UNIT 2
CHAPTER 2
PROFIT & LOSS
BASIC CONCEPT BUILDER

We introduce the concept with some definitions below. This concept is basically an application of percentage.

Cost price (CP) is the price at which an article is purchased. **Selling price** (SP) is the price at which an article is sold.

If SP is more than CP, it is a **profit** or **gain**

If CP is more than SP, it is a **loss**.

- **Gain or Profit** = SP – CP
- **Loss** = CP – SP
- Loss or gain is always reckoned on CP
- **Profit Percentage** (Profit %) = $\frac{PROFIT}{CP} \times 100 = \frac{SP-CP}{CP} \times 100$
- **Loss percentage** (Loss %) = $\frac{LOSS}{CP} \times 100 = \frac{CP-SP}{CP} \times 100$

    - Profit or Gain % = SP = $CP \times \frac{(100+PROFIT\,\%)}{100}$; CP = $SP \times \frac{100}{(100+PROFIT\,\%)}$

- **LOSS %** = SP = $CP \times \frac{(100-LOSS\,\%)}{100}$ CP= $SP \times \frac{100}{(100-LOSS\,\%)}$

Hence

- If an article is sold at a profit of 25%, then SP = 125 % of CP
- If an article is sold at a loss of 25% then SP = 75% of CP

SOME IMPORTANT FACTS

- If a person sells two items at the same price; one at Profit or Loss of A% and another Profit or loss of B%, then **Net Percent** Change = A + B + $\frac{A \times B}{100}$
    - If Profit %, take positive value and if Loss % take negative value. If the final result is positive, that is Profit % and if final result is negative, that is loss%

- If a trader professes to sell his goods at cost price, but uses **false weights**, then Gain % = $\frac{Error}{True\ value - Error} \times 100$

- If an article is sold after allowing a certain discount (d%) on **marked price** (M.P.) then the **selling price** (S.P.) is given by S.P. = (100 – d)% × M.P.

- If an article is sold after allowing two **successive discounts** of d_1% and d_2% then selling price (S.P) is given by SP = $\frac{100-d1}{100} \times \frac{100-d2}{100} \times M.P$

- Two **successive discounts** of d_1 and d_2 are equivalent to a single discount of
    - $d_1 + d_2 - \frac{d_1 \times d_2}{100}$

Examples

Example 1: A man buys a cycle for Rs.1400 and sells it at a loss of 15%. What is the selling price of the cycle?

Sol: CP = Rs 1400 Loss = 15%

SP = 1400 $\times \frac{85}{100}$ = Rs. 1190

Example 2: When a commodity is sold for Rs.34.80, there is a loss of 2%. What is the cost price of the commodity?

Sol: SP = Rs. 34.80, Loss = 2%

CP = 34.80 $\times \frac{100}{98}$ =Rs.35.51

Example 3: Shyam purchased 20 dozens of toys at the rate of Rs. 375 per dozen. He sold each one of them at the rate of Rs. 33. What was his percentage profit?

Sol: CP of 1 dozen Toys = Rs.375 ; SP of 1 dozen Toys =12□33 = 396 Profit = 396 - 375 = 21

Profit % = $\frac{21}{375} \times 100$= 5.6

Example 4: A shopkeeper sells 200 meters of cloth for Rs. 9,000 at a profit of Rs. 5 per meter. What is the cost price of 1 meter of cloth?

Sol: Profit on 200 meter of cloth = 200 × 5 = Rs 1,000

Cost price of 200 meter of cloth = 9000 – 1000 = Rs 8000

Cost price of 1 meter of cloth = $\frac{8000}{200}$ = Rs.40

Example 5: On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. Then find the cost Price?

Sol: (C.P.of 17 balls) – (S.P. of 17 balls) = (C.P. of 5 balls)

C.P. of 12 balls = S.P. of 17 balls = Rs.720.

CP of 1 ball= Rs. $\frac{720}{12}$ = Rs.60

Example 6: An article was purchased for Rs. 78,350/-. Its price was marked up by 30%. It was sold at a discount of 20% on the marked up price. What was the profit percent on the cost price?

Sol: Cost Price = Rs.78,350

Marked price = 78350 × $\frac{130}{100}$= Rs.101855

Selling Price = 101855 × $\frac{80}{100}$= Rs.81484

Profit = 81484 – 78350 = 3134

Profit % = $\frac{3134}{78350}$ × 100= 4%

Example 7: The cost of 8 kg of almonds is equal to the cost of 50 kg of apples. The cost of 19 kg of mangoes is Rs. 456. The cost of 1 kg of apples is twice the cost of 2 kg of mangoes. What is the total cost of 3 kg of almonds and 4 kg of apples together?

Sol: Cost price of 1 kg of Mangoes $\frac{456}{19}$ = Rs 24

Cost Price of 1 kg apples = 2 × 48 = Rs. 96

Cost Price of 1 kg almond $\frac{50 \times 96}{8}$ = Rs 600

Cost price of 3 kg of almond and 4 kg of apples = 3 × 600 + 4 × 96 = Rs. 2184

Example 8: John buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800. What is his profit percent?

Sol: Cost Price = 4700+800 = Rs.5500. Selling Price = Rs. 5800.

Profit= (SP) - (CP)=5800 - 5500 = Rs. 300.

Profit% = $\frac{300}{500} \times 100 = 5\frac{5}{11}\%$

Example 9: Raju purchased an item of Rs. 46,000 and sold it at loss of 12 percent. With that amount he purchased another item and sold it at a gain of 12 percent. What was his overall gain/loss?

Sol: CP = Rs. 46,000 Loss = 12%

SP = 46,000 × $\frac{88}{100}$= 40480

Second Time

CP = Rs 40480, Profit = 12%

SP = 40480 × $\frac{112}{100}$ = Rs 45337.60

Overall Loss = 46000 - 45337.60 = 662.40.

Example 10:A fruit seller sells mangoes at the rate of Rs.9 per kg and thereby loses 20%. At what price per kg, he should have sold them to make a profit of 5%?

Sol: SP = Rs 9, Loss =20%

CP = 9 × $\frac{100}{80}$= 11.25

Profit = 5%

SP = 11.25 × $\frac{105}{100}$= Rs. 11.81

Example 11:A book was sold for Rs.27.50 with a profit of 10%. If it were sold for Rs.25.75, then what would have been the percentage of profit?

Sol: SP = Rs 27.50, Profit = 10%

CP = 27.50 × $\frac{100}{110}$ = 25

CP = Rs 25, New SP = Rs. 25.75 Profit = 25.75 - 25 = 0.75

Profit % = $\frac{0.75}{25} \times 100$ =3%

Example 12:A man sells two flats at the rate of Rs.1.995 lakhs each. On one he gains 5% and on the other, he loses 5%. His gain or loss percent in the whole transaction is?

Sol:Net percentage change= 5 – 5 +$\frac{5 \times (-5)}{100}$ = - 00.25

Loss = 0.25%

Example 13: By selling a pen for Rs.15, a man loses one sixteenth of what it costs him. The cost price of the pen is?

Sol:Let CP = x, Loss = x/16

According to question,

X - $\frac{X}{16}$ = 15 => X = 16

So The CP = Rs. 16

Example 14:A shopkeeper professes to sell his goods at cost price but uses a weight of 800 gm instead of kilogram weight. Thus, he makes a profit of?

Sol: Let CP of 1gr = Rs. 1 CP of 800 gr = Rs. 800

CP of 1Kg(1000gr) = Rs.1000 SP of 800gr = Rs. 1000

Profit = 1000 - 800 = 200

Profit % = $\frac{200}{800} \times 100$ = 25%

Example 15: The cost price : selling price of an article is a : b. If b is 200% of a then the percentage of profit on cost price is?

Sol: Gain percentage = $\frac{SP-CP}{CP} \times 100 = \frac{b-a}{a} \times 100$

B = 200% a => b = 2a

$\frac{2a-a}{a} \times 100 = 1 \times 100 = 100$

Example 16: Charan purchased a mobile phone and a refrigerator for 15,400 and 19,600 respectively. He sold mobile phone for a profit of 15 percent and the refrigerator for a loss of 20 percent. What is his overall loss/profit?

Sol:C. Pm = 15400, p = 15, C.Pr = 19600, l = 20

SP = 17710 ; SP = 15680

Total C.P. = 15400 + 19600 = 35000

Total S.P. = 17710 + 15680 = 33390

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

loss = 35000 – 33390 = 1610

Example 17: By selling 12 oranges for 60, a man loses 25%. The number of oranges he has to sell for 100, so as to gain 25% is?

Sol: $Sp_1 = \frac{60}{12} = 5$; $p_1 = -25\%$, $S.P_2 = ?$ $P_2 = 25\%$

The shopkeeper has to sell each orange at Rs 25/3. So for Rs 100, he has to sell

$\frac{100 \times 3}{125}$ = 12 oranges

Example 18 : The cost price of 400 lemons is equal to the selling price of 320 lemons. Then the profit percent is?

Sol: 400 C.P = 320 S.P

P = $\frac{400-320}{320} \times 100$ =>25%

Example 19 :A man sells two tables at the same price. On one he makes a profit of 10% and on the other he suffers a loss of 10%. His loss per cent on the whole transactions is?

Sol: Profit = 10%, loss = 10%

Therefore Overall loss % = $\frac{x^2}{320} = \frac{10 \times 10}{100}$ =1%

Example 20 : Prof. Chakravarthy bought a car and got 15% of its original price as a dealer's discount. He then sold it at 20% profit on his purchase price. What percentage profit did he get on the original price?

Sol: Let the original price be 100.

Then C.P = 85, SP= $\frac{120}{100} \times 85$= 102

∵ Original price is 100, percentage profit on the original price = (102 –85)/85×100=20%