PROFIT & LOSS

SYNOPSIS

1. Cost price is the money paid by a shopkeeper to buy goods.
2. Selling price is the price at which the shopkeeper sells the goods.
3. If cost price (CP) is less than selling (SP), then shopkeeper gets loss.
   $\therefore$ loss = CP – SP
4. If the selling price is more than the cost price the shopkeeper get profit
   $\therefore$ Profit = SP – CP
5. If SP > CP there is profit and SP < CP, then there is loss in the transaction.
6. CP = SP + loss or SP = CP – loss
   SP = CP + profit orCP = SP – profit
7. For comparison of profit or loss obtained in different transactions they are expressed as percentages since CP is the investment, that a shopkeeper makes in the transactions.

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

   b) Loss % = $\frac{\text{loss}\times 100}{\text{CP}}$

   Ex : If CP = 800/-, Profit = 15%, then find the SP and Profit.

   Sol : Profit = $\frac{15}{100}\times 800 = \text{Rs.}120$

   Total SP = CP + gain

   Total SP = 800 + 120 = Rs.920

   Ex : If CP = 1200, SP = 900, then find the loss%

   Sol : Loss = CP – SP = 1200 – 900 = 300

   $$\text{Loss\%} = \frac{\text{loss}\times 100}{\text{CP}} = \frac{300\times 100}{1200} = 25\%$$

(i) $\text{S.P.} = \frac{(100+\text{Gain\%})}{100}\times C.P.$, when C.P. and gain % are given.

(ii) $\text{S.P.} = \frac{(100-\text{Loss\%})}{100}\times C.P.$, when C.P. and loss% are given.

Ex: Prakash bought a watch for Rs. 960. For how much should he sell it to gain 5%?

Sol. First Method:

C.P. = Rs. 960, Gain% = 5%

Gain = 5% of Rs. 960 = Rs. $\left(\frac{5}{100}\times 960\right) = Rs.48$

$\therefore$ S.P. = (C.P.) + Gain

= Rs. $(960+48) = Rs.1008$.

Second Method:

C.P. = Rs. 960, Gain% = 5%

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

$= Rs.\left(\frac{105}{100}\times 960\right) = Rs.1008$

i. C.P. = $\frac{100}{(100+\text{Gain}\%)}\times$ S.P., when S.P. and gain% are given.

ii. C.P. = $\frac{100}{(100-\text{Loss}\%)}\times$ S.P., when S.P. and loss % are given.

Ex. Rohit sold a radio set for Rs. 1400 at a gain of 12%, For how much did he purchase it?

Sol. First Method:

Let C.P. be Rs. x.

Then, Gain = 12% of Rs. x = Rs. $\left(\frac{12}{100}\times x\right) = Rs.\left(\frac{3x}{25}\right)$

S.P. = (C.P.) + Gain

= Rs. $\left(x+\frac{3x}{25}\right) = \text{Rs.}\frac{28\text{x}}{25}$

But, S.P. = Rs. 1400 (given)

$\therefore \frac{28x}{25} = 1400 \Rightarrow x = \left(1400\times\frac{25}{28}\right) = 1250$.

Hence, Rohit purchased the radio for Rs. 1250.

Second Method (Using Formula):

S.P. = Rs. 1400, gain = 12%

$\therefore$ C.P. $= \frac{100}{(100+\text{gain}\%)}\times \text{S.P.} = \text{Rs.}\left(\frac{100}{112}\times 1400\right) = Rs.1250$.

WORK SHEET - 1

SINGLE ANSWER TYPE

1. I gain 70 paisa on Rs. 70. My gain percent is
   1) 0.1% 2) 1% 3) 7% 4) 10%
2. A shopkeeper sold an article for Rs. 2090.42. Approximately, what will be the percentage profit if he sold that article for Rs. 2602.58?
   1) 15% 2) 20% 3) 25% 4) 30%
3. Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, his gain percent is
   1) $4\frac{4}{7}\%$ 2) $5\frac{5}{11}\%$ 3) 10% 4) 12%
4. A shopkeepr purchased 70 kg of potatoes for Rs. 420 and sold the whole lot at the rate of Rs. 6.50 per kg. What will be his gain percent?
   1) $4\frac{1}{6}\%$ 2) $6\frac{1}{4}\%$ 3) $8\frac{1}{3}\%$ 4) 20%
5. 100 oranges are bought at the rate of Rs. 350 and solid at the rate of Rs. 48 per dozen. The percentage of profit or loss is
   1) $14\frac{2}{7}\%$ 2) 15% 3) $14\frac{2}{7}\%$ 4) 15%
6. A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?
   1) Rs. 1090 2) Rs. 1160 3) Rs. 1190 4) Rs. 1202
7. A sells an article which costs him Rs. 400 to B at a profit of 20%. B then sells it to C, making a profit of 10% on the price he paid to A. How much does C pay B?
   1) Rs. 472 2) Rs. 476 3) Rs. 528 4) Rs. 532
8. Peter purchased a machine for Rs.80,000 and spent Rs. 5000 on repair and Rs. 1000 on transport and solid it with 25% profit. At what price did he sell the machine?
   1) Rs. 1,05,100 2) Rs. 1,06,250 3) Rs. 1,17,500 4) None of these
9. By selling an article for Rs. 100, a man gains Rs. 15. Then, his gain% is
   1) 15% 2) $12\frac{2}{3}\%$ 3) $17\frac{11}{17}\%$ 4) $17\frac{1}{4}\%$
10. When a commodity is sold for Rs. 34.80, there is a loss of 2%. What is the cost price of the commodity?
    1) Rs. 26.10 2) 43 3) 43.20 4) 46.40
11. When a plot is sold for Rs. 18,700, the owner loses 15%. At what price must be plot be solid in order to gain 15%?
    1) Rs. 21,000 2) Rs. 22,500 3) Rs. 25,300 4) Rs. 25,800
12. If selling price of an article is $\frac{4}{3}$ of its cost price, the profit in the transaction is
    1) $16\frac{2}{3}\%$ 2) $20\frac{1}{2}\%$ 3) $25\frac{1}{2}\%$ 4) $33\frac{1}{3}\%$

13. The ratio of the cost price and the selling price is 4:5. The profit percent is
1) 10% 2) 20% 3) 25% 4) 30%

14. If selling price is doubled, the profit triples. Find the profit percent
1) $66\frac{2}{3}$ 2) 100 3) $105\frac{1}{3}$ 4) 120

15. By selling a pen for Rs. 15, a man loses one-sixteenth of what it costs him. The cost price of the pen is
1) Rs. 16 2) Rs. 18 3) Rs. 20 4) Rs. 21

16. By selling an article, Michael earned a profit equal to one-fourth of the price he bought it. If he solid it for Rs. 375, what was the cost price?
1) Rs. 281.75 2) Rs. 300 3) Rs. 312.50 4) Rs. 350

17. If loss is $\frac{1}{3}$ of S.P., the loss percentage is
1) $16\frac{2}{3}\%$ 2) 20% 3) 25% 4) $33\frac{1}{3}\%$

18. The cost price of 19 articles is equal to the selling price of 16 articles. Gain percent is
1) $3\frac{9}{17}\%$ 2) $15\frac{15}{19}\%$ 3) $18\frac{3}{4}\%$ 4) 20%

19. If the selling price of 50 articles is equal to the cost price of 40 articles, then the loss or gain percent is
1) 20% loss 2) 20% gain 3) 25% loss 4) 25% gain

20. A man sold 18 cots for Rs. 16,800, gaining thereby the cost price of 3 cots. The cost price of a cot is
1) Rs. 650 2) Rs. 700 3) Rs. 750 4) Rs. 800

21. C.P = Rs. 240, S.P = Rs 290, profit percent is
1) 22% 2) 24% 3) 20.833% 4) 21.833%

22. C.P. = Rs. 240, S.P. = Rs. 290, profit percent is
1) 22% 2) 24% 3) 20.833% 4) 21.833%

23. Rama Krishna purchased a scooter for Rs 17,000. Due to list in petrol costs he sold it for a loss of 155 What was his S.P. ?
1) Rs 14, 440 2) Rs 14,450 3) Rs 14,460 4) Rs 14, 470

24. A shop keeper purchased a gross of pencils for Rs 216 and sold each pencil for Rs 1.75. How much did he gain or lose ?
1) 35 2) 34 3) 36 4) 37

25. Subbu purchased a bicycle for Rs 1150. After using it for a year, he sold it for Rs 900. What was his percentage of gain or loss ?
1) 21.66% 2) 21.65% 3) 21.74% 4) 21.85%

26. A shopkeeper bought 500 eggs at Rs 4 per 10 eggs. Among them 20 eggs are found broken and 30 eggs spoiled. If he sold the remaining eggs at Rs 0.55 per egg, how much did he gain or lose ? Find its percentage.

1) 45.50, $22\frac{3}{4}\%$ 2) 47.50, $23\frac{3}{4}\%$

3) 46.50, $23\frac{3}{4}\%$ 4) 46.50, $23\frac{3}{4}\%$

27. Subba raju purchased a Cow for Rs 2,250. If he wants to gain 25%, what should be his selling price ?

1) 2,812 2) 2,812.33 3) 2,812.50 4) 2,812.95

28. A shopkeeper sold two books at Rs 15. Profit of one was 25% and loss on the second was 25%. How much did he gain or loss in percentage?

1) $\frac{24}{4}\%$ 2) $\frac{26}{4}\%$ 3) $\frac{25}{4}\%$ 4) $\frac{27}{4}\%$

KEY & HINTS

WORK SHEET (KEY)				
1) 2	2) 3	3) 2	4) 3	5) 1
6) 3	7) 3	8) 3	9) 3	10) 4
11) 3	12) 4	13) 3	14) 2	15) 1
16) 2	17) 3	18) 3	19) 1	20) 4
21) 4	22) 3	23) 2	24) 3	25) 3
26) 2	27) 3	28) 3		

1. $\text{Gain}\% = \left(\frac{0.70}{70}\times 100\right)\% = 1\%$

2. Profit = Rs. (2602.58 - 2090.42) = Rs. 512.16

$\text{Profit}\% = \left(\frac{512.16}{2090.42}\times 100\right)\% = \left(\frac{512160}{209042}\times 10\right)\% = 24.5\% \approx 25\%$

3. C.P. = Rs. (4700 + 800) = Rs. 5500; S.P. = Rs. 5800

Gain % $= \left(\frac{300}{5500} \times 100\right)\% = 5\frac{5}{11}\%$

4. C.P. of 1 kg = Rs. $\left(\frac{420}{70}\right) = Rs.6$. S.P. of 1 kg = Rs. 6.50

$\therefore$ Gain % $= \left(\frac{0.50}{6} \times 100\right)\% = \frac{25}{3}\% = 8\frac{1}{3}\%$

5. C.P. of 1 orange = Rs. $\left(\frac{350}{100}\right) = Rs.3.50.$

S.P. of 1 orange $= Rs.\left(\frac{48}{12}\right) = Rs.4$

$\therefore$ Gain% $= \left(\frac{0.50}{3.50} \times 100\right)\% = \frac{100}{7}\% = 14\frac{2}{7}\%$

6. S.P. = 85% of Rs. 1400 $= Rs.\left(\frac{85}{100} \times 1400\right) = Rs.1190$.

7. C.P. for 'B' = 120% of Rs. 400 = Rs. $\left(\frac{120}{100} \times 400\right) = Rs.480$

C.P. for C = 110% of Rs. 480 = $Rs.\left(\frac{110}{100} \times 480\right) = Rs.528$

8. C.P. = Rs. $(80000 + 5000 + 1000) = Rs.86000$, Profit = 25%

$\therefore$ S.P. $= 125\%$ of Rs. 86000 = Rs. $\left(\frac{125}{100} \times 86000\right) = Rs.107500$.

9. S.P. = Rs. 100, gain = Rs. 15
$\therefore$ C.P. = Rs. (100 - 15) = Rs. 85

Gain% $= \left(\frac{15}{85} \times 100\right)\% = \frac{300}{17}\% = 17\frac{11}{17}\%$

10. C.P. $= Rs.\left(\frac{100}{75} \times 34.80\right) = Rs.46.40$

11. $85 : 18700 = 115 : x$ or $x = \left(\frac{18700 \times 115}{85}\right) = 25300$

Hence, S.P. = Rs. 25,300

12. Let C.P.= Rs. x. Then, S.P. = Rs. $\frac{4x}{3}$. Gain = Rs. $\left(\frac{4x}{3} - x\right) = Rs.\frac{x}{3}$.

$\therefore$ Gain% $= \left(\frac{x}{3}\times\frac{1}{x}\times 100\right)\% = 33\frac{1}{3}\%$

13. Let C.P. = Rs. 4x. Then, S.P. = Rs. 5x. Gain Rs. (5x - 4x) = Rs. x

$\therefore$ Gain % $= \left(\frac{x}{4x}\times 100\right)\% = 25\%$

14. Let C.P. be Rs. x and S.P. be Rs. y. Then, $3(y-x) = (2y-x) \Rightarrow y = 2x$

Profit = Rs. $(y-x) = Rs.(2x-x) = Rs.x$

$\therefore$ Profit % $= \left(\frac{x}{x}\times 100\right)\% = 100\%$

15. Let the C.P. be Rs. x. Then, $x - 15 = \frac{x}{16} \Rightarrow x - \frac{x}{16} = 15 \Rightarrow \frac{15x}{16} = 15 \Rightarrow x = 16$

$\therefore$ C.P. = Rs. 16

16. S.P. = C.P. $= +\frac{1}{4}C.P. = \frac{5}{4}C.P.$

$\therefore \frac{5}{4}C.P. = 375 \Rightarrow C.P. = Rs.\left(375\times\frac{4}{5}\right) = Rs.300$

17. Let S.P. = Rs. x. Then, Loss = Rs. $\frac{x}{3}$. C.P. = Rs. $\left(x+\frac{x}{3}\right) = Rs.\frac{4x}{3}$

$\therefore$ Loss% $= \left(\frac{x}{3}\times\frac{3}{4x}\times 100\right)\% = 25\%$

18. Let C.P. of each article be Re. 1
Then, C.P. of 16 articles = Rs. 16; S.P. of 16 articles = Rs. 19

$\therefore$ Gain % $= \left(\frac{3}{16}\times 100\right)\% = 18\frac{3}{4}\%$

19. Let C.P. of each article be Re. 1
Then, C.P. of 50 articles = Rs. 50; S.P. of 50 articles = Rs. 40

$\therefore$ Loss % $= \left(\frac{10}{50}\times 100\right)\% = 20\%$

20. (S.P. of 18 cots) - (C.P. of 18 cots) = (C.P. of 3 cots)
$\Rightarrow$ C.P. of 21 cots = S.P. of 18 cots = Rs. 16800

$\Rightarrow$ C.P. of 1 cot = Rs. $\left(\frac{16800}{21}\right) = Rs.800$.

21. Loss = C.P. - S.P

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

23. Loss percent = 15% = $\frac{15}{100}$

Amount of loss = $\frac{15}{100} \times 17,000 = \text{Rs}\,2,550$

S.P. = C.P. – Loss

24. C.P. = Rs 216

S.P. = 144 × 1.75 = 252

S.P > C.P.

$\therefore$ Profit = S.P. – C.P.

25. C.P. = Rs 1150, S.P. = Rs 900,

S.P. < C.P.

$\therefore$ Loss % = $\frac{\text{Loss}}{\text{C.P.}} \times 100 = \frac{250}{1150} \times 100$.

26. C.P. = 50 × 4 = Rs 200

S.P. = 450 × 0.55 = 247.5

Profit = 47. 50

Profit% = $\frac{47.50}{200} \times 100 = 23\frac{3}{4}\%$.

27. C.P. = Rs 2,250, P% = 25%

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

$\Rightarrow$ Profit = 562.5

28. In this case always loss

Loss % = $\frac{25^2}{100} = \frac{25}{4} = 6\frac{1}{4}\%$.