Profit, Loss and Discount

EXERCISE 2 (A)

Q. 1. Find the profit or loss percent, when :

- (i) C.P. = Rs. 55 and S.P. = Rs. 72.60
- (ii) C.P. = Rs. 490 and S.P. = Rs. 416.50
- (iii) C.P. = Rs. 112, overheads = Rs. 14 and S.P. = Rs. 94.50.

Sol. (i) C.P. = Rs. 55

S.P. = Rs. 72.60

$$\begin{aligned}\therefore \text{Gain} &= \text{S.P.} - \text{C.P.} \\ &= \text{Rs. } 72.60 - \text{Rs. } 55.00 \\ &= \text{Rs. } 17.60\end{aligned}$$

$$\begin{aligned}\text{Gain percent} &= \frac{\text{Gain} \times 100}{\text{C.P.}} \\ &= \frac{17.60 \times 100}{55} \% \\ &= \frac{1760 \times 100}{100 \times 55} \% = 32 \%\end{aligned}$$

(ii) C.P. = Rs. 490

S.P. = Rs. 416.50

$$\begin{aligned}\therefore \text{Loss} &= \text{C.P.} - \text{S.P.} \\ &= \text{Rs. } 490.00 - \text{Rs. } 416.50 = \text{Rs. } 73.50\end{aligned}$$

$$\begin{aligned}\text{Loss \%} &= \frac{\text{Loss} \times 100}{\text{C.P.}} = \frac{73.50 \times 100}{490} \% \\ &= \frac{7350 \times 100}{100 \times 490} \% = 15 \%\end{aligned}$$

(iii) C.P. = Rs. 112

Overheads = Rs. 14

$$\begin{aligned}\therefore \text{Total C.P.} &= \text{Rs. } 112 + \text{Rs. } 14 \\ &= \text{Rs. } 126\end{aligned}$$

S.P. = Rs. 94.50

$$\begin{aligned}\text{Loss} &= \text{C.P.} - \text{S.P.} = \text{Rs. } 126 - \text{Rs. } 94.50 \\ &= \text{Rs. } 31.50\end{aligned}$$

$$\begin{aligned}\text{Loss \%} &= \frac{\text{Loss} \times 100}{\text{C.P.}} = \frac{31.50 \times 100}{126} \% \\ &= \frac{3150 \times 100}{100 \times 126} = 25\% \text{ Ans.}\end{aligned}$$

Q. 2. Find S.P. when :

- (i) C.P. = Rs. 435 and loss = 16%
- (ii) C.P. = Rs. 172, overheads = Rs. 61 and gain = 12%.

Sol. (i) C.P. = Rs. 435, Loss = 16%

$$\begin{aligned}\therefore \text{S.P.} &= \frac{\text{C.P.} \times (100 - \text{Loss \%})}{100} \\ &= \frac{435 (100 - 16)}{100} = \frac{435 \times 84}{100} \\ &= \text{Rs. } 365.40.\end{aligned}$$

(ii) C.P. = Rs. 172

Overheads = Rs. 61

$$\begin{aligned}\therefore \text{Total C.P.} &= \text{Rs. } 172 + \text{Rs. } 61 \\ &= \text{Rs. } 233\end{aligned}$$

Gain = 12%

$$\begin{aligned}\therefore \text{S.P.} &= \frac{\text{C.P.} (100 + \text{gain \%})}{100} \\ &= \frac{233 (100 + 12)}{100} = \frac{233 \times 112}{100} \\ &= \text{Rs. } 260.96 \text{ Ans.}\end{aligned}$$

Q. 3. Find C.P. when :

- (i) a cycle is sold for Rs. 1485 at a profit of 8%.
- (ii) a fan is sold for Rs. 657.60 at a loss of 4%.

Sol. (i) S.P. of cycle = Rs. 1485

Profit = 8%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 + \text{gain \%}} = \frac{1485 \times 100}{100 + 8}$$

$$= \text{Rs.} \frac{1485 \times 100}{108} = \text{Rs.} 1375.$$

(ii) S.P. of fan = Rs. 657.60

Loss = 4%

$$\text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss \%}} = \frac{657.60 \times 100}{100 - 4}$$

$$= \frac{65760 \times 100}{100 \times 96} = \text{Rs.} 685 \quad \text{Ans.}$$

Q. 4. If oranges are bought at 11 for Rs. 30 and sold at 10 for Rs. 31, find loss or gain percent.

Sol. L.C.M. of 11 and 10 = 110

C.P. of 110 oranges

$$= \frac{110 \times 30}{11} = \text{Rs.} 300$$

S.P. of 110 oranges

$$= \frac{110 \times 31}{10} = \text{Rs.} 341$$

$$\text{Gain} = \text{S.P.} - \text{C.P.} = \text{Rs.} 341 - \text{Rs.} 300 \\ = \text{Rs.} 41 \quad \text{Ans.}$$

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

$$= \frac{41 \times 100}{300} \% = \frac{41}{3} \% = 13\frac{2}{3} \% \quad \text{Ans.}$$

Q. 5. By selling an article for Rs. 123, the shopkeeper loses 25%. Find the gain or loss percent, if the article be sold for Rs. 188.60.

Sol. In first case, S.P. = Rs. 123

Loss = 25%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss \%}} = \frac{123 \times 100}{100 - 25}$$

$$= \frac{123 \times 100}{75} = \text{Rs.} 164$$

In second case,

S.P. = Rs. 188.60

$$\therefore \text{Gain} = \text{S.P.} - \text{C.P.}$$

$$= \text{Rs.} 188.60 - \text{Rs.} 164$$

$$= \text{Rs.} 24.60$$

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

$$= \frac{24.60 \times 100}{164} = \frac{2460 \times 100}{100 \times 164} \%$$

$$= 15\% \quad \text{Ans.}$$

Q. 6. A dealer sold two almirahs for Rs. 6090 each gaining 16% on one and losing 16% on the other. Find his net gain or loss percent in the whole transaction.

Sol. S.P. of first almirah = Rs. 6090

Gain % = 16%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 + \text{Gain \%}} = \frac{6090 \times 100}{100 + 16}$$

$$= \text{Rs.} \frac{6090 \times 100}{116} = \text{Rs.} 5250$$

S.P. of the second almirah = Rs. 6090

Loss = 16%

$$\text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss \%}} = \frac{6090 \times 100}{100 - 16}$$

$$= \text{Rs.} \frac{6090 \times 100}{84} = \text{Rs.} 7250$$

Total C.P. of both almirahs

$$= \text{Rs.} 5250 + 7250 = \text{Rs.} 12500$$

and total S.P. = Rs. 6090 + Rs. 6090

$$= \text{Rs.} 12180$$

$$\therefore \text{Loss} = \text{C.P.} - \text{S.P.}$$

$$= \text{Rs.} 12500 - 12180 = \text{Rs.} 320$$

$$\text{Loss \%} = \frac{\text{Loss} \times 100}{\text{C.P.}} = \frac{320 \times 100}{12500} \%$$

$$= 2.56\% \quad \text{Ans.}$$

Q. 7. By selling a book for Rs. 115.20, a man loses 10%. At what price should he sell it to gain 5%?

Sol. S.P. of book = Rs. 115.20

Loss = 10%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss \%}} = \frac{115.20 \times 100}{100 - 10}$$

$$= \frac{11520 \times 100}{100 \times 90} = \text{Rs. } 128$$

If gain = 5%

$$\text{then S.P.} = \frac{\text{C.P.}(100 + \text{gain \%})}{100}$$

$$= \frac{128(100 + 5)}{100} = \text{Rs. } \frac{128 \times 105}{100}$$

$$= \text{Rs. } 134.40 \text{ Ans.}$$

Q. 8. A man sells an article at a profit of 25%. If he had bought it at 20% less and sold it for Rs. 10.50 less, he would have gained 30%. Find the cost price of the article.

Sol. Let C.P. of an article = Rs. 100

Gain = 25%

$$\therefore \text{S.P.} = \text{Rs. } 100 + 25 = \text{Rs. } 125$$

$$\text{In second case C.P.} = \text{Rs. } 100 - 20$$

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

Gain = 30%

$$\therefore \text{S.P.} = \frac{\text{C.P.}(100 + \text{Gain \%})}{100}$$

$$= \text{Rs. } \frac{80 \times (100 + 30)}{100} = \text{Rs. } \frac{80 \times 130}{100}$$

$$= \text{Rs. } 104$$

Difference between two S.P.'s

$$= \text{Rs. } 125 - 104 = \text{Rs. } 21$$

If difference is Rs. 21, then

$$\text{C.P.} = \text{Rs. } 100$$

and if difference is Rs. 10.50, then

$$\text{C.P.} = \frac{100 \times 10.50}{21}$$

$$= \frac{100 \times 1050}{100 \times 21} = \text{Rs. } 50 \text{ Ans.}$$

Q. 9. 20% more can be gained if a piece of cloth is sold for Rs. 83 instead of Rs. 78. Find the cost price of the piece of cloth.

Sol. Difference in both S.P.'s

$$= \text{Rs. } 83 - \text{Rs. } 78 = \text{Rs. } 5$$

But difference in gain = 20%

If Rs. 20 is more then C.P. = Rs. 100

and if Rs. 5 is more, then C.P.

$$= \text{Rs. } \frac{100 \times 5}{20} = \text{Rs. } 25 \text{ Ans.}$$

Q. 10. The difference between selling an article at 7% profit and at 16% profit is Rs. 63. Find the cost price of the article and also the two selling prices.

Sol. Difference in percent profit = 16% - 7%
= 9%

$$\therefore 9\% \text{ of C.P.} = \text{Rs. } 63$$

$$\text{C.P.} = \frac{63 \times 100}{9} = \text{Rs. } 700$$

Now first S.P. when gain is 7%

$$= \frac{\text{C.P.}(100 + \text{Gain \%})}{100}$$

$$= \frac{700(100 + 7)}{100}$$

$$= \text{Rs. } \frac{700 \times 107}{100} = \text{Rs. } 749$$

Similarly second S.P. when gain is 16%

$$= \frac{700(100 + 16)}{100} = \frac{700 \times 116}{100}$$

$$= \text{Rs. } 812 \text{ Ans.}$$

Q. 11. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he paid for it and sold it Rs. 2 less, he would have gained 10%. Find the cost price of the article.

Sol. Let C.P. of the article = Rs. 100

$$\therefore \text{First S.P.} = \text{Rs. } 100 + 5 = \text{Rs. } 105$$

$$\text{Second time C.P.} = 100 - 5 = \text{Rs. } 95$$

Gain = 10%

$$\therefore \text{S.P.} = \frac{95 \times (100 + 10)}{100} = \frac{95 \times 110}{100}$$

$$= \text{Rs. } \frac{209}{2}$$

Difference between two S.P.'s

$$= \text{Rs. } 105 - \frac{209}{2} = \text{Rs. } \frac{1}{2}$$

If difference is $\text{Rs. } \frac{1}{2}$ then C.P. = Rs. 100

and difference is Rs. 2, then C.P.

$$= \text{Rs. } \frac{100 \times 2 \times 2}{1} = \text{Rs. } 400 \quad \text{Ans.}$$

Q. 12. A grocer purchased 80 kg of rice at Rs. 13.50 per kg and mixed it with 120 kg rice at Rs. 16 per kg. At what rate per kg must he sell the mixture to gain 16%?

Sol. C.P. of 80 kg rice at Rs. 13.50 per kg

$$= \text{Rs. } 13.50 \times 80 = \text{Rs. } 1080$$

C.P. of 120 kg rice at Rs. 16 per kg

$$= \text{Rs. } 16 \times 120 = \text{Rs. } 1920$$

$\therefore$ C.P. of $(80 + 120) = 200$ kg of rice

$$= \text{Rs. } 1080 + 1920 = \text{Rs. } 3000$$

Gain = 16%

$$\therefore \text{S.P. of 200 kg} = \frac{\text{C.P.} (100 + \text{Gain \%})}{100}$$

$$= \text{Rs. } \frac{3000 (100 + 16)}{100}$$

$$= \text{Rs. } \frac{3000 \times 116}{100} = \text{Rs. } 3480$$

$$\text{S.P. of 1 kg} = \text{Rs. } \frac{3480}{200}$$

$$= \text{Rs. } \frac{1740}{100} = \text{Rs. } 17.40 \quad \text{Ans.}$$

Q. 13. A manufacturer makes a profit of 15% by selling a T.V. set for Rs. 17250. If the cost of manufacturing increases by 20% and the price paid by the retailer is increased by 10%, find the gain percent made by the manufacturer.

Sol. S.P. of T.V. set = Rs. 17250

Gain % = 15%

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

$$= \text{Rs. } \frac{17250 \times 100}{(100 + 15)} = \text{Rs. } \frac{17250 \times 100}{115}$$

$$= \text{Rs. } 15000$$

In second case

Increase in cost = 20%

$$\therefore \text{C.P.} = \frac{15000 \times (100 + 20)}{100}$$

$$= \frac{15000 \times 120}{100} = \text{Rs. } 18,000$$

$$\text{and S.P.} = \frac{17250 \times (100 + 10)}{100}$$

$$= \frac{17250 \times 110}{100} = \text{Rs. } 18975$$

$$\therefore \text{Gain} = \text{S.P.} - \text{C.P.}$$

$$= \text{Rs. } 18975 - \text{Rs. } 18000$$

$$= \text{Rs. } 975$$

$$\text{Gain \%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{975 \times 100}{18000} \%$$

$$= \frac{65}{12} \% = 5 \frac{5}{12} \% \quad \text{Ans.}$$

Q. 14. By selling 33 metres cloth, a shopkeeper gains the selling price of 11 metres of cloth. Find his gain percent.

Sol. $\therefore \text{C.P.} = \text{S.P.} - \text{Gain}$

$$\therefore \text{C.P. of 33 m} = \text{S.P. of 33 m} - \text{Gain}$$

$$\Rightarrow \text{C.P. of 33 m} = \text{S.P. of 33 m}$$

$$- \text{S.P. of 11 m}$$

$$\Rightarrow \text{C.P. of 33 m} = \text{S.P. of 22 m}$$

$$\text{Let C.P. of 1 m} = \text{Rs. } 1$$

$$\therefore \text{C.P. of 33 m} = \text{Rs. } 33$$

$$\text{S.P. of 22 m} = \text{Rs. } 33$$

$$\text{and S.P. of 1 m} = \text{Rs. } \frac{33}{22} = \text{Rs. } \frac{3}{2}$$

$$\text{Gain on 1 m} = \text{Rs. } \frac{3}{2} - 1 = \text{Rs. } \frac{1}{2}$$

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

$$= \frac{1}{2} \times 100 = 50\% \quad \text{Ans.}$$

Q. 15. A washing machine was sold by a shopkeeper at a gain of 15%. Had it been sold for Rs. 375 more, he would have gained 20%. Find the cost price of the washing machine.

Sol. First time gain = 15%

and second time gain = 20%

$$\therefore \text{Difference in gain \%} = 20\% - 15\% = 5\%$$

Now if gain is Rs. 5 then C.P. = Rs. 100
and if gain is Rs. 375 then C.P.

$$= \text{Rs. } \frac{100 \times 375}{5} = \text{Rs. } 7500. \text{ Ans.}$$

Q. 16. A sells a watch to B at a gain of 20% and B sells it to C at a loss of 10% and C sells it for Rs. 1404 gaining 4%. How much did A pay for it?

Sol. S.P. of watch for C = Rs. 1404

Gain = 4%

$$\therefore \text{C.P. for C} = \frac{\text{S.P.} \times 100}{100 + \text{gain \%}}$$

$$= \frac{1404 \times 100}{100 + 4} = \frac{1404 \times 100}{104} = \text{Rs. } 1350$$

or S.P. for B = Rs. 1350

Loss = 10%

$$\therefore \text{C.P. for B} = \frac{\text{S.P.} \times 100}{100 - \text{Loss \%}}$$

$$= \text{Rs. } \frac{1350 \times 100}{100 - 10} = \text{Rs. } \frac{1350 \times 100}{90}$$

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

or S.P. for A = Rs. 1500

Gain = 20%

$$\therefore \text{C.P. for A} = \frac{\text{S.P.} \times 100}{100 + \text{Gain \%}}$$

$$= \text{Rs. } \frac{1500 \times 100}{100 + 20} = \text{Rs. } \frac{1500 \times 100}{120}$$

$$= \text{Rs. } 1250 \text{ Ans.}$$

Q. 17. A man bought eggs at Rs. 19.20 per dozen. At what price per hundred must he sell them so as to earn a profit of 15%.

Sol. C.P. of 1 dozen eggs = Rs. 19.20

$$\therefore \text{C.P. of 100 eggs} = \text{Rs. } \frac{19.20 \times 100}{12}$$

$$= \text{Rs. } \frac{1920 \times 100}{100 + 12} = \text{Rs. } 160$$

Gain % = 15%

$$\therefore \text{S.P. of 100 eggs} = \frac{\text{C.P.} (100 + \text{Gain \%})}{100}$$

$$= \text{Rs. } \frac{160 (100 + 15)}{100} = \text{Rs. } \frac{160 \times 115}{100}$$

$$= \text{Rs. } 184 \text{ Ans.}$$

Q. 18. A man purchased two radios for Rs. 1500 each and sold one of them at 12% gain. He sold the other radio on such a price that there was a total loss of Rs. 120 in the whole transaction. Find the percentage loss made by him on second radio.

Sol. C.P. of one radio = Rs. 1500

Gain % = 12%

$$\therefore \text{S.P.} = \frac{\text{C.P.} (100 + \text{Gain \%})}{100}$$

$$= \frac{1500 (100 + 12)}{100} = \text{Rs. } \frac{1500 \times 112}{100}$$

$$= \text{Rs. } 1680$$

$$\text{C.P. of both radios} = \text{Rs. } 1500 \times 2$$

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

Total loss = Rs. 120

$$\therefore \text{Total S.P.} = \text{C.P.} - \text{Loss}$$

$$= \text{Rs. } 3000 - \text{Rs. } 120 = \text{Rs. } 2880$$

S.P. of first radio = Rs. 1680

$$\therefore \text{S.P. of second radio} = \text{Rs. } 2880 - 1680$$

$$= \text{Rs. } 1200$$

Loss on second radio = C.P. - S.P.

$$= \text{Rs. } 1500 - \text{Rs. } 1200 = \text{Rs. } 300$$

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

$$= \frac{300 \times 100}{1500} \% = 20\% \text{ Ans.}$$

Q. 19. A sweet seller professes to sell his goods at cost price, but he uses a weight of 950 gm for 1 kg. Calculate his profit percent.

Sol. Let C.P. of 1 gm = Re 1

$\therefore$ C.P. of 1 kg or 1000 gm = Rs. 1000

and S.P. of 950 gm = Rs. 1000

$$\therefore \text{S.P. of 1 gm} = \text{Rs. } \frac{1000}{950} = \text{Rs. } \frac{20}{19}$$

$$\text{Gain} = \text{S.P.} - \text{C.P.} = \text{Rs. } \frac{20}{19} - 1 = \text{Rs. } \frac{1}{19}$$

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

$$= \frac{\frac{1}{19} \times 100}{1} = \frac{100}{19} = 5\frac{5}{19}\% \text{ Ans.}$$

Q. 20. A man sold a radio for Rs. 1500 and gained $\frac{1}{9}$ of its cost price. Find (i) the cost price of the radio (ii) the gain % earned on it.

Sol. S.P. = C.P. + Gain

$$\Rightarrow \text{S.P. of radio} = \text{C.P.} + \frac{1}{9} \text{ of C.P.}$$

$$\Rightarrow \text{Rs. } 1500 = \frac{10}{9} \text{ C.P.}$$

$$(i) \therefore \text{C.P.} = \text{Rs. } \frac{1500 \times 9}{10} = \text{Rs. } 1350$$

$$(ii) \text{Gain} = \frac{1}{9} \text{ of C.P.} = \frac{1}{9} \times 1350 = \text{Rs. } 150$$

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

$$= \frac{150 \times 100}{1350} \% = \frac{100}{9} \% = 11\frac{1}{9}\% \text{ Ans.}$$

Q. 21. A fruit-seller bought 80 kg of apples at Rs. 25 per kg. He sold 50 kg of it at a loss of 10%. At what price per kg should he sell the remaining apples so as to gain 20% on the whole?

Sol. C.P. of 80 kg of apples at the rate of Rs. 25 per kg = Rs. $25 \times 80 = \text{Rs. } 2000$

$$\therefore \text{S.P. of 80 kg} = \frac{\text{C.P.} \times (100 + \text{Gain}\%)}{100}$$

$$= \frac{2000 (100 + 20)}{100} = \text{Rs. } 2000 \times \frac{120}{100}$$

$$= \text{Rs. } 2400$$

$$\text{C.P. of 50 kg} = \text{Rs. } 25 \times 50 = \text{Rs. } 1250$$

$$\text{Loss \%} = 10\%$$

$$\therefore \text{S.P. of 50 kg} = \frac{1250 (100 - 10)}{100}$$

$$= 1250 \times \frac{90}{100} = \text{Rs. } 1125$$

S.P. of remaining 30 kg

$$= \text{Rs. } 2400 - \text{Rs. } 1125 = \text{Rs. } 1275$$

$$\text{S.P. of one kg} = \text{Rs. } 1275 \div 30$$

$$= \text{Rs. } 42.50 \text{ Ans.}$$

Q. 22. A milkman purchases milk at the rate of Rs. 18 per litre then mixes 20% water to it. Find his gain per cent, if he sells the mixture at Rs. 19 per litre.

Sol. C.P. of one litre milk = Rs. 18

Water to be mixed = 20% of one litre

$$= \frac{20}{100} \times 1 = \frac{1}{5} \text{ litre}$$

$$\therefore \text{Total mixture} = 1 + \frac{1}{5} = \frac{6}{5} \text{ litre}$$

S.P. of $\frac{6}{5}$ litre of mixture at the rate of

$$\text{Rs. } 19 \text{ per litre} = \text{Rs. } 19 \times \frac{6}{5} = \text{Rs. } \frac{114}{5}$$

$$\therefore \text{Gain} = \text{Rs. } \frac{114}{5} - \text{Rs. } 18$$

$$= \text{Rs. } \frac{114 - 90}{5} = \text{Rs. } \frac{24}{5}$$

$$\text{Gain \%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{24 \times 100}{5 \times 18} \%$$

$$= \frac{80}{3} \% = 26\frac{2}{3}\% \text{ Ans.}$$

Q. 23. A man sells a TV set for Rs. 13800 and makes a profit of 15%. He sells a second TV set at a loss of 10%. If on the whole

he neither gains nor loses, find the cost price of the second TV set.

Sol. S.P. of first TV set = Rs. 13800

Gain % = 15%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 + \text{Gain \%}} = \frac{13800 \times 100}{100 + 15}$$

$$= \frac{13800 \times 100}{115} = \text{Rs. } 12000$$

$\therefore$ Gain = S.P. - C.P.

$$= \text{Rs. } 13800 - \text{Rs. } 12000 = \text{Rs. } 1800$$

But it is given that he neither gains nor loses

$\therefore$ Gain of first TV set = Loss of second TV set

$\Rightarrow$ Loss of second set = Rs. 1800

But loss % = 10%

$\therefore$ 10% of C.P. = Rs. 1800

$$\frac{10}{100} \times \text{C.P.} = \text{Rs. } 1800$$

$$\Rightarrow \text{C.P.} = \frac{1800 \times 100}{10}$$

$\Rightarrow$ C.P. of second T.V. set = Rs. 18000 **Ans.**

Q. 24. A sold a watch to B at a profit of 15%. Later on, B sold it back to A at a profit of 20%, thereby gaining Rs. 207. How much did A pay for the watch originally?

Sol. Let C.P. of watch for A = Rs. 100

Gain = 15%

$\therefore$ S.P. = Rs. 100 + 15 = Rs. 115

or C.P. for B = Rs. 115

Gain = 20%

$$\therefore \text{S.P. for B} = \frac{\text{C.P.} \times (100 + \text{Gain \%})}{100}$$

$$= \frac{\text{Rs. } 115 (100 + 20)}{100}$$

$$= \text{Rs. } \frac{115 \times 120}{100} = \text{Rs. } 138$$

Gain = S.P. - C.P. = Rs. 138 - Rs. 115

If gain is Rs. 207, then originally C.P. of A = Rs. 100

and if gain is Rs. 207, then C.P.

$$= \text{Rs. } \frac{100 \times 207}{23} = \text{Rs. } 900 \text{ Ans.}$$

Q. 25. A dealer sold three-fourth of his articles at a gain of 20% and the remaining at cost price. Find the gain earned by him in the whole transaction.

Sol. Let cost of each article = Rs. 100

and no. of articles = 100

$\therefore$ Total cost price = Rs. 100 $\times$ 100

$$= \text{Rs. } 10000$$

C.P. of $\frac{3}{4}$ th of total articles

$$= 100 \times \frac{3}{4} \times 100 = \text{Rs. } 7500$$

Gain = 20%

$$\therefore \text{S.P.} = \frac{\text{Rs. } 7500 \times (100 + 20)}{100}$$

$$= \text{Rs. } 7500 \times \frac{120}{100} = \text{Rs. } 9000$$

$$\left[\frac{\text{C.P.} \times (100 + \text{gain \%})}{100} \right]$$

Cost price of remaining $\frac{1}{4}$ th articles

$$= \text{Rs. } 100 \times 25 = \text{Rs. } 2500$$

S.P. = C.P. = Rs. 2500

Total C.P. = Rs. 10000

and total S.P. = Rs. 9000 + Rs. 2500

$$= \text{Rs. } 11500$$

Total gain = S.P. - C.P.

$$= \text{Rs. } 11500 - \text{Rs. } 10000$$

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

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

$$= \frac{1500 \times 100}{10000} = 15\% \text{ Ans.}$$

Q. 26. A man bought goods worth Rs. 6000 and sold half of them at a gain of 10%. At what gain per cent must he sell the remainder so as to get a gain of 25% on the whole?

Ans. Total C.P. of total goods = Rs. 6000

$$\begin{aligned}\text{C.P. of half goods} &= \text{Rs. } 6000 \times \frac{1}{2} \\ &= \text{Rs. } 3000\end{aligned}$$

Gain = 10%

$$\begin{aligned}\therefore \text{S.P.} &= \frac{\text{C.P. (100 + gain\%)}}{100} \\ &= \frac{3000 (100 + 10)}{100} \\ &= \text{Rs. } \frac{3000 \times 110}{100} = \text{Rs. } 3300\end{aligned}$$

C.P. of second half goods = Rs. 3000

Gain on total goods = 25%

$$\begin{aligned}\therefore \text{Total S.P.} &= \frac{\text{Rs. } 6000 (100 + 25)}{100} \\ &= \frac{\text{Rs. } 6000 \times 125}{100} = \text{Rs. } 7500\end{aligned}$$

S.P. of second half goods

$$= \text{Rs. } 7500 - \text{Rs. } 3300 = \text{Rs. } 4200$$

Gain = S.P. - C.P.

$$= \text{Rs. } 4200 - \text{Rs. } 3000 = \text{Rs. } 1200$$

$$\begin{aligned}\text{Gain \%} &= \frac{\text{Total gain} \times 100}{\text{C.P.}} \\ &= \frac{1200 \times 100}{3000} = 40\% \text{ Ans.}\end{aligned}$$

Q. 27. A fruitseller has 24 kg of apples. He sells a part of these at a gain of 20% and the balance at a loss of 5%. If on the whole he earns a profit of 10%, find the quantity of apples sold at a loss.

Sol. Total quantity of apples = 24 kg

Let C.P. of one kg = Rs. 100

$$\begin{aligned}\therefore \text{Total C.P. of 24 kg} &= \text{Rs. } 100 \times 24 \\ &= \text{Rs. } 2400\end{aligned}$$

Gain on total = 10%

$$\begin{aligned}\therefore \text{Total S.P. of 24 kg} &= \frac{\text{C.P. (100 + gain\%)}}{100} \\ &= \frac{2400 \times (100 + 10)}{100} = \text{Rs. } \frac{2400 \times 110}{100} \\ &= \text{Rs. } 2640\end{aligned}$$

Let he sells the apples at 20% gain

$$= x \text{ kg}$$

$$\text{C.P. of } x \text{ kg} = \text{Rs. } 100 \times x = \text{Rs. } 100x$$

$$\therefore \text{S.P. of } x \text{ kg} = \frac{\text{Rs. } 100x (100 + 20)}{100}$$

$$= \text{Rs. } 100x \times \frac{120}{100} = \text{Rs. } 120x$$

$$\text{C.P. of remaining apples} = (24 - x) \times 100$$

Loss = 5%

$$\therefore \text{S.P.} = \frac{100 (24 - x) (100 - 5)}{100}$$

$$= \frac{100 (24 - x) \times 95}{100}$$

$$= \text{Rs. } 95 (24 - x)$$

$$\text{Total S.P.} = \text{Rs. } 120x + 95 (24 - x)$$

According to the condition

$$120x + 95 (24 - x) = 2640$$

$$\Rightarrow 120x + 2280 - 95x = 2640$$

$$\Rightarrow 25x = 2640 - 2280 = 360$$

$$\Rightarrow x = \frac{360}{25} = \frac{72}{5}$$

$\therefore$ Quantity of apples sold at a loss

$$= 24 - \frac{72}{5} = \frac{120 - 72}{5} \text{ kg} = \frac{48}{5} \text{ kg}$$

$$= 9.6 \text{ kg Ans.}$$

Q. 28. A trader purchases a watch and a wall clock for Rs. 390. He sells them making a profit of 10% on the watch and 15% on the wall clock. He earns a profit of Rs. 51.50. Find the individual cost price of the watch and wall clock.

$$\begin{aligned}\text{Sol. Total cost price of watch and wall clock} \\ &= \text{Rs. } 390\end{aligned}$$

Let C.P. of watch = Rs. x

Then, C.P. of wall clock = Rs. $(390 - x)$

Profit on watch = 10%

$$\therefore \text{S.P. of watch} = \frac{\text{C.P. (100 + gain\%)}}{100}$$

$$= \frac{x (100 + 10)}{100} = \text{Rs. } \frac{110x}{100}$$

Gain on wall clock = 15%

∴ S.P. of wall clock

$$= \frac{(390 - x)(100 + 15)}{100}$$

$$= \text{Rs. } \frac{115(390 - x)}{100}$$

$$\therefore \text{Total S.P.} = \text{Rs. } \left[\frac{110}{100}x + \frac{115}{100}(390 - x) \right]$$

$$= \text{Rs. } \frac{110x + 44850 - 115x}{100}$$

$$= \frac{44850 - 5x}{100}$$

∴ Total gain = S.P. - C.P.

$$= \frac{44850 - 5x}{100} - \frac{390}{1}$$

$$= \frac{44850 - 5x - 39000}{100}$$

$$= \frac{5850 - 5x}{100}$$

According to the problem,

$$\frac{5850 - 5x}{100} = 51.50$$

$$\Rightarrow \frac{5850 - 5x}{100} = \frac{5150}{100}$$

$$\Rightarrow 5850 - 5x = 5150$$

$$\Rightarrow 5x = 5850 - 5150$$

$$\Rightarrow 5x = 700 \Rightarrow x = \frac{700}{5} = 140$$

∴ Cost price of watch = Rs. 140

and cost price of wall clock

$$= \text{Rs. } (390 - 140) = \text{Rs. } 250 \text{ Ans.}$$

Q. 29. A man purchases two items at a total cost of Rs. 650. He sells one with 20% profit and the other at a loss of 25% and gets the same selling price for both the items. Find the respective cost price of the two items.

Ans. Total C.P. of two items = Rs. 650

Let C.P. of first item = Rs. x

Then, C.P. of second item = Rs. $(650 - x)$

Gain on first item = 20%

and loss on second item = 25%

∴ S.P. of first item

$$= \frac{x(100 + 20)}{100} = \frac{120}{100}x$$

and S.P. of second item

$$= \frac{(650 - x)(100 - 25)}{100}$$

$$= (650 - x) \times \frac{75}{100}$$

According to the condition,

$$\frac{120}{100}x = (650 - x) \times \frac{75}{100}$$

$$\Rightarrow 120x = (650 - x) 75$$

$$\Rightarrow 120x = 48750 - 75x$$

$$\Rightarrow 120x + 75x = 48750$$

$$\Rightarrow 195x = 48750$$

$$\Rightarrow x = \frac{48750}{195} = 250$$

∴ Cost price of first article = Rs. 250

and C.P. of second article

$$= \text{Rs. } 650 - \text{Rs. } 250$$

$$= \text{Rs. } 400 \text{ Ans.}$$

Q. 30. The cost of production of a TV - set is Rs. 18000 divided between material, labour and overheads in the ratio 11 : 4 : 3.

(i) Calculate the cost of material used in the TV-set.

(ii) If the TV-set is marked at a price that clears 20% of profit on the cost price, what is the marked price of the set?

(iii) If the cost of material, labour and overheads increases by 20%, 30% and 10% respectively, what is the cost of manufacturer now?

(iv) What should be the marked price to get a profit of 20% now?

Sol. C.P. of a TV set = Rs. 18000

Ratio between its material, labour and overheads = 11 : 4 : 3

$$\text{Sum of ratios} = 11 + 4 + 3 = 18$$

$$\therefore \text{Cost on material} = \text{Rs. } 18000 \times \frac{11}{18} \\ = \text{Rs. } 11000$$

$$\text{Cost on labour} = \text{Rs. } 18000 \times \frac{4}{18} \\ = \text{Rs. } 4000$$

$$\text{and cost on overheads} = \text{Rs. } 18000 \times \frac{3}{18} \\ = \text{Rs. } 3000$$

$$(i) \therefore \text{Cost of material used in the TV set} \\ = \text{Rs. } 11000$$

$$(ii) \text{Gain \%} = 20\%$$

$$\therefore \text{Marked price (or S.P.)}$$

$$= \frac{\text{C.P.} \times (100 + \text{Gain \%})}{100} \\ = \text{Rs. } \frac{18000 (100 + 20)}{100} \\ = \text{Rs. } 18000 \times \frac{120}{100} = \text{Rs. } 21600$$

$$(iii) \text{Increased cost of material}$$

$$= \text{Rs. } \frac{11000 \times (100 + 20\%)}{100} \\ = \text{Rs. } 11000 \times \frac{120}{100} = \text{Rs. } 13200$$

$$\text{Increased cost of labour}$$

$$= \text{Rs. } \frac{4000 (100 + 30\%)}{100} \\ = \text{Rs. } 4000 \times \frac{130}{100} = \text{Rs. } 5200$$

$$\text{Increased cost of overheads}$$

$$= \text{Rs. } \frac{3000 (100 + 10)}{100} \\ = \text{Rs. } \frac{3000 \times 110}{100} = \text{Rs. } 3300$$

$$\therefore \text{Total cost for the manufacturer}$$

$$= \text{Rs. } 13200 + \text{Rs. } 5200 + \text{Rs. } 3300 \\ = \text{Rs. } 21700$$

$$(iv) \text{Gain} = 20\%$$

$$\therefore \text{Marked price (S.P.)}$$

$$= \text{Rs. } \frac{21700 \times (100 + 20\%)}{100}$$

$$= \text{Rs. } \frac{21700 \times 120}{100}$$

$$= \text{Rs. } 26040 \text{ Ans.}$$

EXERCISE 2 (B)

Q. 1. A publisher gives 24% discount on printed price of his books. What does a customer pay for a book whose printed price is Rs. 365 ?

$$\text{Sol. Printed price of book} = \text{Rs. } 365$$

$$\text{Rate of discount} = 24\%$$

$$\therefore \text{Total discount} = \text{Rs. } 365 \times \frac{24}{100} \\ = \text{Rs. } 87.60$$

$$\therefore \text{Selling price (S.P.) of the book} \\ = \text{Rs. } 365.00 - \text{Rs. } 87.60 \\ = \text{Rs. } 277.40 \text{ Ans.}$$

Q. 2. The marked price of a refrigerator is Rs. 18750. The shopkeeper offers an off-season discount of 18% on it. How much the customer has to pay for it ?

$$\text{Sol. Marked price (M.P.) of refrigerator} \\ = \text{Rs. } 18750$$

$$\text{Discount} = 18\%$$

$$\therefore \text{S.P.} = \frac{\text{M.P.} (100 - \text{Discount \%})}{100} \\ = \frac{18750 (100 - 18)}{100} = \text{Rs. } \frac{18750 \times 82}{100} \\ = \text{Rs. } 15375 \text{ Ans.}$$

Q. 3. After allowing a discount of 16%, a baby cycle is available for Rs. 1974. What is the marked price of the cycle ?

$$\text{Sol. Rate of discount} = 16\%$$

$$\text{S.P.} = \text{Rs. } 1974$$

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

$$= \text{Rs. } \frac{1974 \times 100}{100 - 16} = \text{Rs. } \frac{1974 \times 100}{84}$$

$$= \text{Rs. } 2350 \quad \text{Ans.}$$

Q. 4. Find the rate of discount being given on a sweater whose price has been slashed down from Rs. 975 to Rs. 760.50.

Sol. Marked price = Rs. 975

and selling price = Rs. 760.50

$\therefore$ Amount of discount = M.P. - S.P.

$$= \text{Rs. } 975.00 - \text{Rs. } 760.50$$

$$= \text{Rs. } 214.50$$

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

$$= \frac{214.50 \times 100}{975} \% = \frac{21450 \times 100}{100 \times 975} \%$$

$$= 22\% \quad \text{Ans.}$$

Q. 5. When a discount of 15% is allowed on the marked price of an article, it is sold for Rs. 2975.

(i) Calculate the marked price.

(ii) Given that the marked price is 40% above cost price, find the cost price.

(iii) Find the gain percent obtained on selling the article.

Sol. S.P. of an article = RS. 2975

Discount = 15%

$$(i) \therefore \text{M.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Discount \%}}$$

$$= \text{Rs. } \frac{2975 \times 100}{100 - 15} = \frac{2975 \times 100}{85}$$

$$= \text{Rs. } 3500$$

(ii) $\therefore$ Marked price is above 40% on the cost price

$$\therefore \text{Cost price} = \frac{\text{M.P.} \times 100}{100 + 40\%}$$

$$= \frac{3500 \times 100}{140} = \text{Rs. } 2500$$

$$(iii) \text{Gain} = \text{S.P.} - \text{C.P.} = \text{Rs. } 2975 - \text{Rs. } 2500$$

$$= \text{Rs. } 475$$

$$\text{Gain \%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{475 \times 100}{2500}$$

$$= 19\% \quad \text{Ans.}$$

Q. 6. A dealer marks his goods 45% above cost price and gives a discount of 20% on the marked price. Find the gain percent made by him.

Sol. Let C.P. = Rs. 100

then marked price = Rs. 100 + 45

$$= \text{Rs. } 145$$

Discount = 20%

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

$$= \frac{145 \times 80}{100} = \text{Rs. } 145 \times \frac{4}{5}$$

$$= \text{Rs. } 116$$

$$\text{Gain} = \text{S.P.} - \text{C.P.} = \text{Rs. } 116 - 100$$

$$= \text{Rs. } 16$$

$$\text{Gain \%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{16 \times 100}{100}$$

$$= 16\% \quad \text{Ans.}$$

Q. 7. An article was marked 40% above cost price and a discount of 35% was allowed on the marked price. Find the gain or loss percent incurred on it.

Sol. Let C.P. of an article = Rs. 100

$\therefore$ Marked price = Rs. 100 + 40

$$= \text{Rs. } 140$$

Discount = 35%

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

$$= \frac{140 (100 - 35)}{100} = \frac{140 \times 65}{100}$$

$$= \text{Rs. } 91$$

$$\therefore \text{Loss} = \text{C.P.} - \text{S.P.} = \text{Rs. } 100 - 91$$

$$= \text{Rs. } 9$$

$$\therefore \text{Loss \%} = \frac{\text{Loss} \times 100}{\text{C.P.}} = \frac{9 \times 100}{100}$$

$$= 9\% \quad \text{Ans.}$$

Q. 8. A dealer purchased washing machine for Rs. 15320. He allows a discount of 12% on its marked price and gains 10% on it. Find the marked price of the washing machine.

Sol. C.P. of machine = Rs. 15320

Gain % = 10%

$$\therefore \text{S.P.} = \frac{\text{C.P.} (100 + \text{Gain \%})}{100}$$

$$= \frac{15320 (100 + 10)}{100} = \frac{15320 \times 110}{100}$$

= Rs. 16852

Discount % = 12%

$$\therefore \text{M.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Discount \%}}$$

$$= \frac{16852 \times 100}{100 - 12} = \text{Rs.} \frac{16852 \times 100}{88}$$

= Rs. 19150 **Ans.**

Q. 9. A shopkeeper bought a sewing machine for Rs. 2450 and marks some price on it. After allowing a discount of 25% on the marked price, he suffers a loss of 10% on it. Find the marked price of the sewing machine.

Sol. C.P. of sewing machine = Rs. 2450

Loss % = 10%

$$\therefore \text{S.P. of machine} = \frac{\text{C.P.} (100 - \text{Loss})}{100}$$

$$= \frac{2450 (100 - 10)}{100}$$

$$= \text{Rs.} \frac{2450 \times 90}{100} = \text{Rs.} 2205$$

Discount % = 25%

$\therefore$ M.P. of the machine

$$= \frac{\text{S.P.} \times 100}{100 - \text{Discount \%}}$$

$$= \frac{2205 \times 100}{100 - 25} = \frac{2205 \times 100}{75}$$

= Rs. 2940 **Ans.**

Q. 10. After allowing a discount of 10% on the marked price, a trader makes a profit of 26%. By what per cent is the marked price above cost price ?

Sol. Let C.P. = Rs. 100

Gain % = Rs. 26%

$$\therefore \text{S.P.} = \text{Rs.} 100 + 26 = \text{Rs.} 126$$

Discount % = 10%

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

$$= \frac{126 \times 100}{100 - 10} = \frac{126 \times 100}{90}$$

= Rs. 140

Difference between C.P. and M.P.

$$= \text{Rs.} 140 - 100 = \text{Rs.} 40$$

$\therefore$ Percentage of price which is above the cost price = 40% **Ans.**

Q. 11. After allowing a discount of 12% on the marked price, a shopkeeper still gains 21%. By what percent is the marked price above cost price ?

Sol. Let cost price = Rs. 100

Gain % = 21%

$$\therefore \text{S.P.} = \text{Rs.} 100 + 21 = \text{Rs.} 121$$

Discount % = 12%

$$\therefore \text{M.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Discount \%}}$$

$$= \frac{121 \times 100}{100 - 12} = \frac{121 \times 100}{88}$$

= Rs. 137.50

Difference between C.P. and M.P.

$$= \text{Rs.} 137.50 - 100 = \text{Rs.} 37.50$$

$\therefore$ Percentage of price which is above the cost price = 37.5% **Ans.**

Q. 12. 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%. Find the percentage of discount allowed.

Sol. Let cost price (C.P.) = Rs. 100

$\therefore$ Marked price (M.P.)

$$= \text{Rs. } 100 + \text{Rs. } 10 = \text{Rs. } 110$$

$$\therefore \text{Loss} = 1\%$$

$$\therefore \text{S.P.} = \frac{\text{Rs. } 100 \times (100 - 1\%)}{100}$$

$$= \text{Rs. } \frac{100 \times 99}{100} = \text{Rs. } 99$$

$$\therefore \text{Discount allowed} = \text{M.P.} - \text{S.P.}$$

$$= \text{Rs. } 110 - \text{Rs. } 99 = \text{Rs. } 11$$

$$\text{Discount \%} = \frac{\text{Total discount} \times 100}{\text{M.P.}}$$

$$= \frac{11 \times 100}{110} = 10\% \text{ Ans.}$$

Q. 13. A shopkeeper fixes the marked price of an item 35% above its cost price. Find the percentage of discount allowed so as to gain 8%.

Sol. Let C.P. of an item = Rs. 100

$$\therefore \text{Marked price} = \text{Rs. } 100 + \text{Rs. } 35 \\ = \text{Rs. } 135$$

$$\text{Gain} = 8\%$$

$$\therefore \text{S.P.} = \frac{\text{C.P.} (100 + \text{gain}\%)}{100} \\ = \frac{100 (100 + 8)}{100} = \frac{100 \times 108}{100} \\ = \text{Rs. } 108$$

$$\text{Total discount} = \text{M.P.} - \text{S.P.}$$

$$= \text{Rs. } 135 - \text{Rs. } 108 = \text{Rs. } 27$$

$$\text{Percent discount} = \frac{\text{Total discount} \times 100}{\text{M.P.}}$$

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

Q. 14. A trader marked his goods at 20% above the cost price. He sold three-fifth of the goods at the marked price and the remaining at a discount of 20%. Find his profit per cent on the whole transaction.

Sol. Let cost price (C.P.) = Rs. 100

$\therefore$ Marked price (M.P.)

$$= \text{Rs. } 100 + \text{Rs. } 20 = \text{Rs. } 120$$

$$\text{C.P. of } \frac{3}{5} \text{ of goods} = \text{Rs. } 100 \times \frac{3}{5} \\ = \text{Rs. } 60$$

and S.P. = Marked price

$$= \frac{3}{5} \times 120 = \text{Rs. } 72$$

C.P. of the remaining $\frac{2}{5}$ of the goods

$$= \text{Rs. } 100 \times \frac{2}{5} = \text{Rs. } 40$$

$$\text{and marked price} = \text{Rs. } 120 \times \frac{2}{5} \\ = \text{Rs. } 48$$

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

$$\therefore \text{C.P.} = \frac{\text{M.P.} \times (100 - 20)}{100}$$

$$= \frac{48 \times 80}{100} = \text{Rs. } \frac{192}{5}$$

$$\text{Total S.P.} = \text{Rs. } 72 + \text{Rs. } \frac{192}{5}$$

$$= \text{Rs. } \frac{360 + 192}{5} = \text{Rs. } \frac{552}{5}$$

$$\text{Total gain} = \text{S.P.} - \text{C.P.}$$

$$= \text{Rs. } \frac{552}{5} - \text{Rs. } 100$$

$$= \text{Rs. } \frac{552 - 500}{5} = \text{Rs. } \frac{52}{5}$$

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

$$= \frac{52 \times 100}{5 \times 100} = \frac{52}{5} = 10.4\% \text{ Ans.}$$

Q. 15. A shopkeeper sold a TV set for Rs. 17,940 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. S.P. of TV set = Rs. 17,940

$$\text{Rate of discount} = 8\%$$

$$\therefore \text{Marked price (M.P.)} = \frac{\text{S.P.} \times 100}{100 - \text{discount \%}}$$

$$= \frac{17940 \times 100}{100 - 8} = \frac{17940 \times 100}{92}$$

$$= \text{Rs. } 19500$$

$$\text{Gain} = 19.6\%$$

$$\begin{aligned}\therefore \text{Cost price} &= \frac{\text{S.P.} \times 100}{100 + \text{gain \%}} \\ &= \frac{17940 \times 100}{100 + 19.6} = \frac{17940 \times 100}{119.6} \\ &= \frac{17940 \times 100 \times 10}{1196} = \text{Rs. } 15000\end{aligned}$$

In second case,

$$\text{C.P.} = \text{Rs. } 15000$$

$$\text{S.P.} = \text{M.P.} = \text{Rs. } 19500$$

$$\begin{aligned}\therefore \text{Total gain} &= \text{S.P.} - \text{C.P.} \\ &= \text{Rs. } 19500 - \text{Rs. } 15000 \\ &= \text{Rs. } 4500\end{aligned}$$

$$\begin{aligned}\text{Gain percent} &= \frac{\text{Total gain} \times 100}{\text{C.P.}} \\ &= \frac{4500 \times 100}{15000} = 30\% \text{ Ans.}\end{aligned}$$

Q. 16. Find a single discount equivalent to two successive discounts of 25% and 4%.

Sol. Let marked price = Rs. 100

$$\text{First discount} = 25\%$$

$$\therefore \text{Sale price} = \text{Rs. } 100 - 25 = \text{Rs. } 75$$

$$\text{Second discount} = 4\%$$

$$\therefore \text{Net sale price} = \frac{75 (100 - 4)}{100}$$

$$= \frac{75 \times 96}{100} = \text{Rs. } 72$$

$$\begin{aligned}\therefore \text{Total amount of discount} \\ &= \text{Rs. } 100 - \text{Rs. } 72 = \text{Rs. } 28\end{aligned}$$

$$\text{Hence single discount} = 28\% \text{ Ans.}$$

Q. 17. Find a single discount equivalent to three successive discounts of 20%, 5% and 2%.

Sol. Let marked price = Rs. 100

$$\text{First discount} = 20\%$$

$$\begin{aligned}\therefore \text{First sale price} &= \text{Rs. } 100 - 20 \\ &= \text{Rs. } 80\end{aligned}$$

$$\text{Second discount} = 5\%$$

$$\therefore \text{Second sale price} = \text{Rs. } \frac{80 (100 - 5)}{100}$$

$$= \frac{80 \times 95}{100} = \text{Rs. } 76$$

$$\text{Third discount} = 2\%$$

$$\therefore \text{Net sale price} = \frac{76 (100 - 2)}{100}$$

$$= \frac{76 \times 98}{100} = \text{Rs. } 74.48$$

Total amount of discount

$$= \text{Rs. } 100 - 74.48 = \text{Rs. } 25.52$$

Hence single discount

$$= \text{Rs. } 25.52\% \text{ Ans.}$$

Q. 18. A trader gives two successive discounts of 15% and 10% on the marked price of an article.

(i) If the marked price is Rs. 100, what would be the selling price.

(ii) If the actual selling price is Rs. 3825, calculate the actual marked price.

(iii) If the actual marked price is 25% more than the cost price, find (a) the cost price. (b) the profit or loss percent.

Sol. Successive discounts are 15% and 10% on the marked price.

$$\begin{aligned}\text{(i) The marked price} &= \text{Rs. } 100 \\ \text{then first S.P. after allowing discount} \\ 15\% &= \text{Rs. } \frac{100 \times (100 - 15)}{100}\end{aligned}$$

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

and second S.P. after allowing the discount 10%

$$\begin{aligned}&= \frac{85 (100 - 10)}{100} = \frac{85 \times 90}{100} \\ &= \text{Rs. } 76.50\end{aligned}$$

Hence selling price = Rs. 76.50

(ii) When selling price = Rs. 3825,

$$\begin{aligned}\text{then marked price} &= \frac{\text{S.P.} \times 100}{100 - \text{Discount \%}}\end{aligned}$$

$$= \text{Rs. } \frac{3825 \times 100}{100 - 15} \times \frac{100}{100 - 10}$$

$$= \text{Rs. } \frac{3825 \times 100 \times 100}{85 \times 90} = \text{Rs. } 5000$$

(iii) When the actual marked price is 25% more than C.P.

Let C.P. = Rs. 100

then actual marked price = Rs. 100 + 25
= Rs. 125

Now if M.P. is Rs. 125 then C.P.

= Rs. 100

and if M.P. is Rs. 5000 then C.P.

$$= \frac{100 \times 5000}{125} = \text{Rs. } 4000$$

S.P. = Rs. 3825

$$\therefore \text{Loss} = \text{S.P.} - \text{C.P.}$$

$$= \text{Rs. } 4000 - \text{Rs. } 3825$$

$$= \text{Rs. } 175$$

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

$$= \frac{175 \times 100}{4000} = \frac{35}{8} = 4\frac{3}{8}\% \quad \text{Ans.}$$

Q. 19. A shopkeeper gives 12% additional discount on the discounted price, after given an initial discount of 20% on the labelled price of a radio. If the final sale price of the radio is Rs. 704, then what is its labelled price?

Sol. Let labelled price (M.P.) = Rs. 100

First discount = 20%

$\therefore$ First price after given discount 20%

$$= \frac{\text{Rs. } 100 (100 - 20)}{100}$$

$$= \frac{100 \times 80}{100} = \text{Rs. } 80$$

Second discount = 12%

$$\therefore \text{Final selling price} = \frac{\text{Rs. } 80 (100 - 12)}{100}$$

$$= \frac{\text{Rs. } 80 \times 88}{100} = \text{Rs. } \frac{352}{5}$$

If final selling price is Rs. $\frac{352}{5}$, then
labelled price = Rs. 100

and if final price is Rs. 704, then labelled

$$\text{price} = \frac{\text{Rs. } 100 \times 5 \times 704}{352}$$

= Rs. 1000 **Ans.**

Q. 20. Two dealers offer an article at the same list price. The first allows successive discounts of 25% and 15%, the other allows 30% and 10%. Which is the better offer?

Ans. In the first case,

Let the list price of the article = Rs. 100

Successive discounts = 25% and 15%

$\therefore$ S.P. of the article

$$= \text{Rs. } 100 \times \frac{(100 - 25)}{100} \times \frac{(100 - 15)}{100}$$

$$= \text{Rs. } 100 \times \frac{75}{100} \times \frac{85}{100} = \text{Rs. } \frac{255}{4}$$

$$= \text{Rs. } 63.75$$

In the second case,

List price of the article = Rs. 100

Successive discounts = 30% and 10%

$\therefore$ S.P. of the article

$$= \text{Rs. } 100 \times \frac{(100 - 30)}{100} \times \frac{(100 - 10)}{100}$$

$$= \text{Rs. } 100 \times \frac{70}{100} \times \frac{90}{100} = \text{Rs. } 63$$

It is clear that second is the better offer **Ans.**

Q. 21. The difference between a discount of 30% and two successive discounts of 20% and 10% on the list price of an article is Rs. 72. Find the list price of the article.

Sol. Let list price of the article = Rs. 100

In first case, the discount = 30%

$$\therefore \text{S.P. of the article} = \frac{100 (100 - 30)}{100}$$

$$= \text{Rs. } 100 \times \frac{70}{100} = \text{Rs. } 70$$

In second case,

two successive discounts = 20% and 10%

∴ S.P. of the article

$$= \text{Rs. } 100 \times \frac{(100 - 20)}{100} \times \frac{(100 - 10)}{100}$$

$$= \text{Rs. } 100 \times \frac{80}{100} \times \frac{90}{100} = \text{Rs. } 72$$

∴ Difference between the two S.P.

$$= \text{Rs. } 72 - \text{Rs. } 70 = \text{Rs. } 2$$

If difference is Rs. 2, then list price = Rs. 100

and if difference is Rs. 72, then list price

$$= \text{Rs. } \frac{100 \times 72}{2} = \text{Rs. } 3600 \text{ Ans.}$$

Q. 22. After getting two successive discounts, a shirt with a list price of Rs. 150 is available at Rs. 105. If the second discount is $12\frac{1}{2}\%$, find the first discount.

Sol. List price of the shirt = Rs. 150

S.P. of the shirt = Rs. 105

∴ Total discount = Rs. 150 - Rs. 105
= Rs. 45

Let first rate of discount = $x\%$

and second discount = $12\frac{1}{2}\% = \frac{25}{2}\%$

∴ S.P. of the shirt

$$= \text{Rs. } 150 \times \frac{(100 - x)}{100} \times \frac{\left(100 - \frac{25}{2}\right)}{100}$$

$$= \text{Rs. } 150 \times \frac{(100 - x)}{100} \times \frac{175}{2 \times 100}$$

$$= \frac{525(100 - x)}{400}$$

According to the condition,

$$\frac{525(100 - x)}{400} = \frac{105}{1}$$

$$52500 - 525x = 42000$$

$$\Rightarrow 52500 - 42000 = 525x$$

$$\Rightarrow 10500 = 525x$$

$$\Rightarrow 525x = 10500$$

$$x = \frac{10500}{525} = 20$$

∴ First rate of discount = 20% **Ans.**