1.3 CHAPTER

Profit and Loss

In any organisation, the most important aspect is profit and loss calculation of any transaction conducted. So the profit/loss calculation is having a very important impact from business point of view.

While dealing with the profit/loss calculation, the following terminologies have to be understood.

Terminalogies in Profit & Loss

Cost price: Cost Price (CP) of an article is the expenditure incurred on the purchase or the production of the article. It can be taken as the 'INVESTMENT' on the article.

Selling price: Selling price of an article is the revenue generated by selling that particular article. So it is the 'REVENUE'.

Both CP & SP are respective quantities. They are not absolute quantities i.e. the value keeps on changing with respect to the person.

If A is selling a quantity to B. In that case selling price for A is the cost price for B.

Profit/Loss: The difference of SP & CP is the profit value or loss value. If SP > CP, the value is profit. If SP < CP, the value is loss.

Percent Profit/Loss: The profit or loss as a percentage of the 'INVESTMENT' is profit or loss percentage.

$$\% \text{ Profit/loss} = \frac{\text{Profit/Loss Value}}{\text{Investment}} \times 100$$

Margin: Margin is generally used in terms of percentage. It is the profit or loss as percentage of the 'REVENUE' or selling price.

$$\% \text{ Margin} = \frac{\text{Profit/Loss value}}{\text{Revenue}} \times 100$$

Marked Price: It is the price of the product being displayed on the label. Generally it is taken as MRP.

Discount: Discount is the rebate given to the customer before the selling of the article. Generally discount is given on marked price but to have a loss the discount can be given on the cost price as well.

Mark up: This is the increment on the cost price before the article is sold to the customer.

From these terminologies it has to be understood that the relation of selling price and cost price is nothing but a percentage increment or decrement situation based on profit or loss respectively. So if profit or loss is P% we can use the multiplying factor

i.e. $\left(1 \pm \frac{P}{100}\right)$

So $SP = CP\left(1 \pm \frac{P}{100}\right)$

Now let us understand it with the help of some examples.

Example 1.

Ram bought a scooter for Rs. 10000 and sold it for 20% loss to Rahul. Rahul invested Rs. 500 in it and sold at 10% profit to Sohan. Find out the amount paid by Sohan.

Solution.

The CP for Rahul

$$= 10000\left(1 - \frac{20}{100}\right)$$

$$= \text{Rs. } 8000$$

Net investment of Rahul on the scooter

$$= 8000 + 500 = \text{Rs. } 8500$$

Rahul sold it for 10% profit

So amount paid by Sohan

$$= 8500\left(1 + \frac{10}{100}\right) = \text{Rs. } 9350$$

Example 2.

Komal sold two articles at same selling price one at 20% profit while another at 20% loss. Find out his net profit or loss percent?

Solution.

Let the SP of one article be x

One article is sold at 20% profit so

$$1.2 \times (CP)_1 = x$$

or $(CP)_1 = \frac{x}{1.2}$

Similarly $0.8 \times (CP)_2 = x$

or $(CP)_2 = \frac{x}{0.8}$

Net $CP = \frac{x}{1.2} + \frac{x}{0.8} = \frac{2x}{0.96}$

So loss $= \frac{2x}{0.96} - 2x$

Loss% $= \frac{2x(0.04)/0.96}{2x/0.96} \times 100$

$= 4\%$ loss

Example 3.

Rose bought a bullock and a cart in rupees 6000. She sold bullock, at 20% profit and cart at 10% profit and got Rs. 7000. Find out the cost price of bullock.

Solution.

Let the CP of bullock be 'b' & of cart be 'c'

Then $b + c = 6000$

and $1.2\,b + 1.1c = 7000$

By solving both the equation we get

$b = 4000$ and $c = 2000$

So CP of bullock is Rs. 4000.

Example 4.

A shopkeeper gives a discount of 10% on a article but his net profit becomes 8% still. Find out by what percent he mark up the article.

Solution.

Let the CP be x & the mark up be P%

Then SP $= \left(1+\frac{8}{100}\right)x$ (As per the profit)

SP $= \left(1+\frac{P}{100}\right)x\left(1-\frac{10}{100}\right)$ As per markup

(Since mark up & discounts are successive percent changes on CP)

So $\left(1+\frac{P}{100}\right)0.9x = 1.08x$

$\Rightarrow \left(1+\frac{P}{100}\right) = 1.2$

$\Rightarrow P = 20\%$

False Weight

Sometimes the shopkeeper keeps the CP & SP of the articles same. But instead of giving us the indicated quantity he supplies less quantity & makes profit. So for the calculation of profit percentage we have to see his investment & the investment is the quantity he is providing to the customer. So profit or loss percent is calculated on the amount being supplied to the customer.

Example 1.

A shopkeeper sells the quantity in the same price rate for which he has bought. But he gives 20% less quantity to the customer. Find his profit percent.

Solution.

Let the indicated weight be 100 gm & CP & SP be 1 Rs./gm

Now quantity given to the customer

$= (1 - 0.2) \times 100$

So investment of shopkeeper

$= 80 \times 1 =$ Rs. 80

The amount gained from the customer

$= 100 \times 1 =$ Rs. 100

Profit % $= \frac{100-80}{80} \times 100 = 25\%$ profit

Example 2.

Ramesh purchased a radioset at Rs. 1500 and sold it at Rs. 1200. Find loss incurred by him?

Loss= C.P. – SP

$= 1500 - 1200 = 300.$

Also in this case we can calculate

Loss% $= \frac{300}{1500} \times 100 = 20\%$

Thus he incurred 20% loss.

Basic Formulae

1. When SP and Gain% are Given then

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

2. When the C.P. and Gain % are given then

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

3. When C.P. and loss% are given then

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

4. When S.P. and loss percentages are given

$$CP = \left(\frac{100}{100 - \text{Loss}\%}\right) \times 100$$

5. If the cost price (C.P.) of m articles is equal to selling price of n article, then

$$\%\ \text{gain or loss} = \left[\frac{m-n}{n}\right] \times 100$$

If m >n, it is % gain and if m<n, it is % loss

6. When two different articles are sold at the same S.P., getting gain/loss of x% on the first and gain/loss of y% on the second, the overall % gain or % loss in the transaction is given by

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

The above expression represent overall gain or loss according to its given (+)ve or (–ve).

7. When two different articles are sold at the same selling price getting gain of x% on the first and loss of x% on the second, then the overall % loss in the transaction is given by $\left(\frac{x}{10}\right)^2$ %

8. A merchant uses faulty measure and sells his goods at gain/loss of x%. The overall % gain or loss (g) is given by

$$\frac{100+g}{100+x} = \frac{\text{True measure}}{\text{Faulty measure}}$$

Note: If merchant sells his goods at cost price then $x = 0$.

Example 1.

A dishonest shopkeeper professes to sell his goods at the cost price but uses faulty measure. His 1 kg weight measures 950 gms only. Find his gain percent.

Solution:

Here, True measure = 1000 gms

False measure = 950 gms

Since the Shopkeeper sells the goods at cost price.

$\therefore$ $x = 0$,

$\therefore$ overall gain % is given by

$$\frac{\text{True measure}}{\text{Faulty measure}} = \frac{100+g}{100+x}$$

$$\Rightarrow \frac{1000}{950} = \frac{1000 \times g}{950}$$

So, $100 + g = \frac{1000 \times 100}{950}$, $g = 5\frac{5}{19}\%$.

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Discount

9. If two successive discount of an article are m% a n% respectively, then a single discount equiva to the successive discount will be $\left(m+n-\frac{mn}{100}\right)$

It can also be calculated as

$$\left[100 - 100 \times \frac{(100-m)}{100} \times \frac{(100-n)}{100}\right]\%$$

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Ex.1 Find the single discount which is equivalent successive discounts of 50% and 40%.

Sol.: Single discount will be equal to

$$\left(m+n-\frac{mn}{100}\right)\%$$

$$\Rightarrow \left(50+40-\frac{50\times 40}{100}\right)\%$$

$\Rightarrow$ 70%

Ex.2 Find a single discount which is equivalent to th successive discounts of 20%, 30% and 20

Sol.: Single discount equivalent to 20% and 30%

$$\Rightarrow \left[20+30-\frac{20\times 30}{100}\right]\%$$

$\Rightarrow$ 44%

Now, we will find single discount whic equivalent to two successive discounts of 4 and 20%.

$$\Rightarrow \left[44+20-\frac{44\times 20}{100}\right]\%$$

$\Rightarrow$ 55.2%

Alternative:

$x \times 0.8x \times 7x \times 8 = 0.448x$

So the final value is $0.448x$

Which is reduced by 55.2%

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Solved Examples

1. By selling a watch for Rs. 495, a shopkeeper incurs a loss of 10%. Find the cost price of the watch for the shopkeeper.

(a) Rs. 545 (b) Rs. 550
(c) Rs. 555 (d) None of these

Ans. (b)

Here S.P. = 495

Loss = 10%

$$C.P. = \frac{SP}{(100 - Loss\%)} \times 100$$

$$CP = \frac{495}{90} \times 100 = Rs.\ 550$$

2. A shopkeeper sold goods for Rs. 2400 and made a profit of 25% in the process. Find his profit percent if he had sold his goods for Rs. 2040.

(a) 6.25% (b) 7%
(c) 6.20% (d) 6.5%

Ans. (a)

SP = 2400, Profit% = 25

$$C.P. = \frac{SP}{(100 + P\%)} \times 100 = \frac{2400}{125} \times 100 = 1920$$

If sold at 2040, profit = Rs. 120

$$\text{Profit \%} \Rightarrow \frac{120}{1920} \times 100 = 6.25$$

3. A digital diary is sold for Rs. 935 at a profit of 10%. What would have been the actual profit or loss on it, if it had been sold for Rs. 810?

(a) Rs. 45 (b) Rs. 40
(c) Rs. 48 (d) Rs. 50

Ans. (b)

SP = 935, Profit %= 10%

$$CP = \frac{935}{110} \times 100 = 850$$

Diary if sold at 810, Loss = Rs. 40

4. A shopkeeper bought 240 chocolates at Rs. 9 per dozen. If he sold all of them at Rs. 1 each, what was his profit percent?

(a) 66(1/6)% (b) 33(1/3)%
(c) 24% (d) 27%

Ans. (b)

CP of 12 chocolate = Rs. 9

$$\text{CP of 1 chocolate} = \frac{9}{12} = Rs.\ 0.75$$

Now SP = Rs. 1 Proift = Rs. 0.25

$$\text{Profit \%} = \frac{0.25}{0.75} \times 100 = 33\frac{1}{3}\%$$

5. A coal merchant makes a profit of 20% by selling coal at Rs. 25 per quintal. If he sells the coal at Rs. 22.50 per quintal, what is his profit percent on the whole investment?

(a) 6% (b) 6.66%
(c) 7.5% (d) 8%

Ans. (d)

Profit % = 20%, SP=25

$$CP = \frac{25}{120} \times 100 = \frac{125}{6} Rs. = 20.83$$

Profit if SP = 22.50

= 22.50 – 20.83 = 1.667

$$\text{Profit \%} = \frac{1.667}{20.83} \times 100 = 8\%$$

[in fractional term this can be solved very easily]

6. The cost price of a shirt and trouser is Rs. 371. If the shirt costs 12% more than the trousers, find the cost price of the trouser.

(a) Rs. 125 (b) Rs. 150
(c) Rs. 175 (d) Rs. 200

Ans. (c)

Let CP of trouser be Rs. x

$$\text{Now CP of shirt} = Rs.\frac{112x}{100}$$

$$\text{According to given condition } x + \frac{112x}{100} = 371,$$

$$\frac{212}{100}x = 371,$$

x = Rs. 175

7. The marked price of a table is Rs. 1200, which is 20% above the cost price. It is sold at a discount of 10% on the marked price. Find the profit percent.

(a) 10% (b) 8%
(c) 7.5% (d) 6%

Ans. (b)

MP = 1200

$$C.P. = \frac{1200}{120} \times 100 = 1000$$

If sold at 10% discount

$$S.P. = 1200 \times \frac{90}{100} = 1080$$

Profit on CP = Rs. 80

$$\text{Profit \%} = \frac{80}{1000} \times 100 = 8\%$$

8. A dozen pairs of gloves quoted at Rs. 80 are available at a discount of 10%. Find how many pairs of golves can be bought for Rs. 24?

(a) 4 (b) 5
(c) 6 (d) 8

Ans. (a)

12 pairs of gloves are available at Rs. 80 (with 10% discount) $80 \times \frac{90}{100}$ = Rs.72

$\because$ In Rs. 72, 12 pairs are available then in

Rs. $1\ \frac{12}{72}$ pairs

$\therefore$ In 24 Rs. $\frac{12}{72} \times 24 = 4$

9. How much percent more than the cost price should a shopkeeper mark his goods, so that after allowing a discount of 12.5% he should have a gain of 5% on his outlay?

(a) 9.375 (b) 16.66%
(c) 20% (d) 25%

Ans. (c)

Let the cost price be Rs. x and printed price be Rs. y.

Hence, price after giving a discount of 12.5%

$$= y - y \times \frac{12.5}{100}$$

$$\text{Given, } = y - y \times \frac{12.5}{100} = x + x \times \frac{5}{100}$$

$$\Rightarrow\ y \times \frac{87.5}{100} = x \times \frac{105}{100}$$

$$\therefore y = \frac{105}{87.5}x \Rightarrow y - x = \frac{105}{87.5}x - x = \frac{17.5}{87.5}x$$

Required Percentage

$$= \frac{y-x}{x} \times 100 = \frac{17.5}{87.5} \times 100 = 20\%$$

10. In order to maintain the price line, a trader allows a discount of 10% on the marked price of goods in his shop. However, he still makes a gross profit of 17% on the cost price. Find the profit percent he would have made on the selling price had he sold at the marked price.

(a) 23.07 (b) 30%
(c) 21.21% (d) 25%

Ans. (b)

Let the cost price be Rs. x and marked price be Rs. y

$$\text{Given, } y - y \times \frac{10}{100} = x + x \times \frac{17}{100}$$

$$\Rightarrow y \times \frac{90}{100} = x \times \frac{117}{100} \Rightarrow y = \frac{117}{90}x$$

$$\therefore\ y - x = \frac{27}{90}x$$

$\therefore$ Required profit percent

$$= \frac{y-x}{x} \times 100 = \frac{27}{90} \times 100 = 30\%$$

11. The cost of production of a cordless phone set in 2002 is Rs. 900, divided between material, labour and overheads in the ratio 3 : 4 : 2. If the cordless phone set is marked at a price that gives a 20% profit on the component of price accounted for by labour, what is the marked price of the set?

(a) Rs. 980 (b) Rs. 1080
(c) Rs. 960 (d) None of these

Ans. (a)

Cost of phone accounted for by labour

$$= \frac{4}{3+4+2} \times 900 = \text{Rs.}400$$

Component of price accountant for by labour

$$= 400 + 400 \times \frac{20}{100} = \text{Rs. } 480$$

Marked price of the set

= 480 + (900 – 400) = Rs. 980

12. If subsequently in 2003, the cost of material, labour and overheads increased by 20%, 30% and 10% respectively, calculate the cost of manufacturing in 2003.

(a) Rs. 1150 (b) Rs. 1050
(c) Rs. 1080 (d) Rs. 1100

Ans. (d)

In 2003, cost of material

$$= 300 + 300 \times \frac{20}{100} = \text{Rs. } 360$$

$$\text{Cost of labour} = 400 + 400 \times \frac{30}{100} = \text{Rs. } 520$$

$$\text{Cost of overhead} = 200 + 200 \times \frac{10}{100} = \text{Rs. } 220$$

Hence, cost of manufacturing

= 360 + 520 + 220 = Rs. 1100

13. A reduction of 10% in the price of sugar enables a housewife to buy 6.2 kg more for Rs. 279. Find the reduced price per kilogram.

(a) Rs. 5 (b) Rs. 4.5
(c) Rs. 4.05 (d) None of these

Ans. (b)

Let original rate = Rs. x per kg

New rate = 90% of

$$x = \text{Rs.}\left(\frac{90}{100}x\right) = \text{Rs.}\frac{9x}{10}$$

Original quantity for Rs. 279 $= \frac{279}{x}$

New quantity $= 279 \times \frac{10}{9x} = \frac{310}{x}$

$$\therefore \frac{310}{x} - \frac{279}{x} = 6.2 \quad \Rightarrow \frac{31}{x} = 6.2$$

$$\Rightarrow x = \frac{31}{6.2} = 5$$

$\therefore$ Reduced Price $= \frac{9 \times 5}{10} =$ Rs. 4.5 per kg

14. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he paid for it and sold it for Rs. 2 less, he would have gained 10%. Find the cost price of the article.

(a) Rs. 500 (b) Rs. 360
(d) Rs. 425 (d) Rs. 400

Ans. (d)

Let the cost price of the article = Rs. x

Price when it is bought at 5% less than cost price

$$= x - x \times \frac{5}{100} = \frac{95}{100}x$$

Selling price when it is sold for Rs. 2 less.

$$= x + x \times \frac{5}{100} - 2 = \frac{105}{100}x - 2$$

Given, $\frac{105}{100}x - 2 - \frac{95}{100}x = \frac{95}{100}x \times \frac{10}{100}$

$$\Rightarrow \frac{10}{100}x - 2 = \frac{95}{1000}x$$

$$\therefore \quad x = \frac{2 \times 1000}{5} = \text{Rs. } 400$$

15. A briefcase was sold at a profit of 10%. If its cost price was 5% less and it was sold for Rs. 7 more, the gain would have been 20%. Find the cost price of the briefcase.

(a) Rs. 175 (b) Rs. 200
(c) Rs. 225 (d) Rs. 160

Ans. (a)

Let the cost price = Rs. x

Price 5% less than cost price $= \frac{95}{100}x$

Selling price when sold for Rs. 7 more

$$= \frac{110}{100}x + 7$$

Given, $\frac{110}{100}x + 7 - \frac{95}{100}x = \frac{95x}{100} \times \frac{20}{100}$

$$\Rightarrow \frac{20}{500}x = 7 \quad \therefore x = \frac{7 \times 500}{20} = \text{Rs. } 175$$

16. A dishonest dealer professes to sell at cost price but uses a 900 gram weight instead of a 1 kilogram weight. Find the percent profit to the dealer.

(a) 10% (b) 11.11%
(c) 12.5% (d) None of these

Ans. (b)

Let the cost price be Rs. x per kg.

Then cost price of 900 gm $= \frac{9}{10}x$

Hence % profit

$$= \frac{x - \frac{9}{10}x}{\frac{9}{10}x} \times 100 = \frac{100}{9}\% = 11.11\%$$

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Profit and Loss

Practice Exercise: I

1. Cost of 3 cricket balls = cost of 2 pairs of leg pads. Cost of 3 pairs of leg pads = cost of 2 pairs of gloves. Cost of 3 pairs of gloves = cost of 2 cricket bats. If a cricket bat costs Rs. 54, what is the cost of a cricket ball?

(a) Rs. 12 (b) Rs. 14
(c) Rs. 16 (d) Rs. 18

2. There would be 10% loss if a toy is sold at Rs. 10.80 per piece. At what price should it be sold to earn a profit of 20%?

(a) Rs. 12 (b) Rs. 12.96
(c) Rs. 14.40 (d) None of these

3. If books bought at prices ranging from Rs. 200 to Rs. 350 are sold at prices ranging from Rs. 300 to Rs. 425, what is the greatest possible profit that might be made in selling eight books?
(a) Rs. 400
(b) Rs. 600
(c) Cannot be determined
(d) None of these

4. If the selling price of 18 articles is equal to the C.P. of 21 articles, the loss or gain percent is:

(a) $16\frac{2}{3}\%$ gain (b) $14\frac{2}{7}\%$ gain

(c) $16\frac{2}{3}\%$ loss (d) $14\frac{2}{7}\%$ loss

5. A man sold 250 chairs and had a gain equal to selling price of 50 chairs. His profit percent is:
(a) 5% (b) 10%
(c) 25% (d) 50%

6. If I purchased 11 books for Rs. 10 and sold all the books at the rate of 10 books for Rs. 11, the profit percent is
(a) 10% (b) 11%
(c) 21% (d) 100%

7. Ajay bought 15 kg of dal at the rate of Rs. 14.50 per kg and 10 kg at the rate of Rs. 13 per kg. He mixed the two and sold the mixture at the rate of Rs. 15 per kg. What was his total gain in this transaction?
(a) Rs. 1.10 (b) Rs. 16.50
(c) Rs. 11 (d) Rs. 27.50

8. Pure ghee costs Rs. 100 per kg. After adulterating it with vegetable oil costing Rs. 50 per kg, a shopkeeper sells the mixture at the rate of Rs. 96 per kg, thereby making a profit of 20%. In what ratio does he mix the two?
(a) 1 : 2 (b) 3 : 2
(c) 3 : 1 (d) None of these

9. A dealer professing to sell his goods at cost price, uses a 900 gm weight for a kilogram. His gain percent is
(a) 9 (b) 10

(c) 11 (d) $11\frac{1}{9}$

10. Toffees are bought at the rate of 3 for a rupee. To gain 50%, they must be sold at:
(a) 2 for a rupees (b) 1 for a rupees
(c) 4 for a rupee (d) 5 for a rupees

11. By selling 45 lemons for Rs. 40, a man loses 20%. How many should he sell for Rs. 24 to gain 20% in the transaction?
(a) 16 (b) 18
(c) 20 (d) 22

12. A man gains 10% by selling a certain article for a certain price. If he sells it at double the price, the profit made is
(a) 20% (b) 120%
(c) 100% (d) 140%

13. 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 Rs. 1500, what did A pay for it?
(a) Rs. 825 (b) Rs. 1000
(c) Rs. 1100 (d) Rs. 1125

14. If the manufacturer gains 10%, the wholesale dealer 15% and the retailer 25%, then the cost of production of a table, whose retail price is Rs. 1265 is
(a) Rs. 632.50 (b) Rs. 800
(c) Rs. 814 (d) Rs. 834.34

15. Two mixers and one T.V. cost Rs. 7000, while two T.V. and a mixer cost Rs. 9800. The value of one T.V. is:
(a) Rs. 2800 (b) Rs. 2100
(c) Rs. 4200 (d) Rs. 8400

16. A horse and a cow were sold for Rs. 12000 each. The horse was sold at a loss of 20% and the cow at a gain of 20%. The entire transaction resulted in
(a) no loss or no gain
(b) loss of Rs. 1000
(c) gain of Rs. 1000
(d) gain of Rs. 2000

17. An Article is sold at a certain price. By selling it at $\frac{2}{3}$ of that price one loses 10%. The gain percent at original price is

(a) 20% (b) $33\frac{1}{3}\%$

(c) 35% (d) 40%

18. A grocer sells rice at a profit of 10% and uses weights which are 20% less than the market weight. The total gain earned by him will be

(a) 30% (b) 35%
(c) 37.5% (d) None of these

19. Two-third of a consignment was sold at a profit of 5% and the remainder at a loss of 2%. If the total profit was Rs. 400, the value of the consignment (in rupees) was:
(a) 20000 (b) 15000
(c) 12000 (d) 10000

20. A fruit seller has 24 kg of apples. He sells a part of these at 20% gain and the balance at a loss of 5%. If on the whole he earns a profit of 10%, the amount of apples sold at loss is:
(a) 6 kg (b) 4.6 kg
(c) 9.6 kg (d) 11.4 kg

21. The C. P. of an article is 40% of the S. P. The percent that the S.P. is of C.P. is:
(a) 250 (b) 240
(c) 60 (d) 40

22. If an article is sold at 5% gain instead of 5% loss, the seller gets Rs. 6.72 more. The C.P. of the article is
(a) Rs. 67.20 (b) Rs. 120
(c) Rs. 134.40 (d) Rs. 240

23. A man bought an article and sold it at a gain of 5%. If he had bought it at 5% less and sold it for Rs. 1 less, he would have made a profit of 10%. The C.P. of the article was:
(a) Rs. 100 (b) Rs. 150
(c) Rs. 200 (d) Rs. 500

24. Raghu bought 4 dozen oranges at Rs. 12 per dozen and 2 dozen oranges at Rs. 16 per dozen. He sold them all to earn 20% profit. At what price per dozen did he sell the oranges?
(a) Rs. 14.40 (b) Rs. 16
(c) Rs. 16.80 (d) Rs. 19.20

25. The profit earned by selling an article for Rs. 900 is double the loss incurred when the same article is sold for Rs. 450. At what price should the article be sold to make 25% profit?
(a) Rs. 600 (b) Rs. 750
(c) Rs. 800 (d) Data inadequate

26. A man sold an article for Rs. 75 and lost something. Had he sold it for Rs. 96, his gain would have been double the former loss. The C.P. of the article is:
(a) Rs. 81 (b) Rs. 82
(c) Rs. 83 (d) Rs. 85.50

27. A table is offered for Rs. 300 with 20% and 10% off. If in addition, a discount of 5% is offered on cash payment, then the cash price of the table is:
(a) Rs. 240 (b) Rs. 216
(c) Rs. 210 (d) Rs. 205.20

28. A tradesman marks his goods 30% above the C.P. If he allows a discount of $6\frac{1}{4}\%$, then his gain percent is:
(a) $23\frac{3}{4}\%$ (b) 22%
(c) $21\frac{7}{8}\%$ (d) None

29. What price should a shopkeeper mark on an article, costing him Rs. 153, to gain 20% after allowing a discount of 15%?
(a) Rs. 224 (b) Rs.216
(c) Rs. 184 (d) Rs.162

30. If the S.P. of Rs. 24 results in a 20% discount on list price, what S.P. would result in a 30% discount on list price?
(a) Rs. 27 (b) Rs. 21
(c) Rs. 20 (d) Rs. 9

31. A shopkeeper earns a profit of 12% on selling a book at 10% discount on the printed price. The ratio of the cost price to the printed price of the book is:
(a) 50 : 61 (b) 45 : 56
(c) 99 : 125 (d) 55 : 69

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Solutions

1. Ans. (c)

$3G = 54 \times 2 = 108 \Rightarrow G = 36.$

$3P = 36 \times 2 = 72 \Rightarrow P = 24$

$3C = 24 \times 2 = 48 \Rightarrow C = 16$

$\therefore$ Cost of a cricket ball = Rs. 16.

2. Ans. (c)

$90 : 10.80 = 120 : x$ or $\frac{90}{10.80} = \frac{120}{x}$.

$\therefore \quad x = \frac{120 \times 10.80}{90} = 14.40$

Hence, S.P. = Rs. 14.40

3. Ans. (d)

Least C.P. = Rs. (200 × 8)= Rs. 1600.

Greatest S.P. = Rs. (425 × 8) = Rs. 3400.

Required profit = Rs. (3400 –1600)

= Rs. 1800.

4. Ans. (c)

Let C.P. of each article be Rs. 1.

C.P. of 18 articles = Rs. 18.

S.P. of 18 articles = Rs. 21.

$\therefore$ Gain% $= \left(\frac{3}{18}\times 100\right)\% = 16\frac{2}{3}\%.$

5. Ans. (c)

Gain = (S.P. of 250 chairs) – (C.P. of 250 chairs).

$\therefore$ (S.P. of 250 chairs) – (C.P. of 250 chairs) = S.P. of 50 chairs.

S.P. of 200 chairs = C.P. of 250 chairs.

Let C.P. of each chair be Rs. 1

C.P. of 200 chairs = Rs. 200.

S.P. of 200 chairs = Rs. 250.

Gain% $= \left(\frac{50}{200}\times 100\right)\% = 25\%.$

6. Ans. (c)

Suppose, the number of books purchased is 110

C.P. of 110 books $= \text{Rs.}\left(\frac{10}{11}\times 110\right)$

= Rs. 100

S.P. of 110 books $= \text{Rs.}\left(\frac{11}{10}\times 110\right)$

= Rs. 121, Profit % = 21%

7. Ans. (d)

C.P. of 25 kg = Rs. (15 × 14.50 + 10 × 13)

= Rs. 347.50

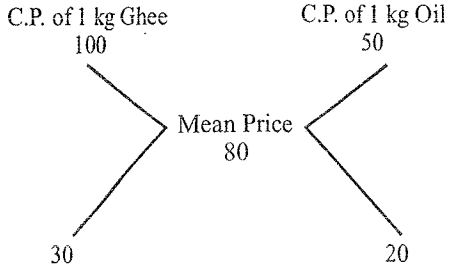
S.P. of 25 kg = Rs. (25 × 15) = Rs. 375.

$\therefore$ Gain = Rs. (375 – 347.50) = Rs. 27.50

8. Ans. (b)

Mean price $= \text{Rs.}\left(\frac{100}{120}\times 96\right) = \text{Rs. } 80/\text{kg}.$

By the rule of alligation:



$\therefore$ Required ratio = 30 : 20 = 3 : 2.

9. Ans. (d)

Gain % $= \left(\frac{100}{900}\times 100\right)\% = 11\frac{1}{9}\%.$

10. Ans. (a)

C. P. of 3 toffees = Rs. 1

S. P. of 3 toffees = 150% of Re 1 = Rs. $\frac{3}{2}$

For Rs. $\frac{3}{2}$, toffees sold = 3.

For Rs. 1, toffees sold $= \left(3\times\frac{2}{3}\right) = 2.$

11. Ans. (b)

Let S.P. of 45 lemons be Rs. x

80 : 40 = 120 : x or $\frac{80}{40} = \frac{120}{x}$

or $x = \frac{40\times 120}{80} = 60$

For Rs. 60, lemons sold = 45

For Rs. 24,

lemons sold $= \left(\frac{45}{60}\times 24\right) = 18.$

12. Ans. (b)

110 : x = (100 + P) : $2x$ or

$\frac{110}{x} = \frac{100+p}{2x}$ or $100+P = 220$

$\therefore$ p = 120%.

13. Ans. (b)

125% of 120% of A = 1500

$\Rightarrow \frac{125}{100}\times\frac{120}{100}A = 1500$

$\therefore$ A $= \left(1500\times\frac{2}{3}\right) = 1000$

14. Ans. (b)

125% of 115% of 110% of p = 1265.

$\therefore \frac{125}{100}\times\frac{115}{100}\times\frac{110}{100}p = 1265$

or $\frac{253}{160}p = 1265.$

$\therefore$ p $= \left(\frac{1265\times 160}{253}\right) = \text{Rs. } 800$

15. Ans. (c)

Let C.P. of a mixer be Rs. x and that of a T.V. be Rs. y.

Then, $2x + y = 7000$ and $2y + x = 9800$.

Multiplying 2nd equation by 2 and subtracting first from it, we get

$3y = 19600 - 7000 = 12600$ or $y = 4200$

$\therefore$ C. P. of a T. V. = Rs. 4200

16. Ans. (b)

Total S.P. = Rs. 24000

C.P. of horse

$$= \text{Rs.}\left(\frac{100}{80}\times 12000\right) = \text{Rs. } 15000.$$

C.P. of a cow

$$= \text{Rs.}\left(\frac{100}{120}\times 12000\right) = \text{Rs. } 10000.$$

Total C.P. = Rs. 25000.

$\therefore$ Loss = 24000 – 25000 = Rs. 1000

17. Ans. (c)

Let original S.P. be Rs. x,

$$\text{New S.P.} = \frac{2}{3}x, \text{ loss} = 10\%$$

$$\therefore \text{C.P.} = \left(\frac{100}{90}\times\frac{2}{3}x\right) = \frac{20x}{27}$$

$$\text{New, C.P.} = \frac{20x}{27}, \text{ S.P.} = \text{Rs. } x,$$

$$\text{Gain} = \left(x - \frac{20x}{27}\right) = \frac{7x}{27}$$

$$\therefore \text{Gain\%} = \left(\frac{7x}{27}\times\frac{27}{20x}\times 100\right)\% = 35\%.$$

18. Ans. (c)

Let us consider a packet of rice marked 1 kg.

Its actual weight is 80% of 1000 gm = 800 gm.

Let C.P. of each gm be Rs. 1.

Then, C. P. of this packet = Rs. 800.

S.P. of this packet = 110% of C.P. of 1 kg.

$$= \left(\frac{110}{100}\times 1000\right) = \text{Rs. } 1100$$

$$\therefore \text{Gain} = \left(\frac{300}{800}\times 100\right)\% = 37.5\%$$

19. Ans. (b)

Let the total value be Rs. x

$$\text{Value of } \frac{2}{3}\text{rd} = \frac{2x}{3}, \quad \text{Value of } \frac{1}{3}\text{rd} = \frac{x}{3}.$$

$$\text{Total S.P.} = \left(105\% \text{ of } \frac{2x}{3} + 98\% \text{ of } \frac{x}{3}\right)$$

$$= \left(\frac{210x}{300} + \frac{98x}{300}\right) = \frac{308x}{300}$$

$$\frac{308x}{300} - x = 400 \Rightarrow \frac{308x - 300x}{300} = 400$$

$$\therefore \quad x = \frac{300\times 400}{8} = 15000$$

20. Ans. (c)

Suppose, the quantity sold at a loss be x kg and let C.P. per kg be Rs. 1

Total C. P. = Rs. 24.

Total S. P. = 120% of $(24 - x)$ + 95% of x.

$$= \frac{6}{5}(24 - x) + \frac{19x}{20} = \frac{576 - 24x + 19x}{20}$$

$$= \frac{576 - 5x}{20}$$

$$\therefore \quad \frac{576 - 5x}{20} = 110\% \text{ of } 24$$

$$\text{or} \quad \frac{576 - 5x}{20} = \frac{264}{10}$$

or $576 - 5x = 528$ or $5x = 48$

or $x = 9.6$ kg

21. Ans. (a)

$$\text{C.P.} = \frac{40}{100}\times \text{S.P. i.e. S.P.} = \frac{5}{2}\text{C.P.}$$

$$= \left(\frac{5}{2}\times 100\right)\% \text{ of C.P.}$$

$\therefore$ S.P. = 250% of C.P.

22. Ans. (a)

Let C.P. be Rs. x

(105% of x) – (95% of x) = 6.72

or 10% of x = 6.72.

23. Ans. (c)

Let original C.P. be Rs. x/Its

$$\text{S.P.} = \frac{105}{100}x = \frac{21x}{20}$$

$$\text{New C.P.} = \frac{95}{100}x = \frac{19x}{20}$$

$$\text{New S.P.} = \frac{110}{100} \times \frac{19x}{20} = \frac{209x}{200}$$

$$\frac{21x}{20} - \frac{209x}{200} = 1 \text{ or } x = 200$$

24. Ans. (b)

Total C.P. = Rs. (12 × 4 +16 × 2) = Rs. 80.

S.P. of 6 dozen oranges

$$= \text{Rs.}\left(\frac{120}{100} \times 80\right) = \text{Rs. } 96.$$

S. P. per dozen = Rs. 16

25. Ans. (b)

Let C.P. be Rs. x

$900 - x = 2\,(x - 450)$

$\Rightarrow 3x = 1800 \Rightarrow x = 600.$

C.P. = Rs. 600, gain required = 25%.

$$\therefore \quad \text{S.P.} = \text{Rs.}\left(\frac{125}{100} \times 600\right) = \text{Rs. } 750$$

26. Ans. (b)

Let C.P. be Rs. x.

$2(x - 75) = (96 - x)$

$\Rightarrow 3x = 246$

$\Rightarrow x = 82$

27. Ans. (d)

Cost price = 95% of 90% of 80% of Rs. 300.

$$= \left(\frac{95}{100} \times \frac{90}{100} \times \frac{80}{100} \times 300\right) = \text{Rs. } 205.20$$

28. Ans. (c)

Let C.P. be Rs. 100. Then, marked price = Rs. 130.

$$\text{S.P.} = \left(100 - \frac{25}{4}\right)\% \text{ of Rs. } 130$$

$$= \left(\frac{375}{400} \times 130\right) = 121.875$$

$$\therefore \quad \text{Profit\%} = 21.875 = \frac{21875}{1000} = 21\frac{7}{8}\%$$

29. Ans. (b)

C.P. = Rs. 153, Gain = 20%.

$$\therefore \quad \text{S.P.} = \left(\frac{120}{100} \times 153\right) = \text{Rs. } 183.60$$

Let, the marked price be Rs. x

$$\frac{85}{100}x = 183.60$$

$$\Rightarrow \quad x = \frac{183.60 \times 100}{85} = 216$$

30. Ans. (b)

Let, the list price be Rs. x

$$\frac{80}{100}x = 24 \Rightarrow x = \frac{24 \times 100}{80} = 30$$

Required S.P. = 70% of Rs.30 = Rs. 21

31. Ans. (b)

Let the C.P. be Rs. 100.

Then, S.P. = Rs. 112.

Let the printed price be Rs. x

$$\text{Then, 90\% of } x = 112 \Rightarrow \frac{90}{100}x = 112$$

$$\therefore \quad x = \left(\frac{112 \times 100}{90}\right) = \frac{1120}{9}$$

$$\therefore \quad (\text{C.P.}) : (\text{Printed price}) = 100 : \frac{1120}{9}$$

$$= 900 : 1120 = 45 : 56$$