CHAPTER 8

PROFIT & LOSS

INTRODUCTION

Cost Price

The amount paid to purchase an article or the price at which an article is made, is known as its cost price.
The cost price is abbreviated as C.P.

Selling Price

The price at which an article is sold, is known as its selling price.
The selling price is abbreviated as S.P.

Profit

If the selling price (S.P.) of an article is greater than the cost price (C.P.), then the difference between the selling price and cost price is called profit.
Thus, If S.P. > C.P., then

Profit = S.P. – C.P.

$\Rightarrow$ S.P. = C.P. + Profit

$\Rightarrow$ C.P. = S.P. – Profit.

Loss

If the selling price (S.P.) of an article is less than the cost price (C.P.), then the difference between the cost price (C.P.) and the selling price (S.P.) is called loss.
Thus, if S.P. < C.P., then

Loss = C.P. – S.P.

$\Rightarrow$ C.P. = S.P. + Loss

$\Rightarrow$ S.P. = C.P. – Loss

- Loss or gain is always considered on C.P.

Example ***1 :*** **An article was bought for ₹ 2000 and sold for ₹ 2200. Find the gain or loss.**

Solution :

C.P. of the article = ₹ 2000
S.P. of the article = ₹ 2200
Since S.P. > C.P. So, there is a gain.
Gain (profit) = S.P. – C.P.
= ₹ 2200 – ₹ 2000 = ₹ 200

Profit and Loss percentage

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

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

Remember

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

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

✧ $\text{S.P.} = \left(\frac{100 + \text{Profit\%}}{100}\right) \times \text{C.P.}$

✧ $\text{S.P.} = \left(\frac{100 - \text{Loss\%}}{100}\right) \times \text{C.P.}$

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

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

Example ***2 :*** **A cycle was purchased for ₹ 1600 and sold for ₹ 1400. Find the loss and loss %.**

Solution :

C.P. of the cycle = ₹ 1600
S.P. of the cycle = ₹ 1400
Since S.P < C.P. So there is a loss.
Loss = C.P. – S.P.
= ₹ 1600 – ₹ 1400 = ₹ 200

$$\text{Loss \%} = \frac{\text{Loss}}{\text{C.P.}} \times 100 = \frac{200}{1600} \times 100 = 12\frac{1}{2}\%$$

Example ***3 :*** **By selling a table for ₹ 330, a trader gains 10%. Find the cost price of the table.**

Solution :

S.P. = ₹ 330, Gain = 10%

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

$$= ₹\ \frac{100}{100+10} \times 330 = \frac{100}{110} \times 330 = ₹\ 300$$

Example ***4 :*** ***A*** **sells a bicycle to** ***B*** **at a profit of 20% and** ***B*** **sells it to** ***C*** **at a profit of 25%. If** ***C*** **pays ₹ 225 for it, what did** ***A*** **pay for it?**

Solution :

$$\text{C.P. of A} = 225 \times \frac{100}{100+20} \times \frac{100}{100+25}$$

$$= 225 \times \frac{100}{120} \times \frac{100}{125} = ₹\,150.$$

Example ***5 :*** **A mobile phone is sold for ₹ 5060 at a gain of 10%. What would have been the gain or loss percent if it had been sold for ₹ 4370?**

Solution :

S.P. = ₹ 5060, gain = 10%

$$\therefore \text{ C.P.} = \frac{5060 \times 100}{100+10} = ₹\,4600.$$

2nd S.P. = ₹ 4370

Since, S.P. < C.P. so there is a loss.

$$\therefore \text{ Loss \%} = \frac{(4600-4370)\times 100}{4600} = 5\%$$

Remember

If a man buys x items for ₹ y and sells z items for ₹ w, then the gain or loss percent made by him is $\left(\frac{xw}{zy}-1\right)\times 100\%$

Example ***6 :*** **Some articles were bought at 6 for ₹5 and sold at 5 for ₹6. Calculate the gain percent.**

Solution :

Suppose, number of articles bought = L.C.M of 6 and 5 = 30

$$\text{C.P of 30 articles} = ₹\left(\frac{5}{6}\times 30\right) = ₹25$$

$$\text{S.P. of 30 articles} = ₹\left(\frac{6}{5}\times 30\right) = ₹\,36$$

$$\text{Gain \%} = \left(\frac{11}{25}\times 100\right)\% = 44\%$$

Shortcut method :

Quantity	Price
6	5
5	6

$$\% \text{ profit} = \left(\frac{xw}{yz}-1\right)\times 100\%$$

$$= \left(\frac{6\times 6}{5\times 5}-1\right)\times 100\%$$

$$= \frac{11}{25}\times 100\% = 44\%$$

DISHONEST DEALING

If a trader professes to sell goods at cost price, but uses false weights to make profit, then

$$\boxed{\text{Gain \%} = \frac{\text{Error}}{\text{True value} - \text{Error}}\times 100}$$

$$\boxed{\frac{\text{True Scale}}{\text{False Scale}} = \frac{100+\text{gain\%}}{100-\text{loss\%}}}$$

A merchant uses y% less weight/length and sells his goods at gain/loss of x%. The overall % gain/loss is given by

$$\left[\left(\frac{y+x}{100-y}\right)\times 100\right]\%$$

Example ***7 :*** **A shopkeeper sells the goods at 44% loss on cost price but uses 30% less weight. What is his percentage profit or loss?**

Solution :

Given, $x = -44, y = 30$

$$\text{The overall \% gain/loss} = \left(\frac{30-44}{100-30}\times 100\right)\% = -20\%$$

which represents loss being a negative expression.

Example ***8 :*** **A cloth merchant says that due to slump in the market, he sells the cloth at 10% loss, but he uses a false metre-scale and actually gains 15%. Find the actual length of the scale.**

Solution :

$$\frac{\text{True scale}}{\text{False scale}} = \frac{100+\text{gain\%}}{100-\text{loss\%}}$$

$$\frac{100}{\text{False scale}} = \frac{100+15}{100-10}$$

$$\Rightarrow \quad \text{False scale} = \frac{100\times 90}{115} = 78.26\,\text{cm}$$

Example ***9 :*** **A dishonest dealer professes to sell his goods at cost price, but he uses a weight of 960 g for the 1 kg weight. Find his gain percent.**

Solution :

Error = 1 kg – 960 g

= 1000 g – 960 g = 40 g.

$$\therefore \quad \text{Gain \%} = \frac{40}{1000-40}\times 100 = \frac{40}{960}\times 100 = 4\frac{1}{6}\%$$

GOODS PASSING THROUGH SUCCESSIVE HANDS

When there are two successive profits of a% and b%, then the resultant profit percent is given by

$$\left(a+b+\frac{ab}{100}\right)\%$$

When there is a profit of a% and loss of b% in a transaction, then the resultant profit or loss percent is given by $\left(a-b-\frac{ab}{100}\right)\%$, according to the +ve or −ve sign respectively.

When cost price and selling price are reduced by the same amount (A) and profit increases then cost price (C.P.)

$$= \frac{[\text{Initial profit \%} + \text{Increase in profit \%}]\times A}{\text{Increase in profit \%}}$$

Example ***10 :*** **A table is sold at a profit of 20%. If the cost price and selling price are ₹ 200 less, the profit would be 8% more. Find the cost price.**

Solution :

By direct method,

$$\text{C.P.} = ₹\ \frac{(20+8)\times 200}{8} = ₹\ 28\times 25 = ₹\ 700.$$

Remember

✧ If cost price of x articles is equal to the selling price of y articles, then profit/loss percentage $= \frac{x-y}{y}\times 100\%$, according to +ve or –ve sign respectively.

Example ***11 :*** **If the C.P. of 15 tables be equal to the S.P. of 20 tables, find the loss percent.**

Solution :

By direct method,

$$\text{Profit/Loss\%} = \frac{-5}{20}\times 100 = -25\% \text{ (loss, since it is –ve.)}$$

Example ***12 :*** **If the C.P. of 6 articles is equal to the S.P. of 4 articles. Find the gain per cent.**

Solution :

Let C.P. of an article be ₹ x; then,

C.P. of 6 articles = ₹ 6x

C.P. of 4 articles = ₹ 4x

But S.P. of 4 articles = C.P. of 6 articles

$\therefore$ S.P. of 4 articles = 6x

Thus, gain = S.P – C.P. = ₹ (6x – 4x) = ₹ 2x

$$\therefore \quad \text{Gain \%} = \frac{2x}{4x}\times 100 = 50$$

Thus, gain in the transaction = 50%

Example ***13 :*** **By selling 33 metres of cloth, a man gains the sale price of 11 metres. Find the gain percent.**

Solution :

Gain = S.P. of 33 metres – C.P. of 33 metres

= S.P. of 11 metres

$\Rightarrow$ S.P. of 22 metres = C.P. of 33 metres

$$\therefore \text{ \% gain} = \frac{\text{gain}}{\text{C.P. of metres}}\times 100$$

$$= \frac{\text{S.P. of 11 metres}}{\text{C.P. of 33 metres}}\times 100$$

$$= \frac{\text{S.P. of 11 metres}}{\text{S.P. of 22 metres}}\times 100 = \frac{11}{22}\times 100 = 50\%$$

Shortcut method :

If on selling 'x' articles a man gains equal to the S.P. of y articles. Then,

$$\text{\% gain} = \frac{y}{x-y}\times 100 = \frac{11}{33-11}\times 100 = \frac{11}{22}\times 100 = 50\%$$

DISCOUNT

Marked Price

The price on the lable is called the marked price or list price. The marked price is abbreviated as M.P.

Discount

The reduction made on the 'marked price' of an article is called the discount.

NOTE :

When no discount is given, 'selling price' is the same as 'marked price'.

- Discount = Marked price × Rate of discount.
- S.P. = M.P. – Discount.
- $\text{Discount \%} = \frac{\text{Discount}}{\text{M.P.}}\times 100$.
- Buy x get y free i.e., if x + y articles are sold at cost price of x articles, then the percentage discount $= \frac{y}{x+y}\times 100$.

Example ***14 :*** **How much % must be added to the cost price of goods so that a profit of 20% must be made after throwing off a discount of 10% from the marked price?**

Solution :

Let C.P. = ₹ 100, then S.P. = ₹120

Also, Let marked price be ₹ x. Then

$$90\% \text{ of } x = 120 \Rightarrow x = \frac{120\times 100}{90} = 133\frac{1}{3}$$

$\therefore$ M.P. should be ₹ $133\frac{1}{3}$

or M.P. = $33\frac{1}{3}\%$ above C.P.

Example ***15 :*** **At a clearance sale, all goods are on sale at 45% discount. If I buy a skirt marked ₹ 600, how much would I need to pay?**

Solution :

M.P. = ₹ 600, Discount = 45%

$$\text{Discount} = \frac{\text{M.P.} \times \text{Discount\%}}{100} = \frac{600 \times 45}{100} = ₹270.$$

$\therefore$ S.P. = M.P. – Discount
= ₹ 600 – ₹ 270 = ₹ 330.

Hence, the amount I need to pay is ₹ 330.

Alternate method :

S.P = M.P × 0.55
= 600 × 0.55 = ₹330

Remember

✧ If two items are sold, each at ₹ x, one at a gain of p% and the other at a loss of p%, there is an overall loss given by $\frac{p^2}{100}$%.

Note that in such cases there is always a loss.

The absolute value of the loss is given by $\frac{2p^2x}{100^2 - p^2}$.

✧ If CP of two items is the same and % Loss and % Gain on the two items are equal, then net loss or net profit is zero.

Example ***16 :*** **A shopkeeper sold two radio sets for ₹ 792 each, gaining 10% on one, and losing 10% on the other. Calculate his overall gain on loss percent.**

Solution :

When selling price of two articles is same and
% gain = % loss
then there will always be a loss.

$$\text{and overall \% loss} = \frac{(10)^2}{100}\% = 1\%$$

Example ***17 :*** **A man bought two housing apartments for ₹ 2 lakhs each. He sold one at 20% loss and the other at 20% gain. Find his gain or loss.**

Solution :

When C.P. of two articles is same and
% gain = % loss
Then, on net, there is no loss, no gain

Remember

✧ If an article is sold at a price $S.P_1$.., then % gain or % loss is x and if it is sold at a price $S.P_2$... then % gain or % loss is y. If the cost price of the article is C.P., then

$$\frac{S.P_1}{100+x} = \frac{S.P_2}{100+y} = \frac{C.P.}{100} = \frac{S.P_1 - S.P_2}{x-y}$$

Where x or y is negative, it indicates a loss, otherwise it is positive.

Example ***18 :*** **By selling a radio for ₹ 1536, Ramesh lost 20%. What percent shall he gain or lose by selling it for ₹2000?**

Solution :

Given, $S.P_1 = 1536$, $x = -20$ (–ve sign indicates loss)
$S.P_2$ = ₹ 2000, y = ?
Using the formula,

$$\frac{S.P_1}{100+x} = \frac{S.P_2}{100+y}$$

$$\text{we get } \frac{1536}{100-20} = \frac{2000}{100+y}$$

$$\Rightarrow 100 + y = \frac{2000 \times 80}{1536} = 104\frac{1}{6}$$

$$\Rightarrow y = 4\frac{1}{6}\%$$

Thus, Ramesh has a gain of $4\frac{1}{6}$% by selling it for ₹ 2,000

Remember

✧ It A sells an article to B at a gain/loss of m% and B sells it to C at a gain/loss of n%. If C pays ₹ z for it to B then the cost price for A is $\left[\frac{100^2 z}{(100+m)(100+n)}\right]$.

Where m or n is negative, if it indicates a loss, otherwise it positive.

Example ***19 :*** **Mohit sells a bicycle to Rohit at a gain of 10% and Rohit again sells it to Jyoti at a profit of 5%. If Jyoti pays ₹462 to Rohit. What is the cost price of the bicycle for Mohit?**

Solution :

Given, $m = 10$, $n = 5$, z = ₹ 462

$$\text{Using the formula, } C.P. = \left[\frac{100^2 z}{(100+m)(100+n)}\right]$$

$$\text{we get } C.P. \text{ for Mohit} = \left[\frac{100^2 \times 462}{(100+10)(100+5)}\right] = 400$$

When two different articles are sold at same S.P., x and y are % gain (or loss) on them. Then overall % gain or loss

$$= \left[\frac{100(x+y) + 2xy}{(100+x)+(100+y)}\right]$$

The above expression represents overall gain or loss according to its sign.

Example ***20 :*** **A man sold two watches for ₹ 1000 each. On one he gains 25% and on the other 20% loss. Find how much % does he gain or loss in the whole transaction?**

Solution :

When $S_1 = S_2$, then overall % gain or % loss

$$= \left(\frac{100(x+y)+2xy}{(100+x)+(100+y)} \right)$$

$$= \left(\frac{100(25-20)+2\times 25\times -20}{(100+25)+(100-20)} \right)$$

$$= -\frac{100}{41}\% \text{ (loss, since it is –ve)}$$

Example ***21 :*** **After allowing a discount of 12% on the marked price of an article, it is sold for ₹880. Find its marked price.**

Solution :

S.P. = ₹ 880 and Discount % = 12

Let M.P. = x

$$\text{Discount} = \frac{\text{M.P.} \times \text{Discount \%}}{100} = \frac{x \times 12}{100} = \frac{3}{25}x$$

Now, M.P. = S.P. + Discount

$$x = 880 + \frac{3}{25}x$$

$$\Rightarrow \quad x - \frac{3}{25}x = 880 \quad \Rightarrow \quad \frac{22x}{25} = 880$$

$$\Rightarrow \quad x = \frac{880 \times 25}{22} = 40 \times 25 = ₹ 1000$$

$\therefore$ Marked price of the article is ₹ 1000.

Example ***22 :*** **A shopkeeper offers his customers 10% discount and still makes a profit of 26%. What is the actual cost to him of an article marked ₹280?**

Solution :

M.P. = ₹ 280 and Discount % = 10

$$\text{Discount} = \frac{\text{M.P.} \times \text{Discount \%}}{100} = \frac{280 \times 10}{100} = ₹ 28$$

S.P. = M.P. – Discount = ₹ 280 – ₹ 28 = ₹ 252

Now, S.P. = ₹ 252 and profit = 26%

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

$$= \frac{100}{100+26} \times 252 = ₹ 200$$

Hence, the actual cost of the article is ₹ 200.

SUCCESSIVE DISCOUNT

In successive discounts, first discount is subtracted from the marked price to get net price after the first discount. Taking this price as the new marked price, the second discount is calculated and it is subtracted from it to get net price after the second discount. Continuing in this manner, we finally obtain the net selling price.

In case of successive discounts a% and b%, the effective discount or single equivalent discount is $\left(a + b - \frac{ab}{100} \right)\%$

If three or more successive discounts on an article are a%, b%, c%,.... respectively, then a single discount equivalent to the successive discounts will be

$$\left[1 - \left(1 - \frac{a\%}{100}\right)\left(1 - \frac{b\%}{100}\right)\left(1 - \frac{c\%}{100}\right)\left(1 - \frac{d\%}{100}\right) \right]\%$$

Example ***23 :*** **Find the single discount equivalent to successive discounts of 15% and 20%.**

Solution :

By direct formula,

$$\text{Single discount} = \left(a + b - \frac{ab}{100} \right)\%$$

$$= \left(15 + 20 - \frac{15 \times 20}{100} \right)\% = 32\%$$

Example ***24 :*** **Find single equivalent discounts of successive discounts of 30%, 20%, 40% and 10%.**

Solution :

Single discount = [1– (1–0.30) × (1–0.20) × (1–0.40) × (1–0.10)×100] = 69.76%

Example ***25:*** **Find the S.P of an article whose M.P is ₹ 9988467 giving successive discounts of 50%, 40% and 10%.**

Solution :

Equivalent discount = [1– (.50×.60×.90)× 100] = 73%

$$\text{S.P} = 9988467 \times \frac{100-73}{100} = 2696886.09$$

Example ***26 :*** **If an article is marked at ₹1000000, and on purchasing a person gets discount of 30%, 30%, 20%, 10% and 10% successively. Find his over all discount percentage.**

Solution :

[1–(0.70×0.70×0.80×0.90×0.90)] × 100 = 68.24%

Example ***27 :*** **An article is listed at ₹65. A customer bought this article for ₹56.16 and got two successive discounts of which the first one is 10%. Calculate the other rate of discount of this scheme that was allowed by the shopkeeper?**

Solution :

Price of the article after first discount

65 – 6.5 = ₹ 58.5

Therefore, the second discount

$$= \frac{58.5 - 56.16}{58.5} \times 100 = 4\%$$

Example ***28 :*** **A shopkeeper offers 5% discount on all his goods to all his customers. He offers a further discount of 2% on the reduced price to those customers who pay cash. What will you actually have to pay for an article in cash if its M.P. is ₹ 4800?**

Solution :

M.P. = ₹ 4800

First discount = 5% of M.P.

$$= \frac{5}{100} \times 4800 = ₹240$$

Net price after discount = ₹ 4800 – ₹240

= ₹4560

Second discount = 2% of ₹ 4560

$$= \frac{2}{100} \times 4560 = ₹91.20$$

Net price after discount = ₹ 4560 – ₹91.20

= ₹4468.80

By Direct Method :

$$\text{S.P.} = 4800\left(1-\frac{5}{100}\right)\left(1-\frac{2}{100}\right) = ₹\ 4468.80$$

Remember

✧ A person buys two items for ₹ A and sells one at a loss of l% and other at a gain of g%. If each item was sold at the same price, then

(a) The cost price of the item sold at loss

$$= \frac{A(100+g\%)}{(100-l\%)+(100+g\%)}$$

(b) The cost price of the item sold at gain

$$= \frac{A(100-l\%)}{(100-l\%)+(100+g\%)}$$

Example ***29 :*** **Ramesh buys two books for ₹410 and sells one at a loss of 20% and the other at a gain of 25%. If both the books are sold at the same price. Find the cost price of two books.**

Solution :

Given, A = 410

$$\text{Cost price of the book sold at loss} = \frac{(410)(100+25)}{(100-20)+(100+25)}$$

$$= \frac{410 \times 125}{80+125} = ₹250$$

Cost price of the book sold at profit

$$= \frac{(410)(100-20)}{(100-20)+(100+25)}$$

$$= \frac{410 \times 80}{80+125} = ₹160$$

EXERCISE

1. A trader wants 10% profit on the selling price of a product whereas his expenses amount to 15% on sales. What should be his rate of mark up on an article costing ₹ 9?

(a) 20% (b) $66\frac{2}{3}\%$

(c) 30% (d) $\frac{100}{3}\%$

2. A man sold 10 eggs for 5 rupees and gained 20%.How many eggs did he buy for 5 rupees?

(a) 10 eggs (b) 12 eggs

(c) 14 eggs (d) 16 eggs

3. A grocer purchased 80 kg of sugar at ₹ 13.50 per kg and mixed it with 120 kg sugar at ₹ 16 per kg. At what rate should he sell the mixture to gain 16%?

(a) ₹ 17 per kg (b) ₹ 17.40 per kg

(c) ₹ 16.5 per kg (d) ₹ 16 per kg

4. A shopkeeper purchased 150 identical pieces of calculators at the rate of ₹ 250 each. He spent an amount of ₹ 2500 on transport and packing. He fixed the labelled price of each calculator at ₹ 320. However, he decided to give a discount of 5% on the labelled price. What is the percentage profit earned by him?

(a) 14% (b) 15% (c) 16% (d) 20%

5. A dishonest dealer sells his goods at the cost price but still earns a profit of 25% by underweighing. What weight does he use for a kg?

(a) 750 g (b) 800 g (c) 825 g (d) 850 g

6. A businessman, while selling 20 articles loses the cost price of 5 articles. Had he purchased the 20 articles for 25% less and sold them for $33\frac{1}{3}\%$ more than the original selling price, what is his gain?

(a) 5% (b) 75% (c) $33\frac{1}{3}\%$ (d) 45%

7. By selling 66 metres of cloth a person gains the cost price of 22 metres. Find the gain percent.

(a) 22% (b) $22\frac{1}{2}\%$ (c) 33% (d) $33\frac{1}{3}\%$

8. A dairy man pays ₹ 6.40 per litres of milk. He adds water and sells the mixture at ₹ 8 per litres, there by making 37.5% profit. The proportion of water to milk received by the customers is

(a) 1:10 (b) 1:12 (c) 1:15 (d) 1:20

9. A single discount equal to a discount series of 10% and 20% is

(a) 25% (b) 28% (c) 30% (d) 35%

10. A trader marks his goods at such a price that he can deduct 15% for cash and yet make 20% profit. Find the marked price of an item which costs him ₹ 90.

(a) $₹\ 135\frac{11}{13}$ (b) $₹\ 105\frac{3}{21}$

(c) $₹\ 127\frac{1}{17}$ (d) $₹\ 95\frac{1}{21}$

11. A wholesaler sells 30 pens at the price of 27 pens to a retailer. The retailer sells the pens at their market price. The profit for the retailer is

(a) 11% (b) 10% (c) $11\frac{1}{9}\%$ (d) $9\frac{1}{11}\%$

12. By selling an umbrella for ₹ 30, a merchant gains 20%. During a clearance sale, the merchant allows a discount of 10% off the marked price (the price at which he used to sell). Find his gain per cent.

(a) 6% (b) 7% (c) 8% (d) 9%

13. A manufacturer sells goods to an agent at a profit of 20%. The agent's wholesale price to a shopkeeper is at a profit of 10% and the shopkeeper retails his goods at a profit of 12%. Find the retailer's price of an article which had cost the manufacturer ₹ 25.

(a) ₹ 37 (b) ₹ 40 (c) ₹ 44 (d) ₹ 46

14. A business man sells lot of shirts at a profit of $12\frac{1}{2}\%$ and invests the proceeds to buy lot of pants, which he sells at a profit of 20%. If he makes a net profit of ₹ 2700, the cost of the shirts was

(a) ₹ 2450 (b) ₹ 2225 (c) ₹ 2000 (d) ₹ 1880

15. A shopkeeper buys 50 dozen eggs at ₹ 4 per dozen. Out of them, 40 eggs were found broken. At what rate should he sell the remaining eggs per dozen so as to gain 5% on the whole?

(a) ₹ 4 (b) ₹ 4.25 (c) ₹ 4.50 (d) ₹ 5.25

16. A person sells his table at a profit of $12\frac{1}{2}\%$ and the other hand if he sells the table at a loss of $8\frac{1}{3}\%$ but on the whole he gains ₹ 25. On the other hand if he sells the table at a loss of $8\frac{1}{3}\%$ and the chair at a profit of $12\frac{1}{2}\%$ then he neither gains nor loses. Find the cost price of the table.

(a) ₹ 120 (b) ₹ 360 (c) ₹ 240 (d) ₹ 230

17. On the eve of Gandhi Jayanti, Gandhi Ashram declared a 25% discount on silk. If selling price of a silk saree is ₹ 525, what is its marked price?

(a) ₹ 700 (b) ₹ 725 (c) ₹ 750 (d) ₹ 775

18. A shopkeeper marks an article at a price which gives a profit of 25%. After allowing certain discount, the profit reduces to $12\frac{1}{2}\%$. The discount percent is
(a) 12% (b) 12.5% (c) 10% (d) 20%

19. A CD was sold at a profit of $12\frac{1}{2}\%$. If it had been sold at a profit of 15%, it would have gained him ₹ 10 more. The cost price of CD (in ₹) is
(a) 450 (b) 500 (c) 400 (d) 550

20. A trader has a weighing balance that shows 1,200 gm for a kilogram. He further marks up his cost price by 10%. Then the net profit percentage is
(a) 32% (b) 23% (c) 31.75% (d) 23.5%

21. A shopkeeper allows 10% discount on goods when he sells without credit. Cost price of his goods is 80% of his selling price. If he sells his goods by cash, then his profit is
(a) 50% (b) 70%
(c) 25% (d) 40%

22. Ram bought a T.V. with 20% discount on the labelled price. Had he bought it with 30% discount he would have saved ₹ 800. The value of the T.V. set that he bought is
(a) ₹ 5,000 (b) ₹ 8,000
(c) ₹ 9,000 (d) ₹ 10,000

23. A trader who marks his goods up to 50% offered a discount of 20%. What % profit the trader makes after offering the payment?
(a) 30% (b) 70%
(c) 20% (d) 50%

24. A retailer buys a sewing machine at a discount of 15% and sells it for ₹ 1955. Thus he makes a profit of 15%. The discount is
(a) ₹ 270 (b) ₹ 290
(c) ₹ 300 (d) ₹ 310

25. A tea-merchant professes to sell tea at cost price but uses a false weight of 900 gram for a kilogram. The profit percent in his transaction is
(a) $11\frac{1}{9}\%$ (b) 10%
(c) $9\frac{1}{11}\%$ (d) 15%

26. Mahesh earned a profit of 20% by selling 60 apples at the rate of ₹ 42.50 for 5 apples. Then the total cost, at which the apples were bought is
(a) ₹ 452 (b) ₹ 425
(c) ₹ 450 (d) ₹ 485

27. The ratio between the sale price and the cost price of an article is 7 : 5. What is the ratio between the profit and the cost price of that article?
(a) 2 : 7 (b) 5 : 2
(c) 7 : 9 (d) None of these

28. The ratio of selling price of 3 articles A, B and C is 8 : 9 : 5 and the ratio of percentage profit is 8 : 7 : 14 respectively. If the profit percentage of A is 14.28% and the cost price of B is ₹ 400, what is the overall percentage gain ?
(a) 14.28% (b) 17.87%
(c) 16.66% (d) None of these

29. There are fifty successive percentage discounts given in a series of 2%, 4%, 6%, 8%...and so on. What is the net discount?
(a) 98% (b) 2550%
(c) 100% (d) Infinite

30. A firm of readymade garments makes both men's and women's shirts. Its average profit is 6% of the sales. Its profit in men's shirts average 8% of the sales and women's shirts comprise 60% of the output. The average profit per sale rupee in women shirts is
(a) 0.0466 (b) 0.0666
(c) 0.0166 (d) None of these

31. A man purchases two watches at ₹ 560. He sells one at 15% profit and other at 10% loss. Then he neither gains nor loses. Find the cost price of each watch.
(a) ₹ 224, ₹ 300 (b) ₹ 200, ₹ 300
(c) ₹ 224, ₹ 336 (d) ₹ 200, ₹ 336

32. Two electronic musical instruments were purchased for ₹ 8000. The first was sold at a profit of 40% and the second at loss of 40%. If the sale price was the same in both the cases, what was the cost price of two electronic musical instruments ?
(a) ₹ 2000, ₹ 6000 (b) ₹ 2200, ₹ 5800
(c) ₹ 2400, ₹ 5000 (d) ₹ 2400, ₹ 5600

33. A man sells an article at 5% profit. If he had bought it at 5% less and sold it for ₹1 less, he would have gained 10%. The cost price of the article is
(a) ₹ 200 (b) ₹ 150 (c) ₹ 240 (d) ₹ 280

34. The cost price of four articles *A*, *B*, *C* and *D* are '*a*', '*b*', '*c*' and '*d*' respectively. *A*, *B*, *C* and *D* are sold at profits of 10%, 20%, 30% and 40% respectively. If the net profit on the sale of these four articles is 25%, '*a*', '*b*', '*c*' and '*d*' cannot be in the ratio
(a) 4 : 1 : 4 : 3 (b) 1 : 2 : 2 : 1
(c) 2 : 3 : 6 : 1 (d) 5 : 2 : 7 : 3

35. A shopkeeper purchased a table marked at ₹ 200 at successive discount of 10% and 15% respectively. He spent ₹ 7 on transportation and sold the table for ₹ 200. Find his gain %?
(a) No loss or gain (b) 25%
(c) 30% (d) 40%

36. A manufacturer sells a pair of glasses to a wholesale dealer at a profit of 18%. The wholesaler sells the same to a retailer at a profit of 20%. The retailer in turn sells them to a customer for ₹30.09 there by earning a profit of 25%. The cost price of the manufacturer is
(a) ₹ 15 (b) ₹ 16 (c) ₹ 17 (d) ₹ 18

37. A video magazine distributor made 3500 copies of the March issue of the magazine at a cost of ₹ 3,50,000. He gave 500 cassettes free to some key video libraries. He also allowed a

25% discount on the market price of the cassettes and gave one extra cassette free with every 29 cassettes bought at a time. In this manner, he was able to sell all the 3500 cassettes that were produced. If the market price of a cassette was ₹ 150, then what is his gain or loss percent for the March issue of the video magazine?

(a) 3.4% loss (b) 15% gain
(c) 40% gain (d) 6.8% loss

38. If Sohan, while selling two goats at the same price, makes a profit of 10% on one goat and suffers a loss of 10% on the other. Then
(a) he makes no profit and no loss.
(b) he makes a profit of 1%.
(c) he suffers a loss of 1%.
(d) he suffers a loss of 2%.

39. A trader marks 10% higher than the cost price. He gives a discount of 10% on the marked price. In this kind of sales how much percent does the trader gain or loss?
(a) 5% gain (b) 2% gain
(c) 1% loss (d) 3% loss

40. A fruit-seller buys lemons at 2 for a rupee and sells them at 5 for three rupees. What is his gain percent?
(a) 10% (b) 15%
(c) 20% (d) 25%

41. A man sold two watches, each for ₹ 495. If he gained 10% on one watch and suffered a loss of 10% on the other, then what is the loss or gain percentage in the transaction?
(a) 1% gain (b) 1% loss
(c) $\frac{100}{99}\%$ loss (d) No gain no loss

42. A person sold an article for ₹ 136 and got 15% loss. Had he sold it for ₹ x, he would have got a profit of 15%. Which one of the following is correct?
(a) $190 < x < 200$ (b) $180 < x < 190$
(c) $170 < x < 180$ (d) $160 < x < 170$

43. The cost of two articles are in the ratio 3 : 5. If there is 30% loss on the first article and 20% gain on the second article, what is overall percentage of loss or gain?
(a) 2.25% gain (b) 5.25% loss
(c) 2% loss (d) None of these

44. A person bought 8 quintal of rice for certain rupees. After a week, he sold 3 quintal of rice at 10% profit, 3 quintal of rice with neither profit nor loss and 2 quintal at 5% loss. In this transaction, what is the profit?
(a) 10% (b) 20%
(c) 25% (d) None of these

45. A man buys a television set which lists for ₹ 5000 at 10% discount. He gets an additional 2% discount (after the first discount) for paying cash. What does he actually pay for the set?
(a) ₹ 4410 (b) ₹ 4400
(c) ₹ 4000 (d) ₹ 4500

46. A merchant earns a profit of 20% by selling a basket containing 80 apples which cost is ₹ 240 but he gives one-fourth of it to his friend at cost price and sells the remaining apples. In order to earn the same profit, at what price must he sell each apple?
(a) ₹ 3.00 (b) ₹ 3.60
(c) ₹ 3.80 (d) ₹ 4.80

47. A cloth store is offering buy 3, get 1 free. What is the net percentage discount being offered by the store?
(a) 20% (b) 25%
(c) 30% (d) $33\frac{1}{3}\%$

48. Two lots of onions with equal quantity, one costing ₹ 10 per kg and the other costing ₹15 per kg, are mixed together and whole lot is sold at ₹ 15 per kg. What is the profit or loss?
(a) 10% loss (b) 10% profit
(c) 20% profit (d) 20% loss

49. A person selling an article for ₹ 96 finds that his loss per cent is one — fourth of the amount of rupees that he paid for the article. What can be the cost price? **(CDS)**
(a) Only ₹160 (b) Only ₹ 240
(c) Either ₹ 160 or ₹ 240 (d) Neither ₹ 160 nor ₹ 240

50. A shopkeeper sells his articles at their cost price but uses a faulty balance which reads 1000*g* for 800*g*. What is his actual profit percentage? **(CDS)**
(a) 25% (b) 20%
(c) 40% (d) 30%

51. *A* man buys 200 oranges for ₹ 1000. How many oranges for ₹ 100 can be sold, so that his profit percentage is 25%? **(CDS)**
(a) 10 (b) 14
(c) 16 (d) 20

52. A cloth merchant buys cloth from a weaver and cheats him by using a scale which is 10 cm longer than a normal metre scale. He claims to sell cloth at the cost price to his customers, but while selling uses a scale which is 10 cm shorter than a normal metre scale. What is his gain? **(CDS)**
(a) 20% (b) 21%
(c) $22\frac{2}{9}\%$ (d) $23\frac{1}{3}\%$

53. A milkman claims to sell milk at its cost price only. Still he is making a profit of 20% since he has mixed some amount of water in the milk. What is the percentage of milk in the mixture? **(CDS)**
(a) $\frac{200}{3}\%$ (b) 75%
(c) 80% (d) $\frac{250}{3}\%$

HINTS & SOLUTIONS

1. (d) Let the SP of the article be ₹ x
Expenses = 15% of x = ₹ $0.15x$
Profit = 10% of x = ₹ $0.10x$
CP = ₹ 9 (given)
Therefore, $9 + 0.15x + 0.1x = x \Rightarrow x = 12$

$\therefore$ % increase for marked price $= \frac{12-9}{9} \times 100$

$= \frac{100}{3}\%$

2. (b) S.P. for 1 egg = ₹ $\frac{5}{10}$ = ₹ $\frac{1}{2}$

$\therefore$ C. P. for 1 egg $= \frac{100}{(100+20)} \times \frac{1}{2} =$ ₹ $\frac{5}{12}$

$\Rightarrow$ He bought 12 eggs for 5 rupees.

3. (b) C.P. of 200 kg of mixture = ₹ $(80 \times 13.50 + 120 \times 16)$
= ₹ 3000.

S.P. = 116% of ₹ 3000 = ₹ $\left(\frac{116}{100} \times 3000\right)$ = ₹ 3480.

$\therefore$ Rate of S.P. of the mixture = ₹ $\left(\frac{3480}{200}\right)$ per kg

= ₹ 17.40 per kg.

4. (a) C.P. of 150 calculators
$= 150 \times 250 + 2500 = 37500 + 2500 =$ ₹ 40000
Labelled price of 150 calculators $= 150 \times 320 =$ ₹ 48000
Discount allowed = 5%
$\therefore$ S.P. of 150 calculators
= 48000 – 5% of 48000 = ₹ 45600

$\therefore$ Profit % $= \frac{5600}{40000} \times 100 = 14$

5. (b) $\frac{\text{True weight}}{\text{False weight}} = \frac{100 + \text{gain}\%}{100 + x}$
Here S.P. = C. P. $\therefore x = 0$

$\Rightarrow$ False weight $= \frac{1000 \times 100}{125} = 800$ g

6. (c) Let the price of 1 article = ₹ 1
$\Rightarrow$ Loss = 20 C.P – 20 S.P.
$\Rightarrow$ 5C.P. = 20 C.P. – 20 S.P. $\Rightarrow$ 20 S.P = 15 C.P
$\Rightarrow$ CP_1 of 20 articles = ₹ 20
$\Rightarrow$ SP_1 of 20 articles = ₹ 15
Also given that, he had purchased the 20 articles for 25% less and sold them for $33\frac{1}{3}$% more, then
$\Rightarrow$ CP_2 of 20 articles = ₹ 15
$\Rightarrow$ SP_2 of 20 articles = ₹ 20

$\therefore$ Gain percentage $= \frac{20-15}{15} \times 100 = 33\frac{1}{3}\%$

7. (d) Let C.P. of one metre of cloth = ₹ 1
then C.P. of 66 metres of cloth = ₹ 66
Gain = C.P. of 22 metres = ₹ 22

% gain $= \frac{22}{66} \times 100 = 33\frac{1}{3}\%$

Shortcut method :
If on selling 'x' articles, a man gains equal to the C.P. of 'y' articles, then % gain $= \frac{y}{x} \times 100$

$\therefore$ % gain $= \frac{22}{66} \times 100 = 33\frac{1}{3}\%$

8. (a) Mean cost price = ₹ $\left(\frac{100}{137.5} \times 8\right)$ = ₹ $\frac{64}{11}$ using alligation rule.

c.p of 1 litre water ₹0 — c.p of 1 litre milk 6.40

$\frac{64}{11}$

$\frac{64}{110}$ — $\frac{64}{11}$

Required ratio $= \frac{64}{110} = \frac{64}{11} = 1 : 10$

9. (b) Equivalent discount $= 10 + 20 - \frac{10 \times 20}{100}$
$= 30 - 2 = 28\%$

10. (c) SP $= 90 \times 1.2 =$ ₹108

Marked price $= \frac{108}{0.85} =$ ₹ 127.05 = ₹ $127\frac{1}{17}$

11. (c) Retailer's S.P. = M.P.
Retailer's C.P. for 30 Pens = M.P. of 27 pens
$\therefore$ Retailer's S.P. for 30 pens = M.P of 30 pens

$\therefore$ % gain $= \frac{30-27}{27} \times 100 = \frac{100}{9} = 11\frac{1}{9}\%$

12. (c) $(100+g_1):S_1::(100+g_2):S_2$

$(100+20):30::(100+g_2):30\left(1-\frac{10}{100}\right)$

[$\because$ 10% discount is allowed on S.P.]

$120:30::(100+g_2):27$

$100+g_2=\frac{120\times27}{30}=108$

$\Rightarrow g_2=8\%$

13. (a) Retailer's price = 112 % of 110% of (120 % of 25)

$=\frac{112}{100}\times\frac{110}{100}\times\frac{120}{100}\times25=₹\ 36.96\approx₹\ 37$

14. (c) Let C.P. = ₹ x

$120\%\text{ of}\left(\frac{225}{2}\%\text{ of x}\right)=2700$

$\Rightarrow\frac{120}{100}\times\frac{225}{2\times100}\times x=2700\Rightarrow x=2000$

15. (c) C.P. $=50\times4=₹\ 200$

Remaining eggs $=600-40=560$

Let S.P. of eggs = ₹ x per dozen

$\therefore$ Total S.P. = ₹ $\frac{560}{12}x$

$\therefore\ \frac{560}{12}x=\frac{(100+5)\%}{100}\times200$

$\Rightarrow x=\frac{105}{100}\times\frac{2400}{560}=₹\ 4.5$ per dozen

16. (b) Suppose the cost price of table = ₹ T and cost price of a chair = ₹ C.

Then; $12\frac{1}{2}\%$ of $T+\left(-8\frac{1}{3}\%\right)$ of $C=25$

and $\left(-8\frac{1}{3}\%\right)$ or $T+12\frac{1}{2}\%$ of $C=0$

or, $\frac{25}{2}T-\frac{25}{3}C=2500$ .....(1)

$-\frac{25}{3}T+\frac{25}{2}C=0$ .....(2)

(1) $\div 2+$ (2) $\div 3$ gives $\frac{25}{4}T-\frac{25}{9}T=1250$

or, $T\left[\frac{225-100}{36}\right]=1250$

$\therefore\ T=360\ \therefore$ Price of a table = ₹ 360

17. (a) Let the marked price be ₹ x.

$\because$ S.P. $=(x-25\%\text{ of }x)=\frac{3}{4}x$

But, S.P = ₹ 525

$\therefore\ \frac{3}{4}x=525\Rightarrow x=700$

18. (c) **Shortcut method :**

$\text{Net profit}=\text{Profit}+\text{Discount}+\frac{\text{Profit}\times\text{Discount}}{100}$

$\frac{25}{2}=25-\text{Discount}-\frac{25\times\text{Discount}}{100}$

('–' to represent discount)

$\frac{25}{2}-25=\frac{-5}{4}$ Discount

$\therefore$ Discount % = 10%

19. (c) **Ist case :**

$\text{S.P}=\frac{100+\text{Profit\%}}{100}\times\text{C.P.}\Rightarrow\text{S.P.}=\frac{100+\frac{25}{2}\times\text{C.P}}{100}$

$\Rightarrow$ S.P $=\frac{112.5}{100}$CP ...(1)

IInd case :

$\text{S.P}=\frac{100+\text{Profit }\%}{100}\times\text{C.P.}\Rightarrow(\text{S.P}+10)=\frac{100+15}{100}\times\text{C.P.}$

$\Rightarrow$ (S.P+10) $=\frac{115}{100}$C.P ...(2)

Dividing equation (1) by (2)

$\frac{\text{S.P}}{\text{S.P}+10}=\frac{112.5}{100}(\text{C.P})\times\frac{100}{115(\text{C.P})}$

$\text{S.P}=\left(\frac{112.5}{115}\right)(\text{S.P}+10)$

115 S.P = 112.5 SP + 1125

S.P = 450

$\therefore\ \text{C.P}=\frac{\text{S.P}\times100}{112.5}=\frac{450\times100}{112.5}=400$

20. (a) The trader professes to sell 1200 kg but sells only 1000 kg.

So profit = 20%

Markup = 10%

$\text{Total profit}=10+20+\frac{10\times20}{100}=32\%$

21. (c) Let marked price of goods be ₹ 100.

Selling price of goods $=100-\frac{10}{100}\times100=₹90$

Cost price of goods is 80% of its selling price

C.P. $=\frac{80}{100}\times90=72$

Profit on goods $=(90-72)=₹\ 18$

Profit % $=\frac{18}{72}\times100=25\%$

22. (b) Let labelled price of T.V. be ₹ x

Price after 20% discount, $x-\frac{20}{100}x=0.8x$

Price after 30% discount, $x-\frac{30}{100}x=0.7x$

According to question

$0.8x-0.7x=800$

$x=800\times10=8000$

23. (c) Let cost price of good be 100
Trades mark up at 50% more i.e. 150

$$\text{Selling price of goods} = 150 - \frac{20}{100} \times 150 = 120$$

$$\text{Profit } \% = \frac{120-100}{100} \times 100 = 20$$

24. (c) Let original price of sewing machine be ₹ x

$$\text{Retailer sought it at } x - \frac{15}{100}x = 0.85x$$

$$0.85x + \frac{15}{100} \times 0.85x = 1955$$

$$1.15 \times 0.85x = 1955$$

$$x = \frac{1955 \times 10000}{115 \times 85} = 2000$$

$$\text{Discount is } \frac{15}{100} \times 200 = ₹\ 300$$

25. (a) $\text{Profit } \% = \frac{1000-900}{900} \times 100 = 11\frac{1}{9}\%$

26. (b) Selling price of 5 apples = ₹ 42.50

$$\text{Selling price of 60 apples} = \frac{42.5}{5} \times 60 = 510$$

C.P + Profit = S.P

$$\text{C.P} + \frac{20}{100} \times \text{C.P} = 510$$

$$\text{C.P} = \frac{510}{120} \times 100 = ₹425$$

27. (d) Let C.P. = ₹ 5x and S.P. = ₹ 7x. Then, Gain = ₹ 2x
∴ Required ratio 2x : 5x = 2 : 5

28. (d)

A		B		C
$\frac{1}{7}$ (8 ↑, 7 ↓) $\frac{1}{8}$	:	$\frac{1}{8}$ (9 ↑, 8 ↓) $\frac{1}{9}$	:	$\frac{1}{4}$ (5 ↑, 4 ↓) $\frac{1}{5}$

Since $14.28\% = \frac{1}{7}$

So, the ratio of profit percentage of

A		B		C	
8	:	7	:	14	(Given)
↓		↓		↓	
$\frac{1}{7}$		$\frac{1}{8}$		$\frac{1}{4}$	

Thus the ratio of CP of A : B : C
7 : 8 : 4

$$\text{Therefore \% profit} = \frac{(8+9+5)-(7+8+4)}{(7+8+4)} \times 100$$

$$= \frac{3}{19} \times 100 = 15.78\%$$

29. (c) Let MP = ₹ 100
CP after 1st discount = ₹ 98
CP after 2nd discunt = ₹ 94.08
But discount cannot be more than 100%

30. (a) Women's shirt comprise 60% of the output.
∴ Men's shirts comprise (100 – 60) = 40% of the output.
∴ Average profit from men's shirt = 8% of 40
= 3.2 out of 40
Overall average profit = 6 out of 100
∴ Average profit from women's shirts = 2.8 out of 60
i.e. 0.0466 out of each shirt.

31. (c) Here, in whole transaction, there is neither gains nor loss, therefore,
Amount of gain in one watch
= Amount of loss in other watch

$$\Rightarrow 0.15 \times CP_1 = 0.10 \times CP_2$$

$$\Rightarrow \frac{CP_1}{CP_2} = \frac{0.10}{0.15} = \frac{2}{3}$$

Also $CP_1 + CP_2 = 560$

$$\therefore CP_1 = \frac{2}{(2+3)} \times 560 = ₹\ 224$$

and $CP_2 = 560 - 224 = ₹\ 336$

32. (d) Here, $SP_1 = SP_2$

$$\Rightarrow 140\, CP_1 = 60\, CP_2 \Rightarrow \frac{CP_1}{CP_2} = \frac{6}{14} = \frac{3}{7}$$

$$\therefore CP_1 = \frac{3}{(3+7)} \times 8000 = ₹\ 2400$$

and $CP_2 = 8000 - 2400 = ₹\ 5600$

33. (a) Let the CP of the article be ₹ x.

$$\text{Then, SP} = ₹\ \frac{105x}{100}$$

$$\text{Now, new CP} = ₹\ \frac{95x}{100} \text{ and new SP} = \frac{105x}{100} - 1$$

According to the question

$$\frac{105x}{100} - 1 - \frac{95x}{100} = \frac{10 \times 95x}{100 \times 100}$$

$$\therefore x = ₹\ 200$$

34. (d) As per the information given in the question, we can conclude that

$$\frac{0.1a + 0.2b + 0.3c + 0.4d}{a+b+c+d} = 0.25$$

$$\Rightarrow 0.05c + 0.15d = 0.05b + 0.15a$$

$$\Rightarrow c + 3d = b + 3a$$

The ratio 5 : 2 : 7 : 3 does not satisfy the given relation.

35. (b) $\text{C.P.} = 200\left(1 - \frac{10}{100}\right)\left(1 - \frac{15}{100}\right) + 7$

$$= \frac{200 \times 90 \times 85}{100 \times 100} + 7 = ₹153 + 7 = ₹\ 160$$

$$\therefore \text{ \% gain} = \frac{200-160}{160} \times 100 = \frac{40}{160} \times 100 = 25\%$$

36. (c) Let the C.P. for the manufacturer be ₹ 100.
Then, C.P. for the wholesaler = ₹ 118
C.P. for the retailer = 118 + 20% of 118 = ₹ 141.60

C.P. for the customer $= 141.60 + 141.60 \times \frac{25}{100} = ₹177$

$\therefore$ If the C.P. for the customer is ₹ 177, then the C.P. for the manufacturer is ₹ 100.

If the C.P. for the customer is ₹ 30.09, then the C.P. for manufacturer is $\frac{100}{177} \times 30.09 = ₹17$

37. (d) CP of 3500 cassettes = ₹ 3,50,000

SP of each set of 30 (29 + 1) cassettes

$= ₹29 \times 150 \times \frac{75}{100}$

$= ₹29 \times 112.50 = ₹3262.50$

$\therefore$ SP of 3500 cassettes including 500 free cassettes = $3262.50 \times 100 = ₹3,26,250$

Over all loss = ₹ 3,50,000 – ₹ 3,26,250 = ₹ 23750

$\therefore$ % loss $= \frac{23750}{350000} \times 100 = 6.8$

38. (c) Let C.P of 1st goat is ₹100.

$\therefore$ S.P. of 1st goat is ₹110 (10% profit)

$\therefore$ S.P. of 2nd goat is ₹110 (Same S.P.)

$\therefore$ C.P. of 2nd goat $= \frac{100}{90} \times 110$ (10% loss)

$= \frac{1100}{9}$

$\therefore$ Total C.P. $= 100 + \frac{1100}{9} = \frac{2000}{9}$

Total S.P. $= 2 \times 110 = 220$

$\therefore$ Loss % $= \frac{\left(\frac{2000}{9} - 220\right) \times 100}{\frac{2000}{9}} = \frac{\frac{20}{9}}{\frac{2000}{9}} \times 100 = 1\%$

loss

Shortcut method: Loss %

$= \left(\frac{\text{common gain and loss\%}}{10}\right)^2 = \frac{100}{100} = 1\%$

39. (c) Let cost price = ₹ x

Marked price $= \frac{x \times 110}{100} = ₹ \frac{11x}{10}$

$\therefore$ SP $= \frac{11x}{10} \times \frac{90}{100} = \frac{99x}{100}$

$\therefore$ Loss percent $= \frac{\frac{99x}{100} - x}{x} \times 100 = -1\%$

('–' sign shows loss.)

40. (c) ₹ 1 = 2 lemons × CP

₹ 1 = $\frac{5}{3}$ lemons × SP

$\Rightarrow$ 2 × CP = $\frac{5}{3}$ × SP

$\Rightarrow$ 6 CP = 5 SP

$\Rightarrow$ $\frac{SP}{CP} = \frac{6}{5}$ (Here SP > CP, then profit)

Both sides substract 1

$\frac{SP - CP}{CP} = \frac{1}{5}$

Profit percent $= \frac{1}{5} \times 100 = 20\%$

41. (b) Loss/gain percent $= \left(10 - 10 - \frac{10 \times 10}{100}\right)\% = -1\%$

('–' sign indicate that there is a loss of 1%)

42. (b) Cost Price $= \frac{\text{Selling price}}{1 - \frac{\text{Loss\%}}{100}} = \frac{136}{1 - \frac{15}{100}}$

$= \frac{136 \times 100}{85} = ₹ 160$

Selling price (x) $= \frac{160 \times (100 + 15)}{100} = \frac{160 \times 115}{100}$

$= ₹ 184$

$\therefore$ Hence, option (b) is correct because $180 < x < 190$.

43. (d) Let the CP of two articles be 3x and 5x, respectively.

$\therefore$ SP of first article $= \frac{3x \times 70}{100} = \frac{21x}{10}$

SP of second article $= \frac{5x \times 120}{100} = 6x$

$\therefore$ Total SP $= 6x + \frac{21x}{10} = \frac{60x + 21x}{10} = \frac{81x}{10}$

$\therefore$ Total CP $= 3x + 5x = 8x$

$\therefore$ Profit $= \frac{81x}{10} - 8x = \frac{81x - 80x}{10} = \frac{x}{10}$

$\therefore$ Overall percentage of gain $= \frac{\frac{x}{10} \times 100}{8x}$

$= \frac{x \times 100}{10 \times 8x} = 1.25\%$

44. (d) Let CP of 8 quintal rice = ₹ x

$\therefore$ CP of 1 quintal rice = ₹ $\frac{x}{8}$

$\therefore$ SP of rice 3 quintal of rice at 10% profit $= \frac{3x}{8} + \frac{3x}{8} \times \frac{1}{10}$

$= \frac{3x}{8} + \frac{3x}{80} = \frac{33x}{80}$

SP of 3 quital rice without profit or loss = ₹ $\frac{3x}{8}$

SP of 2 quintal rice at 5% loss $= \frac{2x}{8} - \frac{2x}{8} \times \frac{5}{100}$

$$= \frac{x}{4} - \frac{x}{4\times 20} = \frac{19x}{4\times 20} = \frac{19x}{80}$$

$\therefore$ Total SP $= \frac{33x}{80} + \frac{3x}{8} + \frac{19x}{80}$

$$= \frac{33x + 30x + 19x}{80} = \frac{82x}{80}$$

$\therefore$ Profit $= \frac{SP - CP}{CP} \times 100 = \frac{\frac{82x}{80} - x}{x} \times 100$

$$= \frac{(82-80)x}{80x} \times 100 = \frac{2}{80} \times 100 = 2.5\%$$

45. (a) Actual payment for the television set
= 98% of 90% of 5000 = ₹ 4410

46. (c) Cost price of 1 apple $= \frac{240}{80} =$ ₹ 3

No. of apples give to his friend $= \frac{1}{4} \times 80 = 20$

Remaining apples = 80 – 20 = 60
Cost of apples to his friend = 20 × 3 = ₹ 60

Total SP at a profit of 20% $= 240 \times \frac{120}{100} =$ ₹ 288

SP of remaining 60 apples = ₹ (288 – 60) = ₹ 228

SP of 1 apple $= \frac{228}{60} =$ ₹ 3.80

47. (b) We know that,

Net percentage discount $= \frac{\text{Discount}}{\text{Cost price}} \times 100$

$$= \frac{1}{4} \times 100 = 25\%$$

48. (c) Let each lot of onion contains x kg onion, then total cost price of these two lots together
= 10x + 15x = 25x
Selling price of whole lot = 15 × (x + x)
= 15 × 2x = 30x

Profit percentage $= \frac{30x - 25x}{25x} \times 100$

$$= \frac{5x}{25x} \times 100 = 20\%$$

49. (c) Let the cost price of an article = ₹ x
Selling price of an article = ₹ 96
According to the question,

$$\frac{x-96}{x} \times 100 = \frac{1}{4}x \Rightarrow 400x - 96 \times 400 = x^2$$

$\Rightarrow x^2 - 400x + 38400 = 0$
$\Rightarrow x^2 - 160x - 240x + 38400 = 0$
$\Rightarrow x(x - 160x) - 240(x - 160) = 0$
$\Rightarrow (x - 160)(x - 240) = 0$
$\therefore x = 160$ or 240
Hence, the cost price of an article is ₹ 160 or ₹ 240.

50. (a) Actual profit percentage

$$= \frac{\text{Fair weight} - \text{Unfair weight}}{\text{Unfair weight}} \times 100$$

$$= \frac{1000-800}{800} \times 100 = \frac{200}{800} \times 100 = 25\%$$

51. (c) Cost price of 200 oranges = ₹1000.

Cost price of 1 orange $= \frac{1000}{200} =$ ₹ 5.

Selling price of 1 orange $= 5 \times \frac{125}{100} =$ ₹ 6.25

So, in ₹ 6.25, number of oranges can be sold = 1
In ₹ 100, number of oranges can be sold

$$= \frac{1}{6.25} \times 100 = 16$$

Hence, 16 oranges can be sold in ₹ 100 for profit 25%.

52. (c) Let the actual C.P. of cloth = 1 ₹

Then the effective C.P. $= \frac{100}{110} = \frac{10}{11}$

(Since he purchases 110 articles by paying ₹ 100)

Again S.P. $= \frac{100}{90} = \frac{10}{9}$

(Since he sells only 90 articles charging the CP of 100 articles).

$\therefore$ Gain% $= \frac{S.P - C.P}{C.P} \times 100 = \frac{\frac{10}{9} - \frac{10}{11}}{\frac{10}{11}} \times 100$

$$= \frac{20}{99} \times \frac{11}{10} \times 100 = \frac{200}{9} = 22\frac{2}{9}\%$$

53. (d) Milkman is getting 20% profit by selling the milk mixed with water.
So, the quantity of milk he is selling less is

$$= \left(\frac{20}{100+20}\right) \times 100$$

$$= \frac{100}{6}\%$$

This quantity is the percentage of water in milk that is =

$\frac{100}{6}\%$ Percentage of milk in the mixture

$$= 100 - \frac{100}{6}$$

$$= \frac{500}{6}\% = \frac{250}{3}\%$$