CHAPTER 10

# PROFIT AND LOSS

(Including Discount)

## 10.1 BASIC CONCEPT

If a man buys an article for ₹ 80 and sells it for ₹ 90,

We say : Cost price of the article = Price at which the article is bought

= ₹ 80

Selling price of the article = Price at which the article is sold

= ₹ 90

Since, the **selling price** of the article is **more** than its **cost price**, it is sold at a **profit.**

And Profit (gain) = ₹ 90 – ₹ 80 = ₹ 10

Thus, **Profit** (gain) = **Selling Price – Cost Price** *i.e.* **Profit = S.P. – C.P.**

**S.P.** is the short form of **selling price** and **C.P.** is the short form of **cost price.**

Similarly, if a man buys an article for ₹ 80 and sells it for ₹ 75,

The cost price of the article = ₹ 80

and its selling price = ₹ 75

Since the **selling price** is **less** than the **cost price,** the article is sold at a **loss.**

And Loss = ₹ 80 – ₹ 75 = ₹ 5

Thus, **Loss = Cost Price – Selling Price,** *i.e.* **Loss = C.P. – S.P.**

1. *When the selling price is more than the cost price, a **profit** is made.*

   *And,* (i) *Profit = Selling Price – Cost Price* *i.e.* *Profit = S.P. – C.P.*

   (ii) *Selling Price = Cost Price + Profit* *i.e.* *S.P. = C.P. + Profit*

   (iii) *Cost Price = Selling Price – Profit* *i.e.* *C.P. = S.P. – Profit*

2. *When the selling price is less than the cost price, a **loss** is made.*

   *And,* (i) *Loss = Cost Price – Selling Price* *i.e.* *Loss = C.P. – S.P.*

   (ii) *Selling Price = Cost Price – Loss* *i.e.* *S.P. = C.P. – Loss*

   (iii) *Cost Price = Selling Price + Loss* *i.e.* *C.P. = S.P. + Loss*

## EXERCISE 10 (A)

1. A pen is bought for ₹ 12.40 and sold for ₹ 13.60. Find the profit made.
2. An article bought for ₹ 56 is sold at a gain of ₹ 8.50. Find its selling price.
3. Find the selling price of an article that is bought for ₹ 540 and sold at a loss of ₹ 68.50.
4. Find the cost price of a dressing table if, on selling it for ₹ 5,235, a profit (gain) of ₹ 847 is made.
5. On selling a sofa-set for ₹ 18,540; the manufacturer makes a loss of ₹ 1,935. How much did it cost to the manufacturer ?
6. Pens bought at 5 for ₹ 60 are sold at 2 for ₹ 30. Find :
   (i) the cost price of each pen.
   (ii) the selling price of each pen.

(iii) the profit or loss made on selling one pen.
(iv) how much is gained or lost on selling 50 similar pens.

7. A man buys 300 articles at 4 for ₹ 6 and sold all of them at ₹ 2 each. Find :
   (i) the cost price of one article
   (ii) the profit made by the man on selling one article.
   (iii) his total profit on selling all the 300 articles.

8. Ramesh sells pencils at 5 for ₹ 4. If he had bought 250 pencils at one rupee each, find :
   (i) the selling price of each pencil.
   (ii) the loss suffered on selling one pencil.
   (iii) the total loss made on selling all the pencils.

9. A shopkeeper buys three articles for ₹ 375, ₹ 580 and ₹ 428 respectively. He is able to sell these articles for ₹ 436, ₹ 635 and ₹ 350 respectively. Find the gain or loss to the shopkeeper on the whole.

10. Rajesh buys an old sofa-set for ₹ 1,250 and spends ₹ 350 on its repairs.
   (i) Find the total cost price of the sofa to Rajesh.
   (ii) Find the profit or the loss made if Rajesh is able to sell the repaired sofa-set for ₹ 1,540.

11. An old scooter is brought for ₹ 7,800, and ₹ 1,850 is spent on its repairing, denting, painting, etc. Find : (i) the total cost price of the scooter.
   (ii) if the repaired scooter is sold for ₹ 10,500, find the loss or the gain made.

---

## 10.2 Finding Profit or Loss Percent

$$\text{Profit\%} = \frac{\text{Profit}}{\text{Cost Price}} \times 100\% \quad \text{and} \quad \text{Loss\%} = \frac{\text{Loss}}{\text{Cost Price}} \times 100\%$$

*Both profit percent and loss percent are calculated on the cost price.*

***Example 1 :***

Find the profit or loss percent when an old car, bought for ₹ 25,000, is sold for ₹ 28,000.

***Solution :***

Given C.P. of car = ₹ 25,000 and, S.P. of it = ₹ 28,000

$\therefore$ Profit = ₹ 28,000 – ₹ 25,000 = ₹ 3,000

And **Profit%** $= \frac{\text{Profit}}{\text{C.P.}} \times 100\% = \frac{3000}{25000} \times 100\% =$ **12%** **(Ans.)**

***Example 2 :***

Peter bought an article for ₹ 400 and sold it for ₹ 380. Calculate his profit or loss as percent.

***Solution :***

Since C.P. = ₹ 400 and S.P. = ₹ 380

$\therefore$ Loss = ₹ 400 – ₹ 380 = ₹ 20

And **Loss percent** $= \frac{\text{Loss}}{\text{C.P.}} \times 100\% = \frac{20}{400} \times 100\% =$ **5%** **(Ans.)**

***Example 3 :***

Mohan bought a T.V. set for ₹ 5,000 and sold it at a profit of 10%. Find the profit and the selling price of the T.V. set.

***Solution :***

Since C.P. = ₹ 5,000 and Profit% = 10%

∴ **Profit** = 10% of ₹ 5,000

$= \frac{10}{100} \times$ ₹ 5,000 = **₹ 500** **(Ans.)**

Also **S.P.** = C.P. + Profit = ₹ 5,000 + ₹ 500 = **₹ 5,500** **(Ans.)**

**Direct Method : S.P.** $= \frac{100 + P\%}{100} \times$ C.P. $= \frac{100 + 10}{100} \times$ ₹ 5,000 = **₹ 5,500**

***Example 4 :***

A man bought an article for ₹ 450 and sold it at a loss of 20%. Find the loss and selling price of the article.

***Solution :***

Since C.P. = ₹ 450 and Loss% = 20%

∴ **Loss** = 20% of ₹ 450 $= \frac{20}{100} \times$ ₹ 450 = **₹ 90** **(Ans)**

And **S.P.** = C.P. – Loss

= ₹ 450 – ₹ 90 = **₹ 360** **(Ans.)**

**Direct Method : S.P.** $= \frac{100 - L\%}{100} \times$ C.P. $= \frac{100 - 20}{100} \times$ ₹ 450 = **₹ 360**

***Example 5 :***

By selling a V.C.R. for ₹ 9,000, a profit of ₹ 1,000 is made. Find the profit percent.

***Solution :***

Since S.P. = ₹ 9,000 and Profit = ₹ 1,000

∴ Cost Price = ₹ 9,000 – ₹ 1,000 = ₹ 8,000

C.P. = S.P. – Profit

And **Profit%** $= \frac{\text{profit}}{\text{C.P.}} \times 100\% = \frac{1000}{8000} \times 100\% =$ **12.5%** **(Ans.)**

***Example 6 :***

By selling a V.C.R. for ₹ 9,000, a loss of ₹ 1,000 is suffered. Find the loss percent.

***Solution :***

Since S.P. = ₹ 9,000 and Loss = ₹ 1,000

∴ Cost Price = ₹ 9,000 + ₹ 1,000 = ₹ 10,000

C.P. = S.P. + Loss

And **Loss%** $= \frac{\text{loss}}{\text{C.P.}} \times 100\% = \frac{1,000}{10,000} \times 100\% =$ **10%** **(Ans.)**

## 10.3 To find C.P. when S.P. and profit percent or loss percent are given

**Formula used :**

$$\text{C.P.} = \frac{100}{100 + \text{profit\%}} \times \text{S.P.,}\ \textit{when profit percent is given}$$

and $$\text{C.P.} = \frac{100}{100 - \text{loss\%}} \times \text{S.P.,}\ \textit{when loss percent is given}$$

***Example 7 :***

An article is sold for ₹ 500 at 25% profit. Find its cost price.

***Solution :***

Given S.P. = ₹ 500 and P% = 25%

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

$$= \frac{100}{100 + 25} \times ₹\ 500 = \frac{10}{125} \times ₹\ 500 = ₹\ 400 \qquad \textbf{(Ans.)}$$

***Example 8 :***

By selling an article for ₹ 800 a shopkeeper suffers a loss of 20%. For how much had he bought it ?

***Solution :***

Given S.P. = ₹ 800 and Loss = 20%

$$\therefore \quad \text{C.P.} = \frac{100}{100 - \text{L\%}} \times \text{S.P.}$$

$$= \frac{100}{100 - 20} \times ₹\ 800 = \frac{100}{80} \times ₹\ 800 = ₹\ 1{,}000 \qquad \textbf{(Ans.)}$$

### EXERCISE 10 (B)

1. Find the gain or loss percent in the following cases :
   (i) C.P. = ₹ 50 and gain = ₹ 6
   (ii) C.P. = ₹ 2 and loss = 50 p
   (iii) C.P. = ₹ 1,000 and S.P. = ₹ 1,200
   (iv) C.P. = ₹ 12 and S.P. = ₹ 10
   (v) S.P. = ₹ 120 and gain = ₹ 20
   (vi) C.P. = ₹ 100 and S.P. = ₹ 90
2. Find the S.P. of an article if its :
   (i) C.P. = ₹ 120 and profit = 10%
   (ii) C.P = ₹ 370 and loss = 20%
3. I bought a cycle for ₹ 375 and sold it at a loss of 12%. How much did I lose ?
4. A man buys a transistor for ₹ 250 and sells it at a gain of ₹ 25. Find his gain percent.

5. At the rate of ₹ 40 per dozen, 12 dozen eggs are bought. Two dozen eggs got broken, and the rest were sold at ₹ 60 per dozen.
   (i) C.P. of 12 dozen eggs.
   (ii) the number of eggs left, after 2 dozen eggs got broken.
   (iii) S.P. of the remaining 10 dozen eggs.
   (iv) profit or loss incurred.
   (v) profit % or loss%.
6. A man bought an old car for ₹ 1,25,000. He spent ₹ 12,000 on repairs and ₹ 3,000 on other things. He then sold the car for ₹ 1,61,000. Find his gain percent.
7. By selling a tape-recorder for ₹ 6,000, a loss of ₹ 1,000 is suffered. Find its cost price. Also, find the price at which this tape-recorder should be sold in order to gain 16%.
8. Four articles are bought for ₹ 5 and sold for ₹ 1.50 each. Find :
   (i) the cost price of each article.
   (ii) the profit or loss made by selling one article.
   (iii) the profit percent made by selling one article.
   (iv) the total selling price of all the four articles.
   (v) the profit or loss made by selling all the four articles.
   (vi) the profit percent made by selling all the four articles.
   (vii) whether or not the answers to part (iii) and part (vi) are the same. If yes, give reason.
9. Six oranges are bought at 3 for ₹ 12 and sold at 2 for ₹ 10. Find :
   (i) the cost price of 6 oranges.
   (ii) the selling price of 6 oranges.
   (iii) the profit or loss on the whole.
   (iv) the percentage profit or loss on the whole.
10. A shopkeeper buys an article for ₹ 10 and sells it for ₹ 8.
   (i) find the shopkeeper's loss percent
   (ii) find the C.P. of 20 such articles and the their S.P.
   (iii) if the shopkeeper buys 20 articles and is able to sell all of them, find the loss suffered by the shopkeeper in the transaction.
11. Find the C.P. if :
   (i) S.P. = ₹ 300 and profit = 25%.
   (ii) S.P. = ₹ 300 and loss = 25%.
   (iii) S.P. = ₹ 1,200 and profit = 50%.
   (iv) S.P. = ₹ 2,000 and loss = 50%.

## 10.4 OVERHEADS

Suppose a man buys some goods from Delhi for ₹ 5,000 and sells them in Meerut for ₹ 6,000, it seems that the man has made a profit

$$= ₹\ 6,000 - ₹\ 5,000 = ₹\ 1,000.$$

What do you think ? Does he actually gain ₹ 1,000 on this transaction ?

Perhaps, it is **not true**.

Because, the man must have spent some money on :

(i) his travelling from Meerut to Delhi and then back to Meerut;

(ii) transportation of the goods bought, etc.

Because of these **extra expenses** (called **overheads**), the actual profit made by the man becomes less than ₹ 1,000. The man may even have made a loss in such a transaction if the overhead expenses had exceeded ₹ 1,000.

***Example 9 :***

A retailer buys some articles from a wholesaler for ₹ 650 and spends ₹ 100 on their transportation, etc. If he sells these articles for ₹ 900, find the profit or loss made by the retailer and express it in percent.

***Solution :***

Since the retailer buys the articles for ₹ 650 and spends ₹ 100 on their transportation,

The total C.P. of the articles

$= ₹\ 650 + ₹\ 100 = ₹\ 750$

S.P. is more than total C.P.

Given S.P. $= ₹\ 900$

$\therefore$ **Profit** $= ₹\ 900 - ₹\ 750 = ₹\ 150$ **(Ans.)**

Also **Profit%** $= \frac{\text{Profit}}{\text{Total C.P.}} \times 100\% = \frac{150}{750} \times 100\% = 20\%$ **(Ans.)**

***Example 10 :***

A trader at Pune buys a T.V. for ₹ 7,000 from Mumbai and sells it in Pune for ₹ 7,600. If his overhead expenses amount to ₹ 1,000, find his profit or loss in this transaction and express it as percent.

***Solution :***

Total C.P. of the T.V. for trader

$= ₹\ 7,000 + ₹\ 1,000 = ₹\ 8,000$

S.P. is less than total C.P.

Given S.P. $= ₹\ 7,600$

$\therefore$ **Loss** $= ₹\ 8,000 - ₹\ 7,600 = ₹\ 400$ **(Ans.)**

Also **Loss%** $= \frac{\text{Loss}}{\text{Total C.P.}} \times 100\% = \frac{400}{8000} \times 100\% = 5\%$ **(Ans.)**

## 10.5 DISCOUNT

While purchasing different things from the market, you must have seen that they mostly have their prices printed on them or on the labels attached to them. This price, (the one that is printed on a thing or on a label attached to it) is called its **marked price** (M.P.).

Now, in order to clear the surplus stock or to increase the sales of different articles, shopkeepers often announce discount sales, *i.e.* they reduce the sales prices of their things by a certain percent.

*This discount or reduction in the price of a thing is always given on its marked price.*

***Example 11 :***

A sofa-set is marked at ₹ 6,000 and is available at a discount of 12%. Find the sale-price of the sofa-set.

***Solution :***

Since the marked price (M.P.) of the sofa-set = ₹ 6,000

And Discount = 12% of marked price = 12% of ₹ 6,000

$$= \frac{12}{100} \times ₹\ 6{,}000 = ₹\ 720$$

∴ Its **sale-price** = Marked Price – Discount = ₹ 6,000 – ₹ 720

= **₹ 5,280** **(Ans.)**

1. *Discount, i.e. reduction in price is always calculated on the marked price.*
2. *Selling (sale) Price = Marked Price – Discount*
3. *Discount = Marked Price – Selling Price and* $\text{Discount\%} = \frac{\text{Discount}}{\text{Marked Price}} \times 100\%$.

***Example 12 :***

An article marked at ₹ 8,000 is sold for ₹ 7,200. Find the discount and discount percent.

***Solution :***

Since M.P. = ₹ 8,000 and S.P. = ₹ 7,200

∴ **Discount = M.P. – S.P.** = ₹ 8,000 – ₹ 7,200 = **₹ 800** **(Ans.)**

Also $\textbf{Discount\%} = \frac{\text{Discount}}{\text{Marked Price}} \times 100\% = \frac{800}{8000} \times 100\% = \textbf{10\%}$ **(Ans.)**

## EXERCISE 10 (C)

1. Peter bought an old scooter for ₹ 3,650 and spent ₹ 845 on repairs. If he sold the scooter for ₹ 4,760, find his profit or loss.
2. An article is bought for ₹ 1,960 and ₹ 75 is spent on its transportation. At what price must it be sold in order to gain ₹ 350 ?
3. A mechanic buys an old T.V. for ₹ 2,640 and spends ₹ 295 on repairs. Find his gain or loss if he sells the T.V. for ₹ 3,228.50. Also, express the gain or loss made as percent.
4. Mohit, a shopkeeper at Agra, buys some goods for ₹ 5,650 from Delhi and spends ₹ 350 on his travelling and transportation of the goods purchased. If, in Agra, he is able to sell all these goods for ₹ 5,700, find the loss suffered by Mohit and express it as percent.
5. A man bought a car for ₹ 75,000. He spent ₹ 9,000 on repairs and ₹ 6,000 on accessories. He then sold the car for ₹ 1,20,000. Find his gain percent.
6. A woollen coat is marked at ₹ 3,000 and is sold at a discount of 15%. Find the discount given and the selling price of the coat.
7. Find the selling price of an article marked at ₹ 240 and sold at a discount of 8%.
8. A shopkeeper allows 12% discount on the printed price of an article. What does a customer pay for the article marked at ₹ 150 ?
9. In a shop of ready-made garments, a dress is marked at ₹ 1,350 and available for ₹ 954. Find the discount given by the shopkeeper and express it as percent.

## REVISION EXERCISE (Chapter 10)

1. Find the cost price of an article that is sold for ₹ 1,080 at a gain of ₹ 180. Also, find the gain percent.
2. Find the cost price of an article that is sold for ₹ 1,350 at a loss of ₹ 150. Also, express the loss percent.
3. Find the selling-price, if :
   (i) C.P. = ₹ 500 and profit = 23%. (ii) C.P. = ₹ 1,800 and loss = 5%.
   (iii) C.P. = ₹ 225 and profit = one-third of the cost price.
   (iv) C.P. = ₹ 555 and loss = one-fifth of the cost price.
4. An article is bought for ₹ 750 and sold at a gain of 20%.
   (i) Find its selling price.
   (ii) How much will be gained if the article is sold at a profit of 30% ?
5. Rohit buys an article for ₹ 1,300 and sells it at a loss of 10%. He then buys another article for ₹ 1,200 and sells it at a gain of 25%. Find :
   (i) the selling price of the first article. (ii) the selling price of the second article.
   (iii) the total selling price of both the articles. (iv) the total cost price of both the articles.
   (v) the profit or loss made on the whole.
   (vi) the profit or loss on the whole as percent.
6. An article is bought for ₹ 620 and sold for ₹ 780. A second article is bought for ₹ 575 and sold for ₹ 437. Similarly, a third article is bought for ₹ 805 and sold for ₹ 883. Find :
   (i) the total C.P. of the three articles. (ii) the total S.P. of the three articles.
   (iii) the profit or loss on the whole as percent.
7. A shopkeeper buys an old T.V. for ₹ 5,400 and spends ₹ 600 on repairs. If he sells the repaired T.V. for ₹ 6,900, find :
   (i) his profit or loss (ii) his profit or loss percent
8. An old article is bought for ₹ 1,600 and ₹ 900 is spent on repairs. If the repaired article is sold for ₹ 2,000, find :
   (i) the profit or loss made on selling the articles.
   (ii) the profit or loss on the whole as percent.
9. An article is marked at ₹ 1,650 and is available at a discount of 20%. Find :
   (i) the discount given (ii) the selling price of the article.
10. A dining table is marked for ₹ 7,500 and sold for ₹ 6,000. Find :
   (i) the discount given (ii) the discount given as percent.