Profit, Loss and Discount

- The price at which an article is bought is called its **cost price** (CP).
- The price at which an article is sold is its **selling price** (SP).
    - Conditions of profit or loss:
        1. If CP < SP then profit is made and Profit = SP – CP
        2. If CP = SP then there is a no profit, no loss.
        3. If CP > SP then loss is incurred and Loss = CP – SP

For example, Suman bought a bottle for Rs 130 and sold it for Rs 142.

Here, SP = Rs 142, CP = Rs 130

As SP > CP, so profit is incurred.

Profit = SP – CP = Rs 142 – Rs 130 = Rs 12

- The formulae to calculate profit and loss are:
    - Profit % $= \frac{\text{Profit}}{\text{C.P}} \times 100$
    - Loss % $= \frac{\text{Loss}}{\text{C.P.}} \times 100$

Example:

A shopkeeper purchased 15 dozen cups for Rs 900. However, 9 cups cracked during transportation. The remaining cups were sold for Rs 9 each. Find the gain or loss percent.

Solution:

Cost price of 15 dozen i.e., 180 cups = Rs 900

9 cups were cracked. Therefore, number of cups left = 180 – 9 = 171

These 171 cups were sold at Rs 9 each.

∴ S.P. of 171 cups = Rs 9 × 171 = Rs 1539

⇒ Profit = SP – CP = Rs (1539 – 900) = Rs 639

$$\text{Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100 = \frac{639}{900} \times 100 = 71\%$$

- Discount is the reduction given on the Marked Price (M.P) of an article.
  Discount = Marked Price – Sale price

  Discount = Discount % of Marked Price

- If the successive discount %, d_1%, d_2%, d_3% … are given, then

$$\textbf{S.P.} = \text{M.P.} \times \left(\frac{\mathbf{100 - d_1}}{\mathbf{100}}\right) \times \left(\frac{\mathbf{100 - d_2}}{\mathbf{100}}\right) \times \left(\frac{\mathbf{100 - d_3}}{\mathbf{100}}\right) \times \ldots.$$

Example:

For the stock sale at the end of a season, a garment shop offers 50% and then 40% on the garments. What is the marked price of a shirt if the shop offers a total discount of Rs 840 after giving two successive discounts?

Solution:

Let the marked price of the shirt be Rs x.

In two successive discounts, d_1% = 50 and d_2% = 40.

We know that

$$\begin{aligned}\text{S.P.} &= \left(\frac{100 - d_1}{100}\right) \times \left(\frac{100 - d_2}{100}\right) \times \text{M.P.} \\ &= \left(\frac{100 - 50}{100}\right) \times \left(\frac{100 - 40}{100}\right) \times x \\ &= \frac{50}{100} \times \frac{60}{100} \times x \\ &= \frac{3x}{10}\end{aligned}$$

We know that, discount = M.P. − S.P.

$$\Rightarrow 840 = x - \frac{3x}{10}$$

$$\Rightarrow \frac{7x}{10} = 840$$

$$\Rightarrow x = \frac{840 \times 10}{7} = 1200$$

Hence, the marked price of the shirt is Rs 1200.