Profit and Loss

INTRODUCTION

Business transactions have now-a-days become common feature of life. When a person deals in the purchase and sale of any item, he either gains or loses some amount generally. The aim of any business is to earn profit. The commonly used terms in dealing with questions involving sale and purchase are:

Cost price The cost price of an article is the price at which an article has been purchased. It is abbreviated as C.P.

Selling price The selling price of an article is the price at which an article has been sold. It is abbreviated as S.P.

Profit or gain If the selling price of an article is more than the cost price, there is a gain or profit.

Thus,   Profit or gain = S.P. – C.P.

Loss If the cost price of an article is greater than the selling price, the seller suffers a loss.

Thus,   Loss = C.P. – S.P.

Note that profit and loss are always calculated with respect to the cost price of the item.

Illustration 1

(i) If C.P. = ₹235, S.P. = ₹240, then profit = ?

(ii) If C.P. = ₹116, S.P. = ₹107, then loss = ?

Solution:

(i) Profit = S.P. – C.P. = 240 –235 = ₹5

(ii) Loss = C.P. – S.P. = 116 – 107 = ₹9

SOME BASIC FORMULAE

1. Gain on ₹100 is *gain per cent*

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

Loss on ₹100 is *loss per cent*

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

Illustration 2 The cost price of a shirt is ₹200 and selling price is ₹250. Calculate the % profit

Solution: We have   C.P. = ₹200, S.P. = ₹250.

Profit = S.P. – C.P = 250 – 200 = ₹50.

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

$$= \frac{50 \times 100}{200} = 25\%$$

Illustration 3 Anu bought a necklace for ₹750 and sold it for ₹675. Find her percentage loss

Solution: Here   C.P. = ₹750, S.P. = ₹675.

Loss = C.P. – S.P. = 750 – 675 = ₹75

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

$$= \frac{75 \times 100}{750} = 10\%$$

2. When the selling price and gain pre cent are given:

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

3. When the cost and gain per cent are given:

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

Explanation

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

$$= \left[\frac{(\text{S.P.} - \text{C.P.}) \times 100}{\text{C.P.}}\right]$$

$$\therefore \quad \frac{\text{Profit\%}}{100} = \frac{\text{S.P.}}{\text{C.P.}} - 1$$

$$\text{or,} \quad \frac{\text{S.P.}}{\text{C.P.}} = 1 + \frac{\text{Profit\%}}{100}$$

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

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

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4. When the cost and loss per cent are given:

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

5. When the selling price and loss per cent are given:

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

Explanation

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

$$= \left[\frac{(\text{C.P.} - \text{S.P.}) \times 100}{\text{C.P.}}\right]$$

$$\therefore \quad \frac{\text{Loss\%}}{100} = 1 - \frac{\text{S.P.}}{\text{C.P.}}$$

$$\text{or} \quad \frac{\text{S.P.}}{\text{C.P.}} = 1 - \frac{\text{Loss\%}}{100}$$

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

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

Illustration 4 Mr. Sharma buys a cooler for ₹4500. For how much should he sell so that there is a gain of 8%?

Solution: We have C.P. = ₹4500, gain% = 8%

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

$$= \left(\frac{100 + 8}{100}\right) \times 4500$$

$$= \frac{108}{100} \times 4500$$

$$= ₹4860$$

Illustration 5 By selling a fridge for ₹7200, Pankaj loses 10% Find the cost price of the fridge

Solution: We have, S.P. = ₹7200, loss = 10%

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

$$= \left(\frac{100}{100 - 10}\right) \times 7200$$

$$= \frac{100}{90} \times 7200$$

$$= ₹8000$$

Illustration 6 By selling a pen for ₹99, Mohan gains $12\frac{1}{2}$% Find the cost price of the pen

Solution: Here S.P. = ₹99, gain% = $12\frac{1}{2}$% or, $\frac{25}{2}$%

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

$$= \left(\frac{100}{100 + \frac{25}{2}}\right) \times 99$$

$$= \left(\frac{100 \times 2}{225}\right) \times 99$$

$$= ₹88.$$

SOME USEFUL SHORT-CUT METHODS

1. If a man buys x items for ₹y and sells z items for ₹w, then the gain or loss per cent made by him is

$$\left(\frac{xw}{zy}-1\right)\times100\%$$

Explanation

S.P. of z items = ₹w

S.P. of x items = ₹$\dfrac{w}{z}x$

Net profit = $\dfrac{w}{z}x-y$.
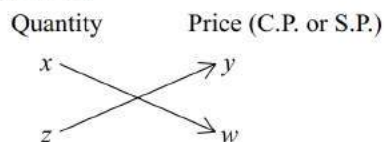
∴ % Profit = $\dfrac{\dfrac{w}{z}x-y}{y}\times100\%$

i.e., $\left(\dfrac{xw}{zy}-1\right)\times100\%$,

which represents loss, if the result is negative.

Note:

In the case of gain per cent the result obtained bears positive sign whereas in the case of loss per cent the result obtained bears negative sign.
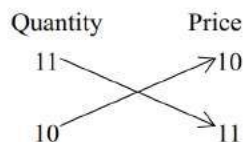
How to remember:

Quantity   Price (C.P. or S.P.)

1. Cross-multiply the numbers connected by the arrows (xw and zy)
2. Mark the directon of the arrows for cross-multiplicaton. The arrow going down forms the numerator while the arrow going up forms the denominator $\left(\dfrac{xw}{zy}\right)$.

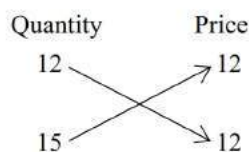**Illustration 7** If 11 oranges are bought for ₹10 and sold at 10 for ₹11, what is the gain or loss%?

Solution:

% profit $= \left(\dfrac{xw}{zy}-1\right)\times100\%$

$= \left(\dfrac{11\times11}{10\times10}-1\right)\times100\%$

$= \dfrac{21}{100}\times100\% = 21\%$

Illustration 8 A fruit seller buys apples at the rate of ₹12 per dozen and sells them at the rate of 15 for ₹12. Find his percentage gain or loss.

Solution:

% gain or loss $= \left(\dfrac{xw}{zy}-1\right)\times100\%$

$= \left(\dfrac{12\times12}{15\times12}-1\right)\times100\%$

$= -\dfrac{36}{180}\times100\% = -20\%$

Since the sign is –ve, there is a loss of 20%

2. If the cost price of m articles is equal to the selling price of n articles, then

% gain or loss $= \left(\dfrac{m-n}{n}\right)\times100$

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

Explanation

Let the C.P. of one article be ₹1

∴ C.P. of m articles = ₹$m\times1$ = ₹m

∵ S.P. of n articles = ₹m

∴ S.P. of 1 article = ₹$\dfrac{m}{n}$

∴ Profit on 1 article = ₹$\left(\dfrac{m}{n}-1\right)$ i.e., ₹$\left(\dfrac{m-n}{n}\right)$

∴ % profit $= \dfrac{m-n}{n}\times\dfrac{100}{1}$ i.e., $\left(\dfrac{m-n}{n}\right)\times100$

Illustration 9 A shopkeeper professes to sell his goods on cost price but uses 800 gm, instead of 1kg. What is his gain %?

Solution: Here cost price of 1000 gm is equal to selling price of 800 gm

$$\therefore \quad \% \text{ gain } = \left(\frac{m-n}{n}\right) \times 100$$

$$= \left(\frac{1000 - 800}{800}\right) \times 100$$

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

Illustration 10 If the selling price of 12 articles is equal to the cost price of 18 articles, what is the profit %?

Solution: Here $m = 18$, $n = 12$

$$\therefore \quad \text{Profit\%} = \left(\frac{m-n}{n}\right) \times 100 = \left(\frac{18-12}{12}\right) \times 100$$

$$= \frac{6}{12} \times 100 = 50\%$$

> **3.** 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
>
> $$\frac{\text{S.P}_1}{100+x} = \frac{\text{S.P}_2}{100+y} = \frac{\text{C.P.}}{100} = \frac{\text{S.P}_1 - \text{S.P}_2}{x - y},$$
>
> where x or y is –ve, if it indicates a loss, otherwise it is +ve.

Illustration 11 By selling a radio for ₹1536, Suresh lost 20% What per cent shall he gain or lose by selling it for ₹2000?

Solution: Here $\quad$ S.P$_1$ = 1536, $x = -20$

$\qquad\qquad\qquad\qquad$ (–ve sign indicates loss)

$\qquad\qquad$ S.P$_2$ = ₹2000, $y = ?$

Using the formula,

$$\frac{\text{S.P}_1}{100+x} = \frac{\text{S.P}_2}{100+y}$$

we get $\qquad \dfrac{1536}{100-20} = \dfrac{2000}{100+y}$

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

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

Thus, Suresh has a gain of $4\frac{1}{6}\%$ by selling it for ₹2000.

> **4.** If '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 –ve, of it indicates a loss, otherwise it is +ve.

Illustration 12 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: Here $m = 10$, $n = 5$, $z = ₹462$.

Using the formula,

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

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

$$= \frac{462 \times 10000}{110 \times 105} = ₹400$$

Illustration 13 'A' sells a DVD to 'B' at a gain of 17% and 'B' again sells it to 'C' at a loss of 25% If 'C' pays ₹1053 to 'B', what is the cost price of the DVD to 'A'?

Solution: We have, $m = 17$, $n = -25$, $z = ₹1053$

$\therefore$ Cost price of DVD to 'A'

$$= \left[\frac{100^2 z}{(100+m)(100+n)}\right]$$

$$= \frac{100 \times 100 \times 1053}{(100+17)(100-25)}$$

$$= \frac{100 \times 100 \times 1053}{117 \times 75} = ₹1200$$

> **5.** If 'A' sells an article to 'B' at a gain/loss of $m\%$ and 'B' sells it to 'C' at a gain/loss of $n\%$, then the resultant profit/loss per cent is given by
>
> $$\left(m + n + \frac{mn}{100}\right) \qquad (1)$$
>
> where m or n is –ve, if it indicates a loss, otherwise it is +ve.

> **Note:**
>
> The expression given by (1) represents resultant profit or loss accordingly as it is +ve or –ve.

Illustration 14 'A' sells a horse to 'B' at a profit of 5% and 'B' sells it to 'C' at a profit of 10% Find the resultant profit per cent

Solution: We have, $m = 5$ and $n = 10$

$$\therefore \quad \text{Resultant profit\%} = \left(m + n + \frac{mn}{100} \right)$$

$$= \left(5 + 10 + \frac{5 \times 10}{100} \right)$$

$$= \frac{31}{2}\% \text{ or, } 15\frac{1}{2}\%$$

Illustration 15 Manoj sells a shirt to Yogesh at a profit of 15% and Yogesh sells it to Suresh at a loss of 10% Find the resultant profit or loss

Solution: Here $\qquad m = 15, n = -10$

$$\therefore \quad \text{Resultant profit/loss\%} = \left(m + n + \frac{mn}{100} \right)$$

$$= \left(15 - 10 + \frac{15 \times -10}{100} \right)$$

$$= \left(15 - 10 - \frac{150}{100} \right)$$

$$= 7/2\% \text{ or, } 3\frac{1}{2}\%$$

which represents profit as the sign is +ve

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6. When two different articles are sold at the same selling price, getting gain/loss of $x\%$ on the first and gain/loss of $y\%$ on the second, then 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 accordingly as its sign is +ve or –ve.

7. When two different articles are sold at the same selling price getting a gain of $x\%$ on the first and loss of $x\%$ on the second, then the overall% loss in the transaction is given by

$$\left(\frac{x}{10} \right)^2 \%$$

Note that in such questions there is always a loss.

Explanation

Let each article be sold at ₹z.

Since gain/loss of $x\%$ is made on the first, cost price of the first article

$$= ₹z \left(\frac{100}{100 + x} \right)$$

Also, gain/loss of $y\%$ is made on the second, therefore cost price of the second article

$$= ₹z \left(\frac{100}{100 + y} \right)$$

$$\therefore \quad \text{Total C.P.} = z \left(\frac{100}{100 + x} \right) + z \left(\frac{100}{100 + y} \right)$$

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

Total S.P. = $2z$

$$\therefore \quad \text{Overall \% gain or loss} = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$$

$$= \frac{2z - \dfrac{100z[100 + x + 100 + y]}{(100 + x)(100 + y)}}{\dfrac{100z[100 + x + 100 + y]}{(100 + x)(100 + y)}} \times 100$$

$$= \frac{2(100 + x)(100 + y) - 100(200 + x + y)}{100(200 + x + y)} \times 100$$

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

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

Note:

In case $y = -x$, we have

$$\text{Overall\% gain or loss} = -\frac{x^2}{100}\%$$

Since the sign is –ve, there is always a loss.

Illustration 16 Mahesh sold two scooters, each for ₹24000. If he makes 20% profit on the first and 15% loss on the second, what is his gain or loss per cent in the transaction?

Solution: Here $x = 20$ and $y = -15$

$$\therefore \quad \text{Over all gain/loss\%}$$

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

$$= \left[\frac{100(20 - 15) + 2 \times 20 \times -15}{(100 + 20) + (100 - 15)} \right]\%$$

$$= -\frac{100}{205}\% = -\frac{20}{41}\%$$

which represents loss, being a –ve expression.

Illustration 17 Rajesh sold two horses for ₹990 each; gaining 10% on the one and losing 10% on the other. Find his total gain or loss per cent

Solution: Here $x = 10$

$\therefore \quad$ Overall loss% $= \left(\dfrac{x}{10}\right)^2 \%$

$\qquad\qquad\qquad = \left(\dfrac{10}{10}\right)^2 \% = 1\%$

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

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

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

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

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

Illustration 18 A dishonest shopkeeper professes to sell cloth at the cost price but he uses faulty metre rod. His metre rod measures 95 cm only. Find his gain per cent

Solution: Here True measure = 100 cm

$\qquad\qquad\qquad$ False measure = 95 cm.

Since the shopkeeper sells the cloth at cost price,

$\therefore \qquad\qquad\qquad x = 0.$

$\therefore$ Over all gain% is given by

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

$\Rightarrow \qquad \dfrac{100 + g}{100} = \dfrac{100}{95}$

$\Rightarrow \qquad 100 + g = \dfrac{100 \times 100}{95}$

$\Rightarrow \qquad g = \dfrac{10000}{95} - 100$

$\qquad\qquad = 5\dfrac{5}{19}\%$

Illustration 19 A dis-honest shopkeeper professes to sell his goods at cost price but he uses a weight of 800 g for the kg weight. Find his gain per cent

Solution: $\quad$ True measure $= 1000\ g$

$\qquad\qquad$ False measure $= 800\ g$

Also, $\qquad\qquad\qquad x = 0$

$\therefore$ Overall gain% is given by

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

$\Rightarrow \qquad \dfrac{100 + g}{100} = \dfrac{1000}{800}$

$\Rightarrow \qquad 100 + g = \dfrac{1000 \times 100}{800}$

$\Rightarrow \qquad g = \dfrac{1000}{8} - 100 = 25\%$

Illustration 20 A shopkeeper sells the goods at 44% loss on cost price but uses 30% less weight. What is his percentage profit or loss?

Solution: Here $\qquad x = -44$ and $y = 30$

$\therefore \quad$ Overall gain/loss% $= \left(\dfrac{y + x}{100 - y}\right) \times 100\%$

$\qquad\qquad\qquad = \left(\dfrac{30 - 44}{100 - 30} \times 100\right)\%$

$\qquad\qquad\qquad = \left(\dfrac{-14}{70} \times 100\right)\% = -20\%$

which represents loss being a negative expression.

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10. 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

   $$= \frac{A(100 + \%\text{gain})}{(100 - \%\text{loss}) + (100 + \%\text{gain})}$$

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

   $$= \frac{A(100 - \%\text{loss})}{(100 - \%\text{loss}) + (100 + \%\text{gain})}$$

Illustration 21 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: Cost price of the book sold at a loss of 20%

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

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

Cost price of the book sold at a profit of 25%

$$= \frac{410\,(100-20)}{(100-20)+(100+25)} = \frac{410 \times 80}{80+125}$$

$$= ₹160$$

11. If two successive discounts on an article are $m\%$ and $n\%$, respectively, then a single discount equivalent to the two successive discounts will be

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

Explanation

Let the marked price of the article be ₹100.

∴ S.P. after the first discount = ₹$(100-m)$ and

discount at $n\%$ on ₹$(100-m) = ₹\dfrac{(100-m) \times n}{100}$

∴ Single equivalent discount

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

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

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

12. If three successive discounts on an article are $l\%$, $m\%$ and $n\%$, respectively, then a single discount equivalent to the three successive discounts will be

$$\left[l+m+n-\frac{(lm+ln+mn)}{100}+\frac{lmn}{100^2}\right]\%$$

Explanation

Let the marked price of the article be ₹100

∴ S.P. after the first discount = ₹$(100-l)$

Second discount at $m\%$ on ₹$(100-l)$

$$= ₹\frac{(100-l) \times m}{100}$$

∴ S.P. after second discount

$$= ₹(100-l)-\frac{(100-l)m}{100}$$

$$= ₹\frac{100\,(100-l)-(100-l)\,m}{100}$$

$$= ₹\frac{(100-l) \cdot (100-m)}{100}$$

Third discount at $n\%$ on ₹$\dfrac{(100-l)(100-m)}{100}$

$$= ₹\frac{(100-l)(100-m)n}{100 \times 100}$$

∴ S.P. after third discount

$$= ₹\frac{(100-l)(100-m)}{100}-\frac{(100-l)(100-m)n}{100 \times 100}$$

$$= ₹\frac{(100-l)(100-m)(100-n)}{100 \times 100}$$

$$= \left(l+m+n-\frac{(lm+ln+mn)}{100}+\frac{lmn}{(100)^2}\right)$$

∴ Single equivalent discount

$$= \left(l+m+n-\frac{(lm+ln+mn)}{100}+\frac{lmn}{(100)^2}\right)\%$$

Illustration 22 Find a single discount equivalent to two successive discounts of 10% and 20%

Solution: The equivalent single discount is given by

$$\left(10+20-\frac{10 \times 20}{100}\right)\% \text{ i.e., } 28\%$$

Illustration 23 Find a single discount equivalent to three successive discounts of 10%, 20% and 30%

Solution: The equivalent single discount is given by

$$\left(10+20+30-\frac{(10 \times 20+10 \times 30+20 \times 30)}{100}+\frac{10 \times 20 \times 30}{100^2}\right)\%$$

i.e., $\left(60-11+\dfrac{6}{10}\right)\% = \dfrac{496}{10}\%$ or, 49.6%

Illustration 24 Two shopkeepers sell machines at the same list price. The first allows two successive discounts of 30% and 16% and the second 20% and 26% Which discount series is more advantageous to the purchaser?

Solution: A single discount equivalent to the two successive discounts of 30% and 16% is $\left(30+16-\dfrac{30 \times 16}{100}\right)\%$

or, $\left(46-\dfrac{24}{5}\right)\%$ or, $41\dfrac{1}{5}\%$

Also, a single discount equivalent to the two successive discounts of 20% and 26% is $\left(20 + 26 - \dfrac{20 \times 26}{100}\right)\%$

or, $\left(46 - \dfrac{26}{5}\right)\%$ or, $40\dfrac{4}{5}\%$

Clearly, the discount series being offered by the first shopkeeper is more advantageous to the purchaser.

13. A shopkeeper sells an item at ₹z after giving a discount of d% on labelled price. Had he not given the discount, he would have earned a profit of p% on the cost price.

The cost price of each item is given by

$$\text{C.P.} = \left[\frac{100^2 z}{(100 - d)(100 + p)}\right]$$

Illustration 25 A shopkeeper sold sarees at ₹266 each after giving 5% discount on labelled price. Had he not given the discount, he would have earned a profit of 12% on the cost price. What was the cost price of each saree?

Solution: We have, labelled price z = ₹266, discount d = 5% and profit p = 12%

Using the formula:

$$\text{C.P.} = \left[\frac{100^2 z}{(100 - d)(100 + p)}\right]$$

we get the cost price of each saree

$$= \left[\frac{100 \times 100 \times 266}{(100 - 5)(100 + 12)}\right]$$

$$= \frac{100 \times 100 \times 266}{95 \times 112} = ₹250$$

Practice Exercises

DIFFICULTY LEVEL-1
(BASED ON MEMORY)

1. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:

(a) 25   (b) 18

(c) 16   (d) 15

[Based on MAT, 2004]

2. 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) ₹250   (d) ₹240

[Based on MAT, 2003]

3. A shopkeeper sold a TV set for ₹17,940, with a discount of 8% and gained 19.6% If no discount is allowed, then what will be his gain per cent?

(a) 25%   (b) 26.4%

(c) 24.8%   (d) None of these

[Based on MAT, 2003]

4. My friend collects antique stamps. She purchased two, but found that she needed to raise money urgently. So she sold them for ₹8000 each. On one she made 20% and on the other she lost 20% How much did she gain or lose in the entire transaction?

(a) No loss/profit   (b) ₹667 loss

(c) ₹667 profit   (d) None of these

[Based on MAT, 2003]

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

(a) 20%   (b) 25%

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

[Based on MAT, 2003]

6. On selling a pen at 5% loss and a book at 15% gain, Karim gains ₹7. If he sells the pen at 5% gain and the book at 10% gain, then he gains ₹13. The actual price of the book is:

(a) ₹100   (b) ₹80

(c) ₹10   (d) ₹400

[Based on MAT, 2003]

7. By selling 33 metres of cloth, a shopkeeper gains the price of 11 metres of cloth. His gain per cent is:

(a) 7%   (b) 50%

(c) 20%   (d) 22%

[Based on MAT, 2002]

8. If 7% of the sale price of an article is equivalent to 8% of its cost price and 9% of its sale price exceeds 10% of its cost price by ₹1, then what is the cost price of the article?

(a) ₹400   (b) ₹350

(c) ₹300   (d) ₹280

[Based on MAT, 2002]

9. A cycle agent buys 30 bicycles, of which 8 are first grade and the rest are second grade, for ₹3150, Find at what

price he must sell the first grade bicycles so that if he sells the second grade bicycles at three quarters of the price, he may make a profit of 40% on his outlay?

(a) ₹200　　　　　　　(b) ₹240

(c) ₹180　　　　　　　(d) ₹210

10. The retail price of a water geyser is ₹1265. If the manufacturer gains 10%, the wholesale dealer gains 15% and the retailer gains 25%, then the cost of the product is:

(a) ₹800　　　　　　　(b) ₹900

(c) ₹700　　　　　　　(d) ₹600

11. If the cost of 12 pencils is equal to the selling price of 10 pencils, the profit per cent in the transaction is:

(a) $16\frac{2}{3}\%$　　　　　　(b) 18%

(c) 20%　　　　　　　(d) 25%

12. Two motor cars were sold for ₹9,900 each, gaining 10% on one and losing 10% on the other. The gain or loss per cent in the whole transaction is:

(a) Neither loss nor gain　(b) 1% profit

(c) $\frac{100}{99}\%$ profit　　　　(d) 1% loss

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

(a) ₹12　　　　　　　(b) ₹1296

(c) ₹14.40　　　　　　(d) None of these

14. Ravi sells an article at a gain of $12\frac{1}{2}\%$. If he had sold it at ₹22.50 more, he would have gained 25% The cost price of the article is:

(a) ₹162　　　　　　　(b) ₹140

(c) ₹196　　　　　　　(d) ₹180

15. A machine is sold at a profit of 10% Had it been sold for ₹40 less, there would have been a loss of 10% What was the cost price?

(a) ₹175　　　　　　　(b) ₹200

(c) ₹225　　　　　　　(d) ₹250

16. A house costs C rupees. Later it was sold for a profit of 25% What is the capital gains tax if it is 50% of the profit?

(a) C/24　　　　　　　(b) C/8

(c) C/4　　　　　　　(d) C/2

17. If selling price is doubled, the profit triples. Find the profit per cent.

(a) $66\frac{2}{3}$　　　　　　　(b) 100

(c) $105\frac{1}{3}$　　　　　　(d) 120

18. Rawat sold a book at 10% loss. Had he sold it for ₹85 more, then he would have made a profit of 7% What was the cost price of the book?

(a) ₹500　　　　　　　(b) ₹850

(c) ₹615　　　　　　　(d) ₹585

19. What is the percentage profit made by selling an umbrella at a certain price, if by selling at two-thirds of that price, there would be a loss of 10%?

(a) 25%　　　　　　　(b) 30%

(c) 35%　　　　　　　(d) None of these

20. If 7 kg of tea of price ₹72/kg is blended with 33 kg of tea of ₹87/kg and 35 kg of ₹85/kg and the mixture is sold at 15% profit, then what is the selling price of the mixture?

(a) ₹80.66/kg　　　　　(b) ₹102.33/kg

(c) ₹91.22/kg　　　　　(d) ₹97.37/kg

21. A property dealer sells a house for ₹6,30,000 and in the bargain makes a profit of 5% Had he sold it for ₹5,00,000, then what percentage of loss or gain he would have made?

(a) 15% loss　　　　　(b) 15% gain

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

22. Sita buys a fridge at 15/16 of its original value and sells it for 10% more than its value. Then, the gain % is:

(a) 15.55　　　　　　　(b) 11.67

(c) 16.67　　　　　　　(d) None of these

23. A cash payment that will settle a bill for 250 chairs are ₹50 per chair less 20% and 15% with a further discount of 5% on cash payment is:

(a) ₹8075

(b) 7025

(c) ₹8500

(d) None of these

24. A shopkeeper is giving 6 kg of rice at the price of ₹5 per kg. What should be the markup on cost price if he wants to make a profit of 20 per cent?

(a) 25%　　　　　　　(b) 50%

(c) 44%　　　　　　　(d) 20%

25. A sweet seller sells three-fifths part of sweets at a profit of 10% and remaining at a loss of 5% If the total profit is ₹1500, then what is the total cost price of sweets?

(a) ₹36,500
(b) ₹37,000
(c) ₹37,500
(d) None of these

26. A sold an article to B at a profit of 20% B sold the same article to C at a loss of 25% and C sold the same article to D at a profit of 40% If D paid ₹252 for the article, then find how much did A pay for it?

(a) ₹175
(b) ₹200
(c) ₹180
(d) ₹210

27. If the absolute difference between the selling price of the article when there is 15% loss and 15% gain in selling a article is ₹450, then what is the cost price of the article?

(a) ₹1,200
(b) ₹1,500
(c) ₹2,000
(d) ₹2,200

28. On selling an article at successive discounts of 20% and 25%, a dealer makes a net profit of 20% Find the net profit per cent if the dealer sells the same article at a discount of 25%

(a) 50%
(b) 40%
(c) 66.66%
(d) 60%

29. If the selling price of a mat is five times the discount offered and if the percentage of discount is equal to the percentage profit, find the ratio of the discount offered to the cost price.

(a) 11:30
(b) 1:5
(c) 1:6
(d) 7:30

30. A sells his house to B at a profit of 10% who in turn sells it to C at a profit of 15% who in turn sells it to D at a profit of 25% and D sells it to E at 35% profit. If cost price of E's house is ₹35,00,000, what is the approximate cost price of A's house?

(a) ₹15,40,000
(b) ₹15,10,000
(c) ₹15,00,000
(d) ₹16,40,000

31. A book vendor sold a book at a loss of 10% Had he sold it for ₹108 more, he would have earned a profit of 10% Find the cost price of the book.

(a) ₹432
(b) ₹540
(c) ₹648
(d) ₹740

32. A dishonest dealer marks up the price of his goods by 20% and gives a discount of 10% to the customer. He also uses a 900 g weight instead of 1 kilogram weight. Find his profit percentage.

(a) 8%
(b) 12%
(c) 20%
(d) None of these

33. A man buys 6 dozen eggs for ₹10.80, and 12 eggs are found rotten and the rest are sold at 5 eggs per rupee. Find his percentage gain or loss.

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

34. If an article is sold at 8% profit instead of 8% loss, it would have brought ₹12 more. Find out the cost price of the article.

(a) ₹75
(b) ₹72
(c) ₹60
(d) ₹70

35. A dishonest shopkeeper pretends to sell his goods at cost price but using false weights and gains $11\frac{1}{9}$%. For a weight of 1 kg he uses:

(a) A weight of 900 g
(b) A weight of 950 g
(c) A weight of 875 g
(d) None of these

[Based on NMAT, 2006]

36. Rehaan purchased a bike for ₹54000. He sold it at a loss of 8 per cent. With that money he again purchased another bike and sold it at a profit of 10 per cent. What is his overall loss/profit?

(a) Loss of ₹657
(b) Profit of ₹567
(c) Loss of ₹648
(d) Profit of ₹648

37. A retailer bought a certain number of CDs for ₹1800. Keeping one to himself, he sold the rest at a profit of ₹6 each. In total, he earned a profit of ₹114. The number of CDs he bought is:

(a) 20
(b) 28
(c) 32
(d) 30

[Based on MAT (Sept), 2010]

38. A garment company declared 15% discount for wholesale buyers. Mr Sachdev bought garments from the company for ₹25000 after getting discount. He fixed up the selling price of garments in such a way that he earned a profit of 8% on original company price. What is the approximate total selling price?

(a) ₹28000
(b) ₹29000
(c) ₹31000
(d) ₹29500

[Based on MAT (Sept), 2010]

39. A person bought two tables for ₹2200. He sells one at 5% loss and the other at 6% profit and thus on the whole he neither gains nor loses. Find the cost price of each table.

(a) ₹1500, ₹700
(b) ₹2000, ₹200
(c) ₹1200, ₹1000
(d) ₹1100, ₹1100

[Based on MAT (Sept), 2010, (Dec), 2009]

40. A shopkeeper sold an article at a profit of 17.5% If he had bought it at 8% less and sold it at 30% profit, he would have earned ₹11.55 more as profit. Cost price of the article is:

(a) ₹550
(b) ₹675
(c) ₹750
(d) ₹1475

41. A man invested ₹8000 for a year in the share market. At the end of the year, he gained 15% and he invested the amount with profit again for the second year. At the end of the second year, he suffered a loss of 15% Find the gain or loss per cent in the investment after two years:

(a) Gain 3.25%
(b) Loss 2.25%
(c) No loss no gain
(d) Loss 5%

42. By selling an article at 80% of its marked price, a merchant makes a loss of 12% What will be the per cent profit or loss made by the merchant if he sells the article at 95% of its marked price?

(a) 5.5% profit
(b) 1% loss
(c) 5% profit
(d) 4.5% profit

43. What is the maximum percentage discount that a merchant can offer on her marked price so that she ends up selling at no profit or loss, if she had initially marked her goods up by 50%?

(a) 16.67%
(b) 20%
(c) 50%
(d) 33.33%

44. A tradesman gives 4% discount on the marked price and 1 article free with every 15 articles bought and still gains 35% The marked price is more than the cost price by:

(a) 40%
(b) 39%
(c) 20%
(d) 50%

45. Even after reducing the marked price of a pen by ₹32, a shopkeeper makes a profit of 15% If the cost price be ₹320, what percentage of profit does he make if he sells the pen at the marked price?

(a) 25%
(b) 20%
(c) 10%
(d) 30%

46. Tarun got 30% concession on the labelled price of an article and sold it at ₹8750 with 25% profit on the price he bought. What was the labelled price?

(a) ₹16000
(b) ₹12000
(c) ₹10000
(d) ₹14000

47. The retail price of a water geyser is ₹1265. If the manufacturer gain 10%, the wholesale dealer gains 15% and the retailer gains 25%, then the cost of the product is:

(a) ₹800
(b) ₹900
(c) ₹700
(d) ₹600

48. A machine is sold at a profit of 10% Had it been sold for ₹40 less, there would have been a loss of 10% What was the cost price?

(a) ₹175
(b) ₹200
(c) ₹225
(d) None of these

49. What per cent profit would be if 34% of cost price is 26% of the selling price?

(a) 30.77%
(b) 74%
(c) 25.16%
(d) 88.40%

50. What per cent selling price would be 34% of cost price, if gross profit is 26% of the selling price?

(a) 25.16%
(b) 74.00%
(c) 17.16%
(d) 88.40%

51. A student purchased a computer system and a colour printer. If he sold the computer system at 10% loss and the colour printer at 20% gain, he would not lose anything. But if he sells the computer system at 5% gain and the colour printer at 15% loss, he would lose ₹800 in the bargain. How much did he pay for the colour printer?

(a) ₹8000
(b) ₹16000
(c) ₹9000
(d) ₹5334

52. A man sells a book at a profit of 20% If he had bought it at 20% less and sold it for ₹18 less, he would have gained 25% The cost price of the book is:

(a) ₹80
(b) ₹70
(c) ₹60
(d) ₹90

53. 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 ₹400, the value of the consignment was:

(a) ₹15000
(b) ₹12000
(c) ₹10000
(d) ₹20000

54. Even after reducing the marked price of a transistor by ₹32, a shopkeeper makes a profit of 15% If the cost price be ₹320, what percentage of profit would he have made if he had sold the transistor at the marked price?

(a) 25%
(b) 20%
(c) 10%
(d) None of these

55. By selling 12 notebooks, the seller earns a profit equal to the selling price of 2 notebooks. What is his percentage profit?

(a) 25%

(b) 20%

(c) $16\frac{2}{3}$%

(d) Data inadequate

56. A shopkeeper marks the prices of his goods at 25% higher than the original price. After that, he allows a discount of 12% What profit or loss did he get?

(a) 15% profit

(b) 10% profit

(c) 10% loss

(d) 15% loss

57. Ramesh purchased a bicycle for ₹5200 and spent ₹800 on its repairs. He had to sell it for ₹5500. Find his profit or loss per cent.

(a) $7\frac{1}{2}$% gain

(b) $8\frac{1}{3}$% loss

(c) 9% loss

(d) None of these

58. A milkman buys milk contained in 10 vessels of equal size. If he sells his milk at ₹5 a litre, he loses ₹200; if he sells it at ₹6 a litre, he would gain ₹150 on the whole. Find the number of litres contained in each vessel:

(a) 20 L

(b) 30 L

(c) 25 L

(d) 35 L

59. A man buys apples at a certain price per dozen and sells them at eight times per hundred. What is his gain or loss per cent?

(a) 4% loss

(b) $8\frac{1}{4}$% loss

(c) 4% gain

(d) $6\frac{1}{4}$% gain

60. Sita buys a fridge at $\frac{15}{16}$ of its original value and sells it for 10% more than its value. Then, gain per cent is:

(a) 15.55

(b) 11.67

(c) 16.67

(d) None of these

61. A trader has 50 kg of rice, a part of which he sells at 10% profit and the rest at 5% loss. He gain 7% on the whole. How much was sold at 10% gain and how much was sold at 5% loss?

(a) 40 kg and 15 kg

(b) 30 kg and 10 kg

(c) 35 kg and 40 kg

(d) 40 kg and 10 kg

62. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It costs him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3000 per week in order to operate that plant. The number of units he should produce and sell in order to make a profit of at least ₹1000 per week is:

(a) 250

(b) 300

(c) 400

(d) 200

63. If the selling price of a product is increased by ₹162, then the business would make a profit of 17% instead of a loss of 19% What is the cost price of the product?

(a) ₹540

(b) ₹450

(c) ₹360

(d) ₹600

64. 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 shirt in women's shirts is:

(a) 0.0466

(b) 0.0666

(c) 0.0166

(d) None of these

65. A trader charges 20% over the cost price. He allowed a 10% discount on account of Diwali on the listed price. What is the net percentage gain?

(a) 15%

(b) 12%

(c) 8%

(d) 10%

66. A shopkeeper sells two radios at ₹1540 each. On one he gains 12% and on the other he loses 12% What was the net result of the sale of both the radios?

(a) No loss no profit

(b) Gain of ₹165

(c) Loss of ₹45

(d) Gain of ₹45

67. By selling 12 marbles for a rupee, a shopkeeper loses 20% In order to gain 20% in the transaction, he should sell the marbles at the rate of how many marbles for a rupee?

(a) 8

(b) 6

(c) 4

(d) 3

68. In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what per centage of the selling price is the profit?

(a) 30%

(b) 70%

(c) 100%

(d) 250%

69. A loss of 19% gets converted into a profit of 17% when the selling price is increased by ₹162. Find the cost price of the article.

(a) ₹450
(b) ₹600
(c) ₹360
(d) ₹540

[Based on MAT, 1999]

70. When a commission of 36% is given on the retail price, profit is 8.8% Find the profit when the commission is decreased by 24%

(a) 76%
(b) 54%
(c) 58%
(d) 49.6%

[Based on MAT, 1999]

71. A horse and a carriage together cost ₹8,000. If by selling the horse at a profit of 10%, and the carriage at a loss of 10%; a total profit of 2.5% is made, then what is the cost price of the horse?

(a) ₹3,000
(b) ₹3,500
(c) ₹4,000
(d) ₹5,000

[Based on MAT, 1999]

72. A machine is sold at a profit of 10% Had it been sold for ₹80 less, there would have been a loss of 10% The cost price of the machine is:

(a) ₹350
(b) ₹400
(c) ₹450
(d) ₹520

[Based on MAT, 1999]

73. At what percentage above the cost price must an article be marked so as to gain 33% after allowing a customer a discount of 5%?

(a) 48%
(b) 43%
(c) 40%
(d) 38%

[Based on MAT, 1999]

74. A man gains 10% by selling a certain article for a certain price. If he sells it at double the price, then the profit made is:

(a) 120%
(b) 60%
(c) 100%
(d) 80%

[Based on MAT, 1999]

75. The sale price of an article including the Sales Tax is ₹616. The rate of Sales Tax is 10% If the shopkeeper has made a profit of 12%, find the cost price.

(a) ₹500
(b) ₹515
(c) ₹550
(d) ₹600

[Based on MAT, 1999]

76. There would be 10% loss if rice is sold at ₹5.40 per kg. At what price per kg should it be sold to earn a profit of 20%?

(a) ₹12
(b) ₹12.96
(c) ₹14.40
(d) ₹7.20

[Based on MAT, 2000]

77. If I purchased 11 books for ₹10 and sold all the books at the rate of 10 books for ₹11, the profit per cent is:

(a) 10%
(b) 11%
(c) 21%
(d) 100%

[Based on MAT, 2000]

78. A owns a house worth ₹10,000. He sells it to B at a profit of 10% based on the worth of the house. B sells the house back to A at a loss of 10% In this transaction A gets:

(a) No profit no loss
(b) Profit of ₹100
(c) Profit of ₹1,100
(d) Profit of ₹2,000

[Based on MAT, 2000]

79. A horse and a cow were sold for ₹12,000 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 gain
(b) Loss of ₹1,000
(c) Gain of ₹1,000
(d) Gain of ₹2,000

[Based on MAT, 2000]

80. A machine is sold at a profit of 10% Had it been sold for ₹40 less, there would have been a loss of 10% What was the cost price?

(a) ₹175
(b) ₹200
(c) ₹225
(d) ₹250

[Based on MAT, 2000]

81. Ajay loses 20% of his money. After spending 80% of the remainder, he is left with ₹4500. How much money (in rupees) did he have initially?

(a) 16785
(b) 36165
(c) 17165
(d) 28125

[Based on JMET, 2011]

82. Even after reducing the marked price of a transistor by ₹32, a shopkeeper makes a profit of 15% If the cost price be ₹320, what percentage of profit would he have made if he had sold the transistor at the marked price?

(a) 25%
(b) 20%
(c) 10%
(d) None of these

[Based on MAT, 2011]

83. A man bought two packets of toffees, the same number in each. The first, he bought at 5 paise each, but the second at 3 for 13 paise. He then mixed them all together and sold them at 70 paise a dozen. His gain is:

(a) 25%
(b) 12%
(c) 24%
(d) 16%

[Based on MAT, 2012]

84. A manufacturer sell 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, thereby earning a profit of 25% The cost price for the manufacture is:

(a) ₹15
(b) ₹16
(c) ₹17
(d) ₹18

[Based on MAT, 2012]

85. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It cost him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3000 per week in order to operate the plant. The number of units he should produce and sell in order to make a profit of atleast ₹1000 per week, is:

(a) 200   (b) 250
(c) 300   (d) 400

86. A man bought two packets of toffees, the same number in each. The first, he bought at 5 paise each, but the second at 3 for 13 paise. He then mixed them all together and sold them at 70 paise a dozen. His gain is:

(a) 25%   (b) 12%
(c) 24%   (d) 16%

87. A manufacturer sell 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, thereby earning a profit of 25% The cost price for the manufacture is:

(a) ₹15   (b) ₹16
(c) ₹17   (d) ₹18

88. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It cost him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3000 per week in order to operate the plant. The number of units he should produce and sell in order to make a profit of atleast ₹1000 per week, is:

(a) 200   (b) 250
(c) 300   (d) 400

89. What per cent selling price would be 34% of the cost price if the gross profit is 26% of the selling price?

(a) 74.00%   (b) 25.16%
(c) 17.16%   (d) 88.40%

90. A student purchased a computer system and a colour printer. If he sold the computer system at 10% loss and the colour printer at 20% gain, he wold not lose anything. But if he sells the computer system at 5% gain and the colour printer at 15% loss, he would lose ₹800 in the bargain. How much did he pay for the colour printer?

(a) ₹16000   (b) ₹8000
(c) ₹9000   (d) ₹5334

91. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It cost him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3000 per week in order to operate that plant. The number of units he should produce and sell in order to make a profit of at least ₹1000 per week is:

(a) 300   (b) 400
(c) 250   (d) 200

92. Aditi bought an article and spent ₹110 on its repairs. She then sold it to Samir at a profit of 20% Samir sold it to vikas at a loss of 10% Vikash finally sold it for ₹1188 at a profit of 10% How much did Aditi pay for the article?

(a) ₹890   (b) ₹1000
(c) ₹780   (d) ₹840

93. A shopkeeper labeled the price of his articles so as to earn a profit of 30% on the cost price. He, then sold the articles by offering a discount of 10% on the labeled price. What is the actual per cent in the deal?

(a) 18%
(b) 15%
(c) 20%
(d) None of these

94. A mixture of 12 kg of wheat flour costing 16 per kg and 4 kg of corn flour costing ₹2 per kg is sold at ₹16 per kg. What is the profit made in selling 40 kg of the mixture?

(a) ₹140   (b) ₹280
(c) ₹300   (d) ₹420

95. A man buys a watch for ₹1950 in cash and sells it for ₹2200 on credit of 1 year. If the rate of interest is 10% per annum, then the man:

(a) Gains ₹55   (b) Gains ₹50
(c) loses ₹30   (d) Gains ₹30

96. A man buys apples at a certain price per dozen and sells them at eight times per hundred. What is his gain or loss percent?

(a) 4% loss   (b) $8\frac{1}{2}$ loss
(c) 4% gain   (d) $6\frac{1}{4}$% gain

97. By selling 12 notebooks, the seller earns a profit equal to the selling price of two notebooks. What is his percentage profit?

(a) 25%   (b) 20%
(c) $16\frac{2}{3}\%$ (d) data inadequate

DIFFICULTY LEVEL-2
(BASED ON MEMORY)

1. The marked price for a pair of shoes is 60% above the cost price. A shopkeeper sells the pair of shoes after giving a discount of x% Now he raises the marked price by x% and gives a discount of $(x + 5)$% If the profit earned in the second case is twice that of the first case, find the value of x.

   (a) 20
   (b) 25
   (c) 10
   (d) 15

2. A showroom owner sells a leather jacket for ₹X and claims to make a profit of 10% He plans to have a stall in the trade fair and marks the same jacket at ₹$2X$. At the stall, he allows a discount of 20% What will be the percentage profit that he will make at the trade fair?

   (a) 80%
   (b) 60%
   (c) 76%
   (d) None of these

   [Based on IIT Joint Man. Ent. Test, 2004]

3. If a person makes a profit of 10% on one-fourth of the quantity sold and a loss of 20% on the rest, then what is his average per cent profit or loss?

   (a) 12.5% profit
   (b) 11.25% loss
   (c) 11.75% profit
   (d) 12.5% loss

   [Based on IIT Joint Man. Ent. Test, 2004]

4. The initial profit percentage for a shirt is 87.5%, which is sold after giving a discount of 20% Due to some reason the cost price of making a shirt increases by 25% Now a shirt is sold after raising the marked price by ₹500 and giving a discount of 25% If the percentage profit still remains the same, find the new selling price of the shirt.

   (a) ₹800
   (b) ₹1,000
   (c) ₹1,200
   (d) ₹1,500

5. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It costs him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3000 per week in order to operate that plant. The number of units he should produce and sell in order to make a profit of at least ₹1000 per week is:

   (a) 400
   (b) 300
   (c) 250
   (d) 200

   [Based on FMS (Delhi), 2003]

6. Profit after selling an article for ₹425 is the same as the loss after selling it for ₹355. The cost of the article is:

   (a) ₹385
   (b) ₹390
   (c) ₹395
   (c) ₹400

   [Based on FMS (Delhi), 2003]

7. A tradesman by means of false balance defrauds to the extent of 8% in buying goods and also defrauds to the extent of 8% in selling. His gain per cent is:

   (a) 16%
   (b) 15.48%
   (c) 16.64%
   (d) 36%

   [Based on FMS (Delhi), 2003]

8. In a game show, each participation costs ₹150. The 1st person to play wins ₹10, the second person wins ₹50, the 3rd person wins ₹100 and the 4th person wins ₹250. This cycle is repeated with 5th person winning ₹10. After 83 people have played, how much profit has the game show made for itself?

   (a) 4090
   (b) 3990
   (c) 3900
   (d) 8180

   [Based on SCMHRD En. Exam., 2003]

9. A furniture store owner has determined that he can sell 100 chairs a month at a selling price of ₹200 each. For each rise of ₹4 in the selling price, he will sell 2 less chairs a month. If he sells the chairs for ₹Z each, then how much money a month will he receive from the sale of chairs?

   (a) $200 - Z/2$
   (b) $50Z + Z^2/4$
   (c) $150Z - Z^2/4$
   (d) $200Z - Z^2/2$

   [Based on SCMHRD Ent. Exam., 2003]

10. To make an article, it takes 40 hrs for a workman who is paid ₹1.80 per hour. The material, 20 per cent of which is wasted in the course of working, costs ₹22.5 per kilogram. The final weight of the article is 8 kg. At what price it must be sold so as to yield a profit of 33.33 per cent?

    (a) ₹360
    (b) ₹404
    (c) ₹396
    (d) ₹384

11. A shopkeeper sold an article for ₹6,750 after giving a discount of 10% on the labelled price. He would have earned a profit of 50%, had there been no discount. What was the actual percentage of profit earned?

    (a) 36
    (b) 40
    (c) 35
    (d) None of these

    [Based on IRMA, 2002]

12. The evergreen shrubs at Ravi's nursery are planted in rows on a square plot of land measuring 2,401 square ft. The shrubs are planted in such a manner that the centres of the shrubs are 7 ft apart and the outer shrubs are planted along the edges of the plot, with a shrub at each corner. Ravi spent ₹896 to cover all the costs necessary for raising this crop of the evergreen shrubs. If Ravi succeeds in selling each shrub for ₹35, his profit will be what percentage of his total cost?

    (a) 100%
    (b) 50%
    (c) 125%
    (d) 150%

13. A wealthy man bought two flats in a posh locality to have a fixed return. But a financial crunch at his home forced him to sell both the flats soon, and he sold both at the rate of ₹3,00,000 each. He thereby incurred a loss of 20% on one of the flats and a gain of 20% on the other. What was the overall profit or loss he incurred in the entire transaction?

    (a) No gain, no loss (b) ₹25,000 profit
    (c) ₹25,000 loss (d) ₹10,000 loss

14. A shopkeeper marked price of an article as 150% of cost price and he has two schemes

    (i) **Scheme A:** You can purchase one article at a discount of 20%

    (ii) **Scheme B:** Purchase two articles at a discount of 30% each.

    He sold 80% of articles under the scheme B and rest under the scheme A. Then, his overall profit is:

    (a) 8% (b) 12%
    (c) 16% (d) 6%

15. The amount of wheat at the rate of ₹610 per quintal which should be added to 126 quintals of wheat costing ₹285 per quintal so that 20% may be gained by selling the mixture at ₹480 per quintal will be:

    (a) 38 quintals
    (b) 49 quintals
    (c) 69 quintals
    (d) None of the above

16. Amit went to Mumbai and bought a pair of watches costing ₹360 at 25% discount on each but on the way back he loses one of these watches and had to buy them (pair) again home. How much did he totally spend on the watches?

    (a) ₹620 (b) ₹720
    (c) ₹540 (d) ₹630

17. The cost price of 16 apples is equal to the selling price of 10 apples. The cost price of 12 oranges is equal to the selling price of 16 oranges and the cost price of 6 mangoes is equal to the selling price of 4 mangoes. If the ratio of the cost price of 1 apple, 1 orange and 1 mango is in the ratio of 1:1:2, then find the net profit per cent on the sale of 1 apple, 2 oranges and 2 mangoes.

    (a) 25% (b) 30%
    (c) 35% (d) 40%

18. The market price of an article is ₹100. If it is sold at a discount of 10%, a profit of 35% is made. How much loss of profit will be made if it is sold for ₹ less then the market price?

    (a) 5% loss (b) 8% gain
    (c) 5% gain (d) 8% loss

19. The cost price of three varieties of apples namely A, B and C is ₹20/kg, ₹40/kg and ₹50/kg. Find the selling price of one kg of apple in which these three varieties of apples are mixed in the ratio of 2:3:5 such that there is a net profit of 20%?

    (a) ₹48 (b) ₹48.6
    (c) ₹49.2 (d) ₹49.8

20. The market price of an article was 40% more than its cost price. I was going to sell it at market price to a customer, but he showed me some defects in the article, due to which I gave him a discount of 28.57% Next day he came again and showed me some more defects, hence I gave him another discount that was equal to 12.5% of the cost price. What was the approximate loss to me?

    (a) Loss of 10% (b) Loss of 12.5%
    (c) Loss of 15% (d) None of these

21. A shopkeeper buys a toy at ₹100 and sells it at ₹120. Another shopkeeper buys the same toy at ₹120 but sells it at ₹100. What are the respective profit/loss per cent for the two shopkeepers?

    (a) 20%, 20% (b) 20%, 16.7%
    (c) 16.7%, 16.7% (d) 16.7% 10%

22. Cost price of 12 oranges is equal to the selling price of 9 oranges and the discount on 10 oranges is equal to the profit on 5 oranges. What is the percentage point difference between the profit percentage and discount percentage?

    (a) 20 (b) 22.22
    (c) 16.66 (d) 15

23. If books bought at prices ranging from ₹200 to ₹350 are sold at prices ranging from ₹300 to ₹425. What is the greatest possible profit that might be made in selling eight books?

    (a) ₹800 (b) ₹1,800
    (c) ₹1,800 (d) None of these

24. A businessman marked the price of his goods 30% more than his C.P. He then sells $\frac{1}{4}$ th of his stock at a discount of 15%, and half of the stock at the marked price, and the rest at a discount of 30% Find his gain percentage.

    (a) 16.5% (b) 15.375%
    (c) 14.20% (d) 13.37%

25. When a bicycle manufacturer reduced its selling price by 50%, the number of bicycles sold radically increased by 600% Initially the manufacturer was getting only 140% profit. What is the percentage increase of his profit?

    (a) 10%
    (b) 14%
    (c) 0%
    (d) Cannot be determined

26. The marked price of a watch is ₹1,600. The shopkeeper gives successive discount of 10%, r% to the customer. If the customer pays ₹1,224 for the watch, find the value of r.

(a) 10%
(b) 20%
(c) 25%
(d) 15%

27. A trader sells goods to a customer at a profit of k% over the cost price, besides it he cheats his customer by giving 880g only instead of 1 kg. Thus his overall profit percentage is 25% Find the value of k.

(a) 8.33%
(b) 8.25%
(c) 10%
(d) 12.5%

28. Ms. Priyanka sold two properties X and Y for ₹30000 each. She sold property X for 20% more than she paid for it and sold property Y for 20% less than she paid for it. If the expenses are disregarded, what was her gain or loss, if any, on the two properties?

(a) Gain of ₹2500
(b) Loss of ₹2500
(c) Gain of ₹1250
(d) There was neither a net gain or a net loss

[Based on ATMA, 2005]

29. A farmer sold a cow and an ox for ₹800 and got a profit of 20% on the cow and 25% on the ox. If he sells the cow and the ox for ₹820 and gets a profit of 25% on the cow and 20% on the ox, the individual cost price of the cow and the ox is:

(a) ₹515.60, ₹115.60 (approx.)
(b) ₹531.50, ₹135.50 (approx.)
(c) ₹530.60, ₹131.60 (approx.)
(d) Cannot be determined

[Based on NMAT, 2005]

30. A man sells two horses for ₹1485. The cost price of the first is equal to the selling price of the second. If the first is sold at 20% loss and the second at 25% gain, what is his total gain or loss (in rupees)?

(a) ₹80 gain
(b) ₹60 gain
(c) ₹60 loss
(d) Neither gain nor loss

[Based on NMAT, 2005]

31. Vineet calculates his profit percentage on the selling price whereas Roshan calculates his profit on the cost price. They find that the difference of their profit is ₹275. If the selling price of of both them are the same and Vineet gets 25% profit and Roshan gets 15% profit, then find their selling price.

(a) ₹2100
(b) ₹2300
(c) ₹2350
(d) ₹2250

[Based on NMAT, 2005]

32. Padam purchased 30 kg of rice at the rate of ₹17.50 per kg and another 30 kg of rice at a certain rate. He mixed the two and sold the entire quantity at the rate of ₹18.60 per kg and made 20% overall profit. At what price per kg did he purchase the lot of another 30 kg rice?

(a) ₹14.50
(b) ₹13.50
(c) ₹12.50
(d) ₹15.50

[Based on NMAT, 2005]

33. A trader purchases a watch and a wall clock for ₹390. He sells them marking a profit of 10% on the watch and 15% on the wall clock. He earns a profit of ₹51.50. The difference between the original prices of the wall clock and the watch is equal to:

(a) ₹110
(b) ₹100
(c) ₹80
(d) ₹120

[Based on NMAT, 2005]

34. A shopkeeper sold an air-conditioner for ₹25935 at a discount of 9% and earned a profit of 3.74% What would have been the percentage of profit earned if no discount had been offered?

(a) 15.6%
(b) 16%
(c) 12.3%
(d) None of these

[Based on IRMA, 2005]

35. Pure Ghee costs ₹100 per kg. After adulterating it with vegetable oil costing ₹50 per kg, a shopkeeper sells the mixture at the rate of ₹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

[Based on FMS (MS), 2006]

36. A fruit vendor professes to sell fruits at the cost price, but uses false weights. He gains 30% in this manner. What weight does he substitute for one kilogram?

(a) $645\dfrac{1}{3}$ g
(b) 750 g
(c) $769\dfrac{3}{13}$ g
(d) 800 g

[Based on JMET, 2011]

37. A dishonest dealer sells his goods at the cost price and still earns a profit of 25% by under weighing. What weight does he use for a kilogram?

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

[Based on FMS, 2005]

Directions (Q. 38-39): *Based on the information given below.*

Books and More sells books, music CDs and film DVDs. In December 2009, they earned 40% profit in music CDs and 25% profit in books. Music CDs contributed 35% towards their total sales in rupees. At the same time total sales in rupees from books is 50% more than that of music CDs.

38. If Books and More have earned 20% profit overall, then in film DVDs they made:

(a) 15.2% profit

(b) 10.0% profit

(c) 10.0% loss

(d) 23.4% loss

39. If Books and More made 50% loss in film DVDs, then overall they made:

(a) 12.3% profit

(b) 8.7% profit

(c) 0.4% loss

(d) 6.25% loss

40. A dealer sold a radio at a loss of 2.5% Had he sold it for ₹100 more, he would have gained $7\frac{1}{2}$% In order to gain $12\frac{1}{2}$%, he should sell it for:

(a) ₹850

(b) ₹925

(c) ₹1080

(d) ₹1125

41. A space research company wants to sell its two products A and B. If the product A is sold at 20% loss and the product B at 30% gain, the company will not lose anything. If the product A is sold at 15% loss and the product B at 15% gain, the company will lose ₹6 million in the deal. What is the cost of product B?

(a) ₹140 million

(b) ₹120 million

(c) ₹100 million

(d) ₹80 million

42. A jobber buys an article at "₹24 less $12\frac{1}{2}$%". He then wishes to sell the article at a gain of $33\frac{1}{3}$% of his cost after allowing a 20% discount on his marked price. At what price, in rupees, should the article be marked?

(a) 30.00

(b) 33.60

(c) 40.00

(d) None of these

43. A farmer bought 749 sheep. He sold 700 of them for the price paid for the 749 sheep. The remaining 49 sheep were sold at the same price per head as the other 700. Based on the cost, the per cent gain on the entire transaction is:

(a) 6.5

(b) 6.75

(c) 7.0

(d) 7.5

44. Sumit works as a state contractor for PWD and supplies bitumen mix for road construction. He has two varieties of bitumen, one at ₹42 per kg and the other at ₹25 per kg. How many kg of first variety must Sumit mix with 25 kg of second variety, so that he may, on selling the mixture at 40 kg, gain 25% on the outlay?

(a) 30

(b) 20

(c) 25

(d) None of these

45. A Techno Company has 14 machines of equal efficiency in its factory. The annual manufacturing costs are ₹42000 and establishment charges are ₹12000. The annual output of the company is ₹70000. The annual output and manufacturing costs are directly proportional to the number of machines. The shareholders get 12.5% profit, which is directly proportional to the annual output of the company. If 7.14% machines remain closed throughout the year, then the percentage decrease in the amount of profit of the shareholders would be:

(a) 12%

(b) 12.5%

(c) 13%

(d) None of these

46. A small and medium enterprise imports two components A and B from Taiwan and China respectively and assembles them with other components to form a toy. Component A contributes to 10% of production cost. Component B contributes to 20% of the production cost. Usually, the company sells this toy at 20% above the production cost. Due to increase in the raw material and labour cost in both the countries, component A became 20% costlier and component B became 40% costlier. Owing to these reasons the company increased its selling price by 15% Considering that cost of other components does not change, what will be the profit percentage, if the toy is sold at the new price?

(a) 15.5%

(b) 25.5%

(c) 35.5%

(d) 40%

47. A salesman sells two kinds of trousers—cotton and woollen. A pair of cotton trousers is sold at 30% profit and a pair of woollen trousers is sold at 50% profit. The salesman has calculated that if he sells 100% more woollen trousers than cotton trousers, his overall profit will be 45% However he ends up selling 50% more cotton trousers than woollen trousers. What will be his overall profit?

(a) 37.5%

(b) 40%

(c) 41%

(d) 42.33%

48. A shopkeeper gives two successive discounts of 10 and 20% on a marked price of ₹5000 for a bicycle. He had to give a further discount of 20% of the cost price on his new selling price, as a result of which he made neither a profit nor a loss. Find the cost price of the bicycle.

(a) ₹2000

(b) ₹3000

(c) ₹3600

(d) ₹4500

Directions (Q. 49–50): *Answer the questions based on the following information.*

Mr. David manufactures and sells a single product at a fixed price in a niche market. The selling price of each unit is ₹30. On the otherhand, the cost, in rupees, of producing x units is $240 + bx + cx^2$, where b and c are some constants. Mr. David noticed that doubling the daily production from 20 to 40 units increases the daily production cost by $16\frac{2}{3}\%$. However, an increase in daily production from 40 to 60 units results in an increase of only 50% in the daily production cost. Assume that demand is unlimited and that Mr. David can sell as much as he can produce. His objective is to maximize the profit.

49. How many units should Mr. David produce daily?

(a) 100   (b) 70

(c) 150   (d) 130

50. What is the maximum daily profit, in rupees, that Mr. David can realize from his business?

(a) 920   (b) 840

(c) 760   (d) 620

(e) Cannot be determined

51. After allowing a discount of 11.11%, a trader still makes a gain of 14.28% At what percent above the cost price does he mark in his goods?

(a) 28.56%   (b) 35%

(c) 22.22%   (d) None of these

52. A dealer buys fruits at ₹100, 80 and 60 per kg. He mixes them in ratio 3: 4: 5 by weight and sells at a profit of 50% At what price per kg does he sell the dry fruit?

(a) ₹80   (b) ₹100

(c) ₹95   (d) None of these

Directions (Q. 53–54): *Answer the questions based on the following information.* A watch dealer incurs an expense of ₹150 for producing every watch. He also incurs an additional expenditure of ₹30,000 that is independent of the number of watches produced. If he is able to sell a watch during the season, he sells it for ₹250. If he fails to do so, he has to sell each watch for ₹100.

53. If he is able to sell only 1200 out of 1500 watches he has made in the season, then he has made a profit of:

(a) ₹90,000   (b) ₹75,000

(c) ₹45,000   (d) ₹60,000

54. If he produces 1500 watches, what is number of watches that he must sell during the season in order to breakeven, given that he is able to sell all the watches produced?

(a) 500   (b) 700

(c) 800   (d) 1000

55. Instead of metre scale, cloth merchant uses a 120 cm scale while buying, but uses an 80 cm scale while selling the same cloth. If he offers a discount of 20% on cash payment, what is his overall profit percentage?

(a) 20%   (b) 25%

(c) 40%   (d) 15%

56. A stockiest wants to make some profit by selling sugar. He contemplates about various methods. Which of the following would maximize his profit?

I. Sell sugar at 10% profit

II. Use 900 g of weight instead of 1 kg.

III. Mix 10% impurities in sugar and selling sugar at cost price.

IV. Increase the price by 5% and reduce weights by 5%

(a) I or II   (b) II

(c) II, III, and IV   (d) Profit are same

57. A dealer offer a cash discount of 20% and still makes a profit of 20%, when he further allows 16 articles to a dozen to a particularly sticky bargainer. How much percent above the cost price were his wares listed?

(a) 100%   (b) 80%

(c) 75%   (d) $66\frac{2}{3}\%$

58. A driver of an auto-rickshaw makes a profit of 20% on every trip when he carries three passengers and the price of petrol is ₹30/L. Find the percentage profit for the same journey if he goes for four passenger per trip and the price of petrol reduces to ₹24/L? (Assume that revenue per passenger is the same in both the cases).

(a) 33.33%

(b) 65.66%

(c) 100%

(d) Data inadequate

59. After selling a watch, Sultan found that he had made a loss of 10% He also found that had he sold it for ₹27 more, he would have made a profit of 5% The actual initial loss was what percentage of the profit earned, had he sold the watch for a 5% profit?

(a) 23%   (b) 150%

(c) 180%   (d) 200%

60. A dealer buys dry fruit at the rate of ₹100, ₹80 and ₹60 per kg. He bought them in the ratio 12 : 15 : 20 by weight. He in total gets 20% profit by selling the first two and at last he finds he has no gain no less in selling the whole quantity which he had. What was the percentage loss he suffered for the third quantity?

(a) 40%   (b) 20%

(c) 30%   (d) 50%

61. 11. The capital of company is made up of 50,000 preferred shares with dividend of 20% and 20,000 common shares, the par value of each type of share being 10. The company had a total profit of 1,80,000 out of which 30,000 was kept in reserve and the remaining distributed to shareholders. Find the dividend percent to the common shareholders.

(a) 20%   (b) 24%

(c) 25%   (d) 30%

62. A manufacturer of a certain item can sell all he can produce at the selling price of ₹60 each. It costs him ₹40 in materials and labour to produce each item and he has overhead expenses of ₹3,000 per week in order to operate that plane. The number of units he should produce and sell in order to make a profit of at least ₹3,000 per week in order to operate that plant. The number of units he should produce and sell in order to make a profit of at least ₹1,000 per week is:

(a) 300   (b) 250

(c) 400   (d) 200

Answer Keys

DIFFICULTY LEVEL-1

1. (c)	2. (a)	3. (d)	4. (b)	5. (d)	6. (b)	7. (b)	8. (b)	9. (c)	10. (a)	11. (c)	12. (d)	13. (c)
14. (d)	15. (b)	16. (b)	17. (b)	18. (a)	19. (c)	20. (d)	21. (d)	22. (d)	23. (a)	24. (c)	25. (c)	26. (b)
27. (b)	28. (a)	29. (d)	30. (d)	31. (b)	32. (c)	33. (a)	34. (a)	35. (a)	36. (d)	37. (a)	38. (c)	39. (c)
40. (a)	41. (b)	42. (d)	43. (d)	44. (d)	45. (a)	46. (c)	47. (a)	48. (b)	49. (a)	50. (a)	51. (b)	52. (d)
53. (a)	54. (a)	55. (b)	56. (b)	57. (b)	58. (d)	59. (a)	60. (d)	61. (d)	62. (d)	63. (b)	64. (a)	65. (c)
66. (c)	67. (a)	68. (b)	69. (a)	70. (d)	71. (d)	72. (b)	73. (c)	74. (a)	75. (a)	76. (d)	77. (c)	78. (c)
79. (b)	80. (b)	81. (d)	82. (a)	83. (a)	84. (c)	85. (a)	86. (a)	87. (c)	88. (a)	89. (b)	90. (a)	91. (d)
92. (a)	93. (d)	94. (a)	95. (a)	96. (a)	97. (b)							

DIFFICULTY LEVEL-2

1. (b)	2. (c)	3. (d)	4. (d)	5. (d)	6. (b)	7. (c)	8. (a)	9. (d)	10. (c)	11. (c)	12. (d)	13. (c)
14. (a)	15. (c)	16. (c)	17. (b)	18. (c)	19. (c)	20. (b)	21. (b)	22. (b)	23. (b)	24. (b)	25. (c)	26. (d)
27. (c)	28. (b)	29. (c)	30. (d)	31. (b)	32. (b)	33. (a)	34. (d)	35. (b)	36. (c)	37. (b)	38. (d)	39. (b)
40. (d)	41. (d)	42. (d)	43. (c)	44. (d)	45. (b)	46. (b)	47. (b)	48. (b)	49. (a)	50. (c)	51. (a)	52. (d)
53. (b)	54. (b)	55. (a)	56. (b)	57. (a)	58. (c)	59. (d)	60. (a)	61. (c)	62. (d)			

Explanatory Answers

DIFFICULTY LEVEL-1

1. (c)   Let S.P. of x articles $= ₹100$

                    $=$ C.P. of 20 articles

$\therefore$ C.P. of one article $= ₹5$

                Profit $= 25\%$

$\therefore$ S.P. of one article $= 6.25$

$\Rightarrow$ S.P. of x articles $= 6.25x$

$\therefore$ $6.25x = 100$

$\Rightarrow$ $x = 16.$

2. (a) Let the C.P. of the article be $₹x$.

        Profit $= 5\%$

$\therefore$ S.P. $= x + 5\%$ of $x = ₹\dfrac{21x}{20}$

If C.P. would have been $(x - 5\%$ of $x)$, i.e., $₹\dfrac{19x}{20}$ and

S.P. would have been $₹\left(\dfrac{21x}{20} - 1\right)$, then gain $\% = 10$

$\therefore$ $\dfrac{\left(\dfrac{21x}{20} - 1\right) - \dfrac{19x}{20}}{\dfrac{19x}{20}} \times 100 = 10$

$\Rightarrow$ $\dfrac{2x - 20}{19x} \times 100 = 10$

$\Rightarrow$ $19x = 20x - 200$

$\Rightarrow$ $x = 200.$

3. (d)   S.P. $= ₹17940$

      Discount $= 8\%$

$\therefore$ Marked Price $= \dfrac{17940 \times 100}{100 - 8} = ₹19500$

      Gain $= 19.6\%$

      C.P. $= \dfrac{17940 \times 100}{100 + 19.6} = ₹15000$

If no discount is allowed on the Marked Price, then S.P. $= ₹19500$

$\therefore$ Gain $\% = \dfrac{4500}{15000} \times 100 = 30.$

4. (b)   C.P. of one stamp $= \dfrac{8000 \times 100}{100 + 20}$

                   $= \dfrac{8000 \times 100}{120} = \dfrac{20000}{3}$

      C.P. of another stamp $= \dfrac{8000 \times 100}{100 - 20}$

                 $= \dfrac{8000 \times 100}{80} = 10000$

$\therefore$ C.P. of both the stamps $= \dfrac{50000}{3}$

      S.P. of both the stamps $= 16000$

$\therefore$ Loss $= \dfrac{2000}{3}$

            $= ₹666.67 \approx ₹667.$

5. (d) Let   S.P. $= ₹x$

$\therefore$ Expenses $= 15\%$ of $x = 0.15x$

        Profit $= 10\%$ of $x = 0.10x$

        C.P. $= ₹9$ (Given)

$\therefore$ $9 + 0.15x + 0.1x = x$

$\Rightarrow$ $x = 12$

$\therefore$ The rate of mark up on the article should be

$\dfrac{100}{3}\%$

6. (b)   Let actual price of the book $= ₹x$

           Let actual price of the pen $= ₹y$

$\therefore$ $(x + 15\%$ of $x) + (y - 5\%$ of $y) = x + y + 7$

$\Rightarrow$ $15x - 5y = 700$ (1)

Also $(x + 10\%$ of $x) + (y + 5\%$ of $y) = x + y + 13$

$\Rightarrow$ $10x + 5y = 1300$ (2)

Using (1) and (2), we get $x = 80, y = 100$

$\therefore$ Actual price of the book $= ₹80.$

7. (b)   Suppose S.P. of 33 metres of cloth $= ₹33$

$\therefore$ Gain $= ₹11 \Rightarrow$ C.P. $= ₹22$

$\Rightarrow$ Gain $= 50\%$

8. (b) Suppose C.P. $= x$ and S.P. $= y$

$\Rightarrow$ 7% of $y = 8\%$ of x

and 9% of $y = 10\%$ of $x + 1$

$\Rightarrow$ $7y = 8x$ and $9y = 10x + 100$

$\Rightarrow$ $9 \times \dfrac{8x}{7} = 10x + 100$

$\Rightarrow$ $x = 350.$

9. (c) Suppose the price of first grade cycle $= ₹x$ and the price of second grade cycle $= ₹y$.

$\therefore$ $8x + 22y = 3150$

Suppose he sells the first grade bicycles @ $₹z$ per bicycle

$\therefore \quad 8z + 22 \times \dfrac{3z}{4} = 3150 + 40\%$ of 3150

i.e., $\qquad 98z = 17640$

$\Rightarrow \qquad z = 180$

$\therefore$ S.P. of the first grade bicycle = ₹180

S.P. of the second grade bicycle = ₹135.

10. (*a*) Suppose the cost = ₹x

$\therefore$ S.P. of the manufacturer

$\qquad = x + 10\%$ of $x = \dfrac{11x}{10}$

$\Rightarrow$ S.P. of the wholesale dealer

$\qquad = \dfrac{11x}{10} + 15\%$ of $\dfrac{11x}{10}$

$\qquad = \dfrac{11x}{10} + \dfrac{33x}{200} = \dfrac{253}{200}x$

$\Rightarrow$ S.P. of the retailer

$\qquad = \dfrac{253}{200}x \quad 25\%$ of $\dfrac{253}{200}x$

$\qquad = \dfrac{253}{200}x + \dfrac{253}{800}x = \dfrac{1265}{800}x$

$\therefore \qquad \dfrac{1265}{800}x = 1265$

$\Rightarrow \qquad x = 800.$

11. (*c*) Let C.P. of 12 pencils = ₹12

$\therefore$ S.P. of 10 pencils = ₹12

C.P. of 10 pencils = ₹10

$\therefore \qquad$ Profit = 20%

12. (*d*) C.P. of the 1st Motor Car

$\qquad = \dfrac{9900 \times 100}{100 + 10} = ₹9000$

C.P. of the 2nd Motor Car

$\qquad = \dfrac{9900 \times 100}{100 - 10} = ₹11000$

$\therefore$ Total C.P. = ₹20000

Total S.P. = ₹19800

$\therefore \quad$ Loss % $= \dfrac{200}{20000} \times 100 = 1.$

13. (*c*) $\qquad 90 : 10.80 = 120 : x$

$\qquad \dfrac{90}{10.80} = \dfrac{120}{x}$

$\therefore \qquad x = \dfrac{120 \times 10.80}{90}$

$\qquad = 14.40.$

14. (*d*) $\qquad 12\dfrac{1}{2}\% = ₹22.50$

$\Rightarrow \qquad$ C.P. = ₹180.

15. (*b*) Let the C.P. be ₹k

$\therefore \qquad$ S.P. $= k + 10\%$ of $k = \dfrac{11k}{10}$

$\therefore \quad k - 10\%$ of $k = \dfrac{11k}{10} - 40$

$\Rightarrow \qquad \dfrac{9k}{10} = \dfrac{11k}{10} - 40$

$\Rightarrow \qquad \dfrac{2k}{10} = 40$

$\Rightarrow \qquad k = 200.$

16. (*b*) $\qquad$ C.P. = ₹C

Profit $= 25\%$ of $C = \dfrac{C}{4}$

S.P. $= C + \dfrac{C}{4} = \dfrac{5C}{4}$

If $\dfrac{C}{4} = 50\%$ profit, then Capital Gains Tax = 50% of

$\dfrac{C}{4} = \dfrac{C}{8}.$

17. (*b*) Let $\qquad$ C.P. = ₹x

$\therefore \qquad$ S.P. = ₹y.

Profit $= ₹(y - x)$

If $\qquad$ S.P $= 2y$, then profit $= 3(y - x)$

$\therefore \qquad 2y - x = 3(y - x)$

$\Rightarrow \qquad y = 2k$

$\therefore$ Profit on ₹x = ₹x; i.e., 100%

18. (*a*) Let C.P. of the book = ₹x

$\therefore \quad x - 10\%$ of $x + 85 = x + 7\%$ of x

$\Rightarrow \quad 17\%$ of $x = 85$

$\Rightarrow \qquad x = 500.$

19. (*c*) Let C.P of the umbrella = ₹x

Let S.P. of the umbrella = ₹y

$\therefore \qquad \dfrac{x - \dfrac{2}{3}y}{x} \times 100 = 10$

$\Rightarrow \qquad \dfrac{3x - 2y}{3x} \times 100 = 10$

$\Rightarrow \qquad \left(1 - \dfrac{2}{3} \times \dfrac{y}{x}\right) \times 100 = 10$

$\Rightarrow \qquad \dfrac{y}{x} = 1.35$

$\therefore \qquad$ Profit % $= \dfrac{y - x}{x} \times 100$

$\qquad = 100\dfrac{y}{x} - 100$

$\qquad = 135 - 100 = 35.$

20. (*d*) C.P./kg of the mixture

$$= \frac{7 \times 72 + 33 \times 87 + 35 \times 85}{75}$$

$$= \frac{504 + 2871 + 2975}{75}$$

$$= \frac{6350}{75} = ₹84.66$$

Profit = 15%

∴ S.P. per kg = ₹84.66 + 15% of ₹84.66

$$= ₹97.37.$$

21. (*d*)   S.P. = ₹630000

Profit = 5%

∴   C.P. = ₹600000

If S.P. would have been ₹500000, then there would have been a loss of $16\frac{2}{3}$%

22. (*d*)   Let original value = x

$$\text{C.P.} = \frac{15}{16} \times x = \frac{15}{16} x$$

$$\text{S.P.} = x + \frac{10}{100} \times x = \frac{11}{10} x$$

$$\text{gain\%} = \frac{\frac{11}{10} x - \frac{15}{16} x}{\frac{15}{16} x} \times 100\% = \frac{52}{3} = 17.33\%$$

23. (*a*) $₹250 \times 50 \left(\frac{80}{100}\right)\left(\frac{85}{100}\right)\left(\frac{95}{100}\right) = ₹8075$

24. (*c*) Let x be the cost price.

∴ cost of 6 kgs of rice = $6x$

With 20% profit margin, selling price = $6x \times 1.2$

This is the price charged for 5 kg

∴ Selling price of 1 kg = $\frac{6x \times 1.2}{5} = 1.44x$

∴ Markup = 44%

25. (*c*) Assume A be the cost price.

∴ $\left[\frac{3}{5} \times A \times \frac{10}{100} - \frac{2}{5} A \times \frac{5}{100}\right] = 1500$

or, $A = ₹37,500$

26. (*b*) Let the article costs 'x' to A

Cost price of B = $1.2x$

Cost price of C = $0.75(1.2x) = 0.9x$

Cost price of D = $1.4(0.9x) = 1.26x = 252$

Amount paid by A for the article = ₹200

27. (*b*)   115% of C.P. – 85% of C.P. = ₹450

∴   C.P. = ₹1,500

28. (*a*) Let the cost price and market price of the article be 'x' and 'y' respectivley.

Case 1: Successive discounts of 20% and 25%

Selling price of the aritcle = $(0.6)0.75y) = 0.6y$

Therefore, $0.6y = 1.2x$ or, $y = 2x$

Case 2: A single discount of 25%

Selling price of the article = $0.75y = 1.5x$

Net profit per cent = $\left[\frac{(1.5x - x)}{(x)}\right]100 = 50\%$

29. (*d*) Since   S.P. = 5 (M.P. – S.P.)

⇒   5 M.P. = 6 S.P.

⇒   M.P. = $\frac{6}{5}$ S.P.

Since the percentage discount = Percentage profit,

$$\frac{\frac{6}{5} \text{S.P.} - \text{S.P.}}{\frac{6}{5}\text{S.P.}} \times 100 = \frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$$

∴ $\frac{1}{6} = \frac{\text{S.P.}}{\text{C.P.}} - 1 \Rightarrow \text{S.P.} = \frac{7}{6} \text{C.P.}$

$$\text{M.P.} = \frac{6}{5} \text{S.P.} = \frac{6}{5} \times \frac{7}{6} \text{C.P.} = \frac{7}{5} \text{C.P.}$$

∴ Ratio of discount to C.P.

$$= \frac{\text{M.P.} - \text{S.P.}}{\text{C.P.}}$$

$$= \frac{\frac{7}{5} \text{C.P.} - \frac{7}{6} \text{C.P.}}{\text{C.P.}} = \frac{7}{30}.$$

30. (*d*) Let the cost price of A's house = ₹x

∴ Cost price of E's house

$$= 1.1 \times 1.15 \times 1.25 \times 1.35 \times x$$

∴ $3500000 = 1.1 \times 1.15 \times 1.25 \times 1.35 \times x$

∴ $x = \frac{3500000}{1.1 \times 1.15 \times 1.25 \times 1.35}$

$$\approx \frac{3500000}{1.26 \times 1.7} \approx ₹16,47,059$$

The nearest option is ₹16,40,000.

31. (*b*) Given: 108 = 10% loss + 10% profit

= 20% extra

Now,   20% = 108

∴   100% = 540

32. (c) Let the C.P. of 1,000 gm of goods be ₹1,000

   Marked price = ₹1,200

   Selling price = ₹1,200 × 0.9

   = ₹1,080

   (after a discount of 10%)

   ₹1,080 is the selling price of 900 g of goods (as he cheats to the extent of 10% while selling)

   C.P. of 900 g = ₹900

   Profit = ₹180

   ∴   Profit % = $\dfrac{180}{900} \times 100 = 20\%$

33. (a) 6 dozens eggs cost = ₹10.80

   Since one dozen is rotten, he sells only 5 dozen at 5 eggs per rupee.

   Hence,   S.P. = ₹12

   this gain % = $\dfrac{(12 - 10.8)}{10.8} \times 100 = 11\dfrac{1}{9}\%$

34. (a) Let the C.P. of the article be x.

   $1.08x - 0.92x = 12$

   ⇒ $0.16x = 12 \Rightarrow x = \dfrac{12}{0.16} = ₹75$

35. (a) Let gain = x

   $\dfrac{100}{9}\% = \dfrac{x}{1000 - x} \times 100\%$

   ⇒ $x = 100$

   ∴ He uses $1000 - 100 = 900$ g

36. (d)   Cost price = 54 000

   Selling price = $54000 \times \dfrac{(100 - 8)}{100}$

   = 49680

   Now, the cost price of another bike = 49680

   Selling price of another bike = $49680 \times \dfrac{110}{100} = 54648$

   Overall profit = 54648 − 54000 = 648

37. (a) Let he bought x number of CDs.

   ∴ $(x - 1) \times 6 = 114$

   ⇒ $x - 1 = 19$

   ⇒ $x = 20$

38. (c) Cost price of garments = ₹25000

   Original company price = $\dfrac{25000}{85} \times 100$

   ∴ Selling price of garments

   = $\dfrac{25000}{85} \times 100 \times \dfrac{108}{100}$

   = ₹31764.71 ≈ ₹31000

39. (c) Let the cost price of one table be x.

   Then, cost price of other table will be $(2200 - x)$.

   $x \times \dfrac{95}{100} + (2200 - x) \times \dfrac{106}{100} = 2200$

   ⇒ $95x + 233200 - 106x = 220000$

   ⇒ $11x = 13200$

   ⇒ $x = ₹1200$

   and, $2200 - x = ₹1000$

40. (a) Let cost price of article be ₹x.

   Then,

   $x \times \dfrac{117.5}{100} + 11.55 = x \times \dfrac{92}{100} \times \dfrac{130}{100}$

   ⇒ $x = \dfrac{11.55}{(0.92 \times 130 - 117.5)} \times 100$

   = ₹550

41. (b) Total amount after one year

   = $8000 \times \dfrac{115}{100} = ₹9200$

   Total amount after 2nd year = $9200 \times \dfrac{85}{100} = 7820$

   ∴ Loss per cent = $\dfrac{8000 - 7820}{8000} \times 100 = 2.25\%$

   Short cut method

   When a value is increased and then decreased by same percentage, then the value is always decreased and it is decreased by $\dfrac{x^2}{100}\%$

   So, loss per cent = $\dfrac{(15)^2}{100} = 2.25\%$

42. (d) Let the cost price of article be ₹x.

   Then, selling price of article = $0.88x$

   Marked price of article

   = $\dfrac{0.88}{80} \times 100 \times x = 1.1x$

   New selling price of article = $1.045x$

   ∴ Profit per cent = $\dfrac{1.045x - x}{x} \times 100 = 4.5\%$

43. (d) Let cost price = ₹100

   Marked price = ₹150

   ∴ Discount per cent = $\dfrac{50}{150} \times 100 = 33.33\%$

44. (d) Discount on articles
$$= \frac{1}{16} \times 100 = 6.25\%$$
Overall discount
$$= -4 - 6.25 + \frac{4 \times 6.25}{100} = -10\%$$
Let cost price = ₹100, then
Selling price = ₹135
So, 90% of marked price = 135
$$\text{Marked price} = \frac{135 \times 100}{90} = ₹150$$
Marked price is increased by
$$= \frac{150 - 100}{100} \times 100 = 50\%$$

45. (a)
$$\text{S.P.} = \frac{115}{100} \text{ C.P.} = \frac{115}{100} \times 320 = ₹368$$
And   S.P. = MP − 32
So,   MP = S.P. + 32 = 368 + 32 = ₹400
$$\text{Per cent profit} = \frac{400 - 320}{320} \times 100 = 25\%$$

46. (c)
$$\text{S.P.} = \frac{70}{700} \text{MP}$$
S.P. of Tarun = ₹8750
$$\text{Labelled price} = \frac{125}{100} \times \frac{70}{100} \text{MP} = 8750$$
$$\Rightarrow \quad \text{MP} = ₹10000$$

47. (a) Let the cost of the product be ₹x.
Then,
$$x \times \frac{110}{100} \times \frac{115}{100} \times \frac{125}{100} = 1265$$
$$\Rightarrow \quad x = 1265 \times \frac{100}{110} \times \frac{100}{115} \times \frac{100}{125}$$
$$= ₹800$$

48. (b) Let the cost price of the machine be ₹x.
Then,
$$x \times \frac{110}{100} - 40 = x \times \frac{90}{100}$$
$$\Rightarrow \quad x = 40 \times \frac{100}{20} = ₹200$$

49. (a) Let cost price and selling price be x and y, respectively.
$$\therefore \quad \frac{34}{100}x = \frac{26}{100}y$$
$$\Rightarrow \quad y = \frac{17}{13}x$$
$$\therefore \quad \text{Profit per cent} = \frac{y - x}{x} \times 100$$
$$= \frac{\frac{17}{13}x - x}{x} \times 100 \approx 30.77\%$$

50. (a) Let the selling price be ₹100, then profit = ₹26
$$\therefore \quad \text{Cost price} = 100 - 26 = ₹74$$
$$\therefore \quad \text{Required per cent} = (34\% \text{ of } 74)\%$$
$$= 25.16\%$$

51. (b) Let the cost price of colour printer and computer system be x and y respectively.
$$x \times \frac{120}{100} + y \times \frac{90}{100} = x + y$$
$$\Rightarrow \quad 0.2x = 0.1y \qquad (1)$$
$$x \times \frac{85}{100} + y \times \frac{105}{100} = x + y - 800$$
$$\Rightarrow \quad 0.05y = 0.15x - 800 \qquad (2)$$
From Eqs. (1) and (2),
$$x = ₹16000$$

52. (d) Let the cost price of book be ₹x.
Then, $(1.2x - 18) - 0.8x = 0.25 \times 0.8x$
$$0.4x - 18 = 0.20x$$
$$\Rightarrow \quad x = \frac{18}{0.20} = ₹90$$

53. (a) Let the value of consignment be x.
Then, $\frac{2}{3}x \times 1.05 + \frac{1}{3}x \times 0.98 = x + 400$
$$\Rightarrow \quad \frac{1}{3}x (3.08) = x + 400$$
$$\Rightarrow \quad \frac{0.08}{3}x = 400$$
$$\Rightarrow \quad x = ₹15000$$

54. (a) Cost price of transistor = ₹320
Selling price of transistor
$$= 320 \times 1.15 = ₹368$$
Marked price of transistor
$$= 368 + 32 = ₹400$$
$$\therefore \quad \text{Required percentage of profit}$$
$$= \frac{400 - 320}{320} \times 100 = 25\%$$

55. (b) Let the selling price of a notebook be ₹x.
Then, cost price of 12 notebooks
$$= 12x - 2x = 10x$$
$$\therefore \quad \text{Profit per cent} = \frac{2x}{10x} \times 100 = 20\%$$

56. (b) Profit per cent or loss per cent
$$= +25 - 12 - \frac{25 \times 12}{100} = +10\%$$
As the sign is + ve. So, there is a profit of 10%

57. (*b*) Total cost price = $5200 + 800 = ₹6000$

Selling price = ₹5500

∴ Loss per cent = $\dfrac{6000 - 5500}{6000} \times 100 = 8\dfrac{1}{3}\%$

58. (*d*) Let the quantity of milk in each vessel be x L.

∴ Quantity of milk in 10 vessels will be $10x$ L.

Selling price of $10x$ L $= 10x \times 5 = ₹50x$

∴   C.P. = ₹$(50x + 200)$

New selling price of $10x$ L

             $= 10x \times 6 = ₹60x$

∴   C.P. = ₹$(60x - 150)$

Now, $(50x + 200) = (60x - 150)$

⇒ $10x = 350$

∴ $x = 35$ L

59. (*a*) Let the cost price of 12 apples be ₹100.

Then, selling price of 100 apples will be ₹800.

∴ C.P. of 1 apple = $\dfrac{100}{12} = ₹\dfrac{25}{3}$

and S.P. of 1 apple = $\dfrac{800}{100} = ₹8$

Loss $= \left(\dfrac{25}{3} - 8\right) = ₹\dfrac{1}{3}$

Loss per cent = $\dfrac{\text{Loss}}{\text{CP}} \times 100 = \dfrac{\frac{1}{3}}{\frac{25}{3}} \times 100$

            $= \dfrac{1}{3} \times \dfrac{3}{25} \times 100$

            $= 4\%$

60. (*d*) Let the original value of fridge be ₹x.

Then, cost price = $\dfrac{15}{16}x$

Selling price = $\dfrac{110}{100} \times x$

∴ Gain per cent = $\dfrac{\frac{110}{100}x - \frac{15}{16}x}{\frac{15}{16}x} \times 100$

            $= 17.33\%$

61. (*d*) By the rule of allegation,
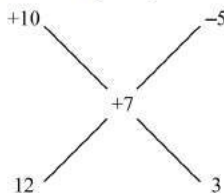
∴ Quantity of rice sold at 10% gain

     $= \dfrac{12}{12 + 3} \times 50 = 40$ kg

Quantity of rice sold at 50% loss

     $= \dfrac{3}{12 + 3} \times 50 = 10$ kg

62. (*d*) Required number of items

     $= \dfrac{(3000 + 1000)}{(60 - 40)}$

     $= \dfrac{4000}{20} = 200$

63. (*b*) $(17 + 19) = 36\%$ of the cost price = ₹162

∴ 100% of the cost price = $\dfrac{162}{36} \times 100 = ₹450$

64. (*a*) Women's shirts comprise 60% of the output.

∴ Men's shirts comprise 40% of the output.

∴ Average profit from men's shirts = 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.

65. (*c*) Suppose   C.P. = ₹100

           Profit = 20%

∴ Listed price = $₹100 \times \dfrac{100 + 20}{100}$

         $= ₹100 \times \dfrac{120}{100} = ₹120$

     Discount = 10%

∴ Discounted price = $120 \times \dfrac{100 - 10}{100}$

         $= ₹120 \times \dfrac{90}{100} = ₹108$

∴   Gain = ₹108 – ₹100

         = ₹8 on ₹100 = 8%

∴   Gain = ₹108 – ₹100 – 8 on ₹100

         = 8%

66. (*c*)   S.P. = ₹1540, Gain = 12%

     C.P. $= \dfrac{SP \times 100}{100 + \text{Gain}\%}$

         $= \dfrac{1540 \times 100}{112} = ₹1375$

     S.P. = ₹1540, loss = 12%

     C.P. $= \dfrac{SP \times 100}{100 - \text{Loss}\%} = \dfrac{1540 \times 100}{88}$

         $= ₹1750$

$\therefore$ S.P. of both the radios = ₹3080

C.P. of both the radios = ₹3125

$\therefore$ Net loss = ₹45

67. (*a*) S.P. of each marble = Re $\dfrac{1}{12}$

Loss = 20%

C.P. $= \dfrac{1}{12} \times \dfrac{100}{80} = \dfrac{5}{48}$

If gain = 20%, then S.P. per marble

$= \dfrac{5}{48} + 20\%$ of $\dfrac{5}{48} = \dfrac{1}{8}$

68. (*b*) Suppose C.P. = ₹100

Profit = ₹320

$\therefore$ S.P. = ₹420

If C.P. becomes ₹125, S.P. remaining the same, then profit = ₹295

$\therefore$ Profit % on S.P. $= \dfrac{295}{420} \times 100 \approx 70$

69. (*a*) Let the cost price of the article be ₹x.

At 19% loss, selling price

$= ₹\, x\left(\dfrac{100-19}{100}\right)$

$= ₹\dfrac{81x}{100}$

Now, according to the question,

$\left(\dfrac{81}{100}\right)x + 162 = x\left(\dfrac{117}{100}\right)$

or, $\dfrac{117}{100}x - \dfrac{81}{100}x = 162$

or, $\dfrac{36}{100}x = 162$

$\therefore \qquad x = \dfrac{162 \times 100}{36} = ₹450$

70. (*d*) Suppose retail price = ₹100

Commission = 36% = ₹36

$\therefore$ S.P. = ₹64

Profit = 8.8%

Let, C.P. = ₹K

$\therefore K + 8.8\%$ of $K = 64$

$\Rightarrow \qquad K = \dfrac{64 \times 100}{108.8} = 58.8$

If commission = 12% = ₹12,

S.P. becomes ₹88

$\therefore$ Profit % $= \dfrac{29.2}{58.8} \times 100 = 49.6$

71. (*d*) Suppose C.P. of Horse = ₹x

$\therefore$ C.P. of Carriage = ₹$(8000 - x)$

$\therefore$ 10% of x – 10% of $(8000 - x)$

$= 2.5\%$ of 8000

$\Rightarrow$ 20% of $x = 1000$

$\Rightarrow \qquad x = 5000$

72. (*b*) Let C.P. = ₹x

$\therefore$ S.P. $= x + 10\%$ of $x = \dfrac{11x}{10}$

If S.P. $= \dfrac{11x}{10} - 80$, then loss would have been 10%

$\therefore \quad \dfrac{11x}{10} - 80 = x - 10\%$ of x

$\Rightarrow \ 11x - 800 = 9x$

$\Rightarrow \qquad x = 400$

73. (*c*) Let C.P. = ₹x

Marked Price = ₹y

$\therefore$ S.P. $= x + 33\%$ of $x = \dfrac{133}{100}x$

Now, according to the question,

$y - 5\%$ of $y = \dfrac{133}{100}x$

$\Rightarrow \quad \dfrac{x}{95} = \dfrac{y}{133} = K$, say

$\Rightarrow x = 95K, y = 133K$

$\therefore \ x + p\%$ of $x = y$, say

$\Rightarrow 95K + p\%$ of $95K = 133K$

$\Rightarrow \ 95 + \dfrac{p}{100} \times 95 = 133$

$\Rightarrow 95p = 13300 - 9500 = 3800$

$\Rightarrow p \quad = 40$

74. (*a*) Let the C.P. be ₹100, then

S.P. = ₹110

New S.P. = ₹220

$\therefore$ Profit % $= 220 - 100 = 120$

75. (*a*) Let the C.P. be ₹x

$\therefore$ S.P. $= x + 12\%$ of $x = \dfrac{112}{100}x = \dfrac{56}{50}x = \dfrac{28}{25}x$

$\therefore \quad \dfrac{28}{25}x + 10\%$ of $\dfrac{28}{25}x = 616$

$\Rightarrow \ \dfrac{208}{250}x \qquad = 616$

$\Rightarrow \ x \qquad = 500$

76. (d)   S.P. of 1 kg of rice = ₹5.40

Loss = 10%

∴ C.P. of 1 kg of rice = ₹5.40 × $\dfrac{100}{100-10}$

$= ₹5.40 × \dfrac{100}{90} = ₹6$

In order to have a profit of 20%

S.P. of 1 kg of rice should be

$= ₹6 × \dfrac{100 × 20}{100}$

$= ₹6 × \dfrac{120}{100} = ₹7.20$

77. (c) C.P. of 11 books = ₹10

S.P. of 10 books = ₹11

∴ S.P. of 11 books = $₹\dfrac{11}{10} × 11 = ₹12.10$

∴ Profit = ₹12.10 – ₹11 = ₹2.10

Hence, profit % = $\dfrac{2.10}{10} × 100 = 21\%$

Quicker Method:

$\%\ profit = \dfrac{11 × 11 - 10 × 10}{10 × 10} × 100 = 21\%$

78. (c) A's Cost price of house = ₹10,000

∴ A's Selling Price = ₹10,000 × $\dfrac{100+10}{100}$

$= ₹10,000 × \dfrac{110}{100} = ₹11,000$

or B's Cost Price = ₹11,000

B's Selling Price = ₹11,000 × $\dfrac{100-10}{100}$

$= ₹11,000 × \dfrac{90}{100} = ₹9,900$

$= ₹9,900$

or A's second Cost Price = ₹9,900

Hence A's profit in this transaction

$= ₹(11,000 - 9,900) = ₹1,100$

79. (b) Total S.P. of horse and cow = ₹12000 × 2

= ₹24,000

C.P. of horse, sold at loss of 20%

$= ₹12000 × \dfrac{100}{100-20}$

$= ₹12000 × \dfrac{100}{80} = ₹15,000$

C.P. of cow, sold at gain of 20%

$= ₹12000 × \dfrac{100}{100+20}$

$= ₹12000 × \dfrac{100}{120} = ₹10000$

Total C.P. of horse and cow

$= ₹15000 + ₹10000 = ₹25000$

Hence, total loss = ₹25000 – ₹24000

= ₹1000

Quicker Method: When each of the two commodities is sold at the same price, and a profit of $x\%$ is made on one and a loss of $x\%$ is made on the other, then there is always loss and the percentage value is given as

$$\dfrac{(\%\ value)^2}{100}$$

Here required $x\%$ loss = $\dfrac{(20)^2}{100} = 4\%$

$Cost\ price = 12000 × 2 × \left(\dfrac{100}{100-4}\right)$

$= 24000 × \dfrac{100}{96} = ₹25000$

∴   loss = ₹25000 – ₹24000 = ₹1000

80. (b) Let the C.P. be ₹k

∴   S.P. = $k + 10\%$ of $k = \dfrac{11k}{10}$

Now, according to the question,

$k - 10\%$ of $k = \dfrac{11k}{10} - 40$

or, $\dfrac{9k}{10} = \dfrac{11k}{10} - 40$

or, $\dfrac{2k}{10} = 40$

∴ $k = 200$

81. (d) Let the amount after the loss = ₹x

So, $x - 80\%$ of $x = 4500$

20% of $x = 4500$

$x = \dfrac{4500 × 100}{20} = ₹22500$

This amount is after the 20% loss.

So, initial amount will be

$= 80\%$ of initial amount

$= 22500$

Initial amount = $\dfrac{22500 × 100}{80} = ₹28125$

82. (a) Given, CP = ₹320

SP = 115% of 320 = ₹368

Then, MP = 368 + 32 = ₹400

If transistor is sold at MP, then

Profit per cent $= \dfrac{400-320}{320} \times 100\% = \dfrac{80}{320} \times 100\% = 25\%$

83. (a) Let both the packets have x number of toffees.

then, CP of $2x$ toffees $= 5x + \dfrac{13x}{3} = \dfrac{28}{3}x$

And SP of $2x$ toffees $= \dfrac{70}{12} \times 2x = \dfrac{35}{3}x$

$\therefore$ Gain percentage $= \dfrac{\left(\dfrac{35}{3} - \dfrac{28}{3}\right)x}{\dfrac{28}{3}x} \times 100$

$= \dfrac{7}{28} \times 100 = 25\%$

84. (c) CP for the manufacturer

$= 30.09 \times \dfrac{100}{118} \times \dfrac{100}{120} \times \dfrac{100}{125} = ₹17$

85. (a) Let the manufacturer should produce 'x' number of articles per week.

Then for the profit of atleast ₹1000 per week,

$SP - CP = 1000$

$\Rightarrow \quad 60x - (40x + 3000) = 1000$

$\Rightarrow \quad 20x = 4000$

$\Rightarrow \quad x = 200$

86. (a) Let both the packets have x number of toffees.

then, CP of $2x$ toffees $= 5x + \dfrac{13x}{3} = \dfrac{28}{3}x$

And SP of $2x$ toffees $= \dfrac{70}{12} \times 2x = \dfrac{35}{3}x$

$\therefore$ Gain percentage $= \dfrac{\left(\dfrac{35}{3} - \dfrac{28}{3}\right)x}{\dfrac{28}{3}x} \times 100$

$= \dfrac{7}{28} \times 100 = 25\%$

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88. (a) Let the manufacturer should produce 'x' number of articles per week.

Then for the profit of atleast ₹1000 per week,

$SP - CP = 1000$

$\Rightarrow \quad 60x - (40x + 3000) = 1000$

$\Rightarrow \quad 20x = 4000$

$\Rightarrow \quad x = 200$

89. (b) Let SP of the object be ₹100.

$\therefore$ CP of the object

$= 100 - \dfrac{26}{100} \times 100 = ₹74$

We are given,

34% of CP of the object

$= \dfrac{34 \times 74}{100} = ₹25.16$

$= 25.16\%$ of SP

90. (a) Let the cost of computer system be ₹x and the cost of colour printer be ₹y.

Then, it is given that,

$x + y = \dfrac{90}{100}x + \dfrac{120}{100}y$

$\Rightarrow \quad 10x - 2y = 0$ (1)

and $\quad (x+y) - 800 = \dfrac{105}{100}x + \dfrac{85}{100}y$

$\Rightarrow \quad \dfrac{-5}{100} + \dfrac{15}{100}y = 800$

$\Rightarrow \quad -x + 3y = 16000$ (2)

On solving Eqs. (1) and (2),.we get

$x = 32000, y = 16000$

91. (d) Let the number of units produced per week be x.

Selling price of all units $= ₹60x$

and CP of all units $= ₹\,40x + 3000$

We are given, $40x + 3000 + 1000 = 60x$

$\Rightarrow \quad 20x = 4000$

$\therefore \quad x = 200$

Hence, he should produce at least 200 units to make a profit of ₹2000 per week.

92. (a) Let Aditi pay for the article $= ₹x$

She spent ₹110 on his repair, so its total cost $= ₹(x + 110)$

Now, she sold it to Samir at a profit of 20%

So, sale price $= (x+110) + (x+110) \times \dfrac{20}{100}$

$= (x+110) + \dfrac{(x+110)}{5}$

$= \dfrac{5x + 550 + x + 110}{5} = ₹\left(\dfrac{6x + 660}{5}\right)$

Now, Samir sold it to Vikas at a loss of 10%

So, sale price $= \left(\dfrac{6x \times 660}{5}\right) - \dfrac{6x + 660}{5} \times \dfrac{10}{100}$

$= \dfrac{6x + 660}{5} - \dfrac{6x + 660}{50}$

$= \dfrac{60x + 6600 - 6x - 660}{50} = ₹\dfrac{54x + 5940}{50}$

Now, finally vikas sold it for ₹1188, at a profit of 10%

So, sale price

$$= \frac{54x + 5940}{50} + \frac{54x + 5940}{50} \times \frac{10}{100}$$

$$\Rightarrow \quad 1188 = \frac{54x + 5940}{50} + \frac{54x + 5940}{500}$$

$$\Rightarrow \quad 1188 = \frac{540x + 59400 + 54x + 5940}{500}$$

$$\Rightarrow \quad \frac{594x + 65340}{500} = 1188$$

$$\Rightarrow \quad \frac{4(148.5x + 16335)}{500} = 1188$$

$$\Rightarrow \quad 148.5x + 16335 = 148500$$

$$\Rightarrow \quad 148.5x = 132165$$

$$\Rightarrow \quad x = \frac{132165}{148.5}$$

$$\therefore \quad x = ₹890$$

So, Aditi bought the article for ₹890.

93. (d) Let the cost price of the articles be ₹100

Marked price = ₹130

After giving a discount of 10% the selling price of the articles $= 0.9 \times 130 = 117$

So, actual profit per cent $= \frac{(117 - 100)}{100} \times 100 = 17\%$

94. (a)

C.P. of 16 kg of the mixture $= ₹(12 \times 16 + 4 \times 2) = ₹200$

S.P. of 16 kg of the mixture $= 16 \times 16 = ₹256$

$\therefore$ Actual gain $= \frac{40}{16} \times 56 = ₹140$

95. (a) Money paid to buy watch = ₹1950.

Money paid as interest of 10% on ₹1950 = ₹195

$\therefore$ Total money paid = ₹2145

Since S.P = ₹2200, therefore the man gained ₹55.

96. (a) Let man buys apples at ₹x per dozen.

$\therefore$ Cost price $= \frac{x}{12}$

and selling price $= \frac{8x}{100}$

Here, S.P < C.P., therefore there is loss

which is equal to CP–SP $= \frac{x}{12} - \frac{8x}{100} = \frac{25x - 24x}{300} = \frac{x}{300}$

$\therefore$ Loss per cent $= \frac{\text{Loss}}{\text{C.P}} \times 100 = \frac{x}{300} \times 100 \times \frac{12}{x} = 4\%$

97. (b) Let x be the selling price of 1 notebook.

$\therefore$ Selling price of 2 note books $= 2x = $ profit

As, we know, profit = selling price − cost price

$\therefore$ Cost price of 12 note books $= 12x - 2x = 10x$

$\therefore$ Profit (percentage) $= \frac{2x}{10x} \times 100 = 20\%$

DIFFICULTY LEVEL-2

1. (b) Let the C.P. be ₹100.

Then, $2\left[160\left\{\frac{(100 - x)}{100}\right\} - 100\right]$

$= \left[160\left\{\frac{(100 + x)}{100}\right\}\left\{\frac{(100 - (x + 5))}{100}\right\} - 100\right]$

Now, solve for x, we get x = 25

2. (c) S.P. at the stall at the trade fair

$= 2x - 20\% \text{ of } 2x = \frac{8x}{5}$

C.P. of the jacket $= \frac{x \times 100}{100 + 10} = \frac{10x}{11}$

$\therefore$ Profit $= \frac{8x}{5} - \frac{10x}{11} = \frac{38x}{55}$

$\therefore$ Profit % made at the trade fair

$= \frac{\dfrac{38x}{55}}{\dfrac{10x}{11}} \times 100$

$= \frac{38}{5} \times \frac{1}{10} \times 100 = 76.$

3. (d) Suppose C.P. = ₹100

$\therefore$ Gain on ₹25 = ₹2.50

$\Rightarrow$ S.P. = ₹27.50

Loss on ₹75 = ₹15

$\Rightarrow$ S.P. = ₹60

$\therefore$ Total S.P. = ₹87.50

$\Rightarrow$ Loss = ₹12.50.

4. (*d*) Let the C.P. be (*d*) x

Then, initial profit percentage

$$= \frac{\left[\left(\frac{15x}{8}\right)\left(\frac{4}{5}\right) - x\right]}{x} \times 100 \qquad (1)$$

In the second case, profit percentage

$$= \frac{\left[\left\{\left(\frac{15x}{8}\right) + 500\right\} \times \left(\frac{3}{4}\right) - \left(\frac{5x}{4}\right)\right]}{\left(\frac{5x}{4}\right)} \qquad (2)$$

Equate (1) and (2) to find the value of x as 800

And the new selling price

$$= \left(\frac{5}{4}\right) \times (1500 + 500)$$

$$= ₹1,500$$

5. (*d*) Suppose the manufacturer should produce x items

$$\therefore \qquad 60x - [40x + 3000] = 1000$$

$$\Rightarrow \qquad 20x = 4000$$

$$\Rightarrow \qquad x = 200.$$

6. (*b*) Suppose C.P. = ₹x

$$\therefore \qquad 425 - x = x - 355$$

$$\Rightarrow \qquad 2x = 780$$

$$\Rightarrow \qquad x = 390.$$

7. (*c*) The tradesman pays for 100 kg and 108 kg of goods by means of false balance.

Actually, he sells 108 kg of goods, but due to false balance, he sells 116.64 kg of goods.

8. (*a*) Profit per cycle = ₹190

Total profit = $20 \times 190 + 140 + 100 + 50$

$$= 3800 + 290 = ₹4090.$$

9. (*d*) If S.P. of each chair is ₹$Z = 200 + 4K$, then number of chairs purchased

$$= 100 - 2K = 100 - \frac{2(Z - 200)}{4}$$

$$= 100 - \frac{Z}{2} + 100$$

$$= 200 - \frac{Z}{2}$$

$\therefore$ Total money received from the sale of chairs

$$= Z\left(200 - \frac{Z}{2}\right) = 200Z - \frac{Z^2}{2}.$$

10. (*c*) Workman's wages = $1.8 \times 40 = ₹72$

Weight of material taken before working

$$= 8 \times \left(\frac{5}{4}\right) = 10 \text{ kg}$$

Cost of 10 kg of material = ₹225

Therefore, C.P. of the material = $225 + 72 = ₹297$

Hence, S.P. = $1.33 \times 297 = ₹396$

11. (*c*) Marked Price = ₹x, say

$$\text{S.P.} = x - 10\% \text{ of } x = \frac{9x}{10}$$

$$\therefore \qquad \frac{9x}{10} = 6750$$

$$\Rightarrow \qquad x = 7500$$

If S.P. = ₹7500, then the C.P. would have been ₹5000, due to 50% profit earned by the shopkeeper.

$\therefore$ Actual percentage of profit by selling the article for ₹6750

$$= \frac{1750}{5000} \times 100 = 35\%$$

12. (*d*) By finding the square root of 2401, you can determine that the plot of land measures 49 ft × 49 ft.

With shrubs planted along the edges and at the corners of the plot, with 7 ft between each shrub, there is room for 8 rows, each with 8 shrubs, for a total of 64 shrubs.

So Ravi's total selling price is $64 \times ₹35 = ₹2,240$

His profit equals the total selling price less the total cost be produce the shrubs. So Ravi's profit will be ₹2240 – ₹896 = ₹1,344.

To write ₹1,344 (his profit) as a percentage of ₹896 (his total cost); you can write it first as a fraction or as a decimal, and then multiply by 100.

$$\frac{1344}{896} = 1.5 \text{ or, } 150\%$$

13. (*c*) $\quad \text{C.P.}_1 = ₹3,75,000$

and, $\quad \text{C.P.}_2 = ₹2,50,000$

$$\Rightarrow \Sigma \text{C.P.} - \Sigma \text{S.P.} = 625000 - 600000$$

$$= ₹25,000$$

14. (*a*) Let number of articles = 100

Let his C.P. = ₹x

Then, he sold 80 articles under scheme B and 20 under scheme A.

Hence, overall discount = $\dfrac{80 \times 30 + 20 \times 20}{100}$ = 28%

Therefore, selling price = $1.5x \times 0.72 = 1.08x$, where x is his cost price.

Hence, net profit is 8%

15. (c) We have C.P. of mixture

$$= \dfrac{100}{100 + \%\text{profit}} \times \text{S.P.}$$

$$= \dfrac{100}{120} \times 480 = 400$$

Quantity of cheaper/Quantity of dearer

$$= (610 - 400)/(400 - 285) = 42:23$$

If cheaper wheat is 42 quintals, dearer one = 23 quintals

$\Rightarrow$ If cheaper wheat is 126 quintals, dearer one

$$= 23/42 \times 126 = 69 \text{ quintals}$$

16. (c) After the discount of ₹25% each, the cost of watches is ₹270.

He has to buy them again, hence total cost of the watches is 270 + 270 = ₹540

17. (b) Let the cost price of 1 apple be 'x', therefore the cost price of 1 orange and 1 mango would be 'x' and '$2x$' respectively.

Selling price of 1 apple = $\left(\dfrac{16x}{10}\right) = 1.6x$

Selling price of 1 orange = $\left(\dfrac{12x}{16}\right) = 0.75x$

Selling price of 1 mango = $\left(\dfrac{12x}{4}\right) = 3x$

Total cost price of 1 apple, 2 oranges and 2 mangoes

$$= x + 2x + 4x = 7x.$$

Total selling price of 1 apple, 2 oranges and 2 mangoes

$$= 1.6x + 1.5x + 6x = 9.1x$$

Net Profit = $9.1x - 7x = 2.1x$

Net profit per cent = $\left(\dfrac{2.1x}{7x}\right)100 = 30\%$

18. (c) 135% of C.P. = ₹90 C.P. = $\dfrac{200}{3}$

Profit on selling it for ₹70

$$= ₹\left(70 - \dfrac{200}{3}\right) = ₹\dfrac{10}{3}$$

Profit% = $\dfrac{\dfrac{10}{3}}{\dfrac{200}{3}} \times 100 = 5\%$

19. (c) Cost price of one kg of apple in which the three varieties of apples are mixed in the ratio 2:3:5 is equal to S where $S = 0.2 \times 20 + 0.3 \times 40 + 0.5 \times 50 = 4 + 12 + 25 = ₹41$

Selling price per kg of apples to ensure there is a net profit of 20% = $1.2 \times 41 = ₹49.2$

20. (b) Let the cost price be ₹100

Then, market price is ₹140

Now, the first discount is of 28.57% $\approx \dfrac{2}{7}$ th of market price.

Hence, its selling price = $140 \times \dfrac{5}{7} = ₹100$

Now since you are selling at cost price, any further discount will be equal to loss percentage.

21. (b)   Percentage profit = $\dfrac{120 - 100}{100} \times 100 = 20\%$

Percentage loss = $\dfrac{120 - 100}{120} \times 100$

$$= \dfrac{20}{120} \times 100 = 16.7\%$$

22. (b)   C.P. : S.P.
         3 : 4

Profit on 3 apples = ₹1 (consider C.P. = ₹1)

Profit = 33.33%

and discount = 11.11%

Since,   C.P.   S.P.   M.P.
          3   4   4.5

          (1)   (0.5)

Profit is double that of discount

So, the percentage point difference

$$= 33.33\% - 11.11\% = 22.22\% \text{ point}$$

23. (b) Profit would be maximum if books are bought for ₹200 and sold for ₹425.

Profit = ₹(425 - 200) = ₹225

Profit of 8 books = ₹225 × 8 = ₹1,800

24. (b) If   C.P. = 100, M.P. = 130

$$\text{S.P.} = \dfrac{1}{4} \times 110.5 + \dfrac{1}{2} \times 130 + \dfrac{1}{4} \times 91$$

$$\text{S.P.} = 27.625 + 65 + 22.75$$

$$= 115.375$$

Hence, profit = 15.375%

25. (c) Let the C.P. of a bicycle = ₹100

Now, since profit is 140%

$\therefore$ S.P. = ₹240

Now, 7 bicycles are being sold instead if 1 bicycle, but the sale price of new bicycle = ₹120

Therefore total sale price of new sale of bicycles

= 7 × 120 = ₹840 and the C.P. = 7 × 100 = 700

So the new profit = 840 – 700 = ₹140

Since the initial profit is same as the new so there is 0 increase in percentage.

26. (d) Marked price of the article = ₹1,600

∴ Selling price = (100 – 10)% of (100 – r%)
of 1600

$$= \frac{90}{100} \times \frac{100 - r}{100} \times 1600$$

$$\Rightarrow \quad 1224 = \frac{9}{10} \times (100 - r) \times 16$$

$$\Rightarrow \frac{1224 \times 10}{9 \times 16} = (100 - r)$$

27. (c) Profit % = $\frac{25}{100} = \frac{120 + k}{880} \frac{\text{(Profit)}}{\text{(Sale)}} \Rightarrow k = 100$

Therefore, net profit % = $\frac{100}{1000} \times 100 = 10\%$

28. (b) If selling price of 2 article is same and sold at x% more and x% less, then there will be always loss

$$= \frac{x^2}{100} = \frac{20^2}{100} = 4\%$$

∴ Gain, 96% = 60000

Loss, 4% = ₹2500

29. (c) Let C.P. cow be x and C.P. of ox be y.

$$\therefore \quad x \times \frac{120}{100} + y \times \frac{125}{100} = 800$$

$$x \times \frac{125}{100} + y \times \frac{120}{100} = 820$$

On solving, we get x = ₹530.6

and y = ₹131.14

30. (d) 1st horse 2nd horse

C.P. = 100

S.P. = 100

S.P. = 80

$$C.P. = \frac{100 \times 100}{125} = 80$$

Hence, total C.P. = Total S.P.

Hence, neither gain nor loss.

31. (b) Let the S.P. of Vineet and Roshan be x.

15% profit on C.P. = $\frac{15}{115} \times 100 = \frac{300}{23}\%$ profit on S.P.

$$\therefore \quad \frac{x \times 25}{100} - \frac{300x}{23 \times 100} = 275$$

On solving x = 2300

32. (b) Cost price of 30 kg of 1st rice = 30 × 17.5

30 kg of 2nd rise = 30 × x

Total cost price = 30 × 17.5 + 30x

$$\therefore \quad \frac{30 \times 17.5 + 30x}{60} \times \frac{120}{100} = 18.6$$

On solving, we get x = ₹13.5

33. (a) Let cost of the watch be ₹x.

∴ 10% of x + 15% of (390 – x) = 51.5

On solving, we get,
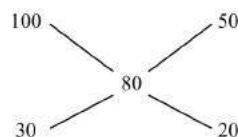
x = 140

Hence, cost of clock = 390 – 140

= ₹250

∴ Difference = 250 – 140

= ₹110

34. (d) Market price = $\frac{25935 \times 100}{91} = 28500$ = S.P.

Cost price = $\frac{25935 \times 100}{103.74} = 25000$

∴ Profit percentage = $\frac{28500 - 25000}{25000} \times 100$

= 14%

35. (b)

∴ C.P. = $\frac{96 \times 100}{120} = 80$

∴ Ratio = 3:2

36. (c) Let the weight substituted for 1 kg = x g

So, $\frac{100 - x}{x} \times 100 = 30$

Solving $x = 769\frac{3}{13}$ g

37. (b)
$$25\% = \frac{x}{1000 - x} \times 100\%$$
$$\Rightarrow \qquad x = 200$$

Hence, he uses weight, $1000 - 200 = 800$ g

38. (d) Let total sales be ₹100. Now, find the respective sales of Music CDs and Books and Rest will be DVDs.

Since, profit is given, cost price of CDs and Books can be calculated.

Further from overall profit, overall cost price can be calculated.

39. (b) Apply same concept as in the previous question.

40. (d) Let C.P. of radio be x.

$$\text{Total difference} = x \left(107\frac{1}{2}\% - 97\frac{1}{2}\%\right)$$
$$= x \times 10\%$$
$$\therefore \qquad \frac{x \times 10}{100} = 100$$
$$\therefore \qquad x = 1000$$

12.5% gain on ₹1000 = ₹1125

41. (d) Let cost of $A = x$ and $B = y$

$$\text{S.P. of } A = \frac{4x}{5}$$
$$\text{and} \qquad B = \frac{13y}{10}$$

Now, $x + y = \dfrac{4x}{5} + \dfrac{13y}{10}$ (because company does not lose anything)

$$\Rightarrow \qquad \frac{x}{5} = \frac{3y}{10}$$
$$\Rightarrow \qquad 2x = 3y$$

Now, use this relation further.

42. (d) Cost price $= 24 \times (100 - 12.5)\% = ₹21$

$$\text{Selling price} = 21 \times \left(100 + 33\frac{1}{3}\right) = ₹28$$

$$\text{Marked price} = \frac{28}{(100 - 20)} \times 100 = ₹35$$

43. (c) Let the price of one sheep = ₹1

So, cost price of 749 sheep = ₹749

Selling price of 700 sheep = ₹749

Selling price of 1 sheep = ₹1.07

$$\therefore \quad \text{Per cent gain} = \frac{1.07 - 1}{1} \times 100 = 7\%$$

44. (d) Let the amount of first variety be x kg.

Cost of first variety $= 42x$

Cost of second variety
$$= 25 \times 25 = 625$$

Total cost price $= 625 + 42x$

S.P. of both variety $= (25 + x) \times 40$
$$= 1000 + 40x$$

Profit $= 1000 + 40x - 625 - 42x$
$$= 375 - 2x$$

Required profit $= 25\%$

$$\frac{375 - 2x}{625 + 42x} \times 100 = 25$$
$$\Rightarrow \quad 1500 - 8x = 625 + 42x$$
$$\Rightarrow \qquad 875 = 50x$$
$$\Rightarrow \qquad x = 17.5 \text{ kg}$$

45. (b) Original profit $= 70000 - 42000 - 12000$
$$= 16000$$

If 7.14% of 14 i.e., one of the machines remain closed throughout the year, then change in profit will be

$$= \frac{13}{14}(70000 - 42000)$$

i.e., $26000 - 12000 = 14000$

Thus, the decrease in the profit %

$$= \frac{2000}{16000} \times 100 = 12.5\%$$

46. (b) Let the price of the product be 100. Then, the prices of the components A and B will be 10 and 20 respectively. As the profit is 20%, the selling price = 120.

Due to increase in the price of raw material, the new costs of components A and B will be 12 and 28 respectively.

The new selling price = 115% of 120 = 138

As, there is no change in the price of the other components, new cost of the product = 110

Thus, the new profit % $= \dfrac{28}{110} \times 100 = 25.45\%$

47. (b) Let the cost of cotton trouser be x and woollen trouser be y.

Selling price of cotton trouser be $\dfrac{13x}{10}$ and woolen trouser be $\dfrac{3y}{2}$.

Earlier salesman sells 100 cotton and 200 woollen trousers.

$$\therefore \qquad \text{C.P.} = 100x + 200y$$
$$\text{and,} \qquad \text{S.P.} = 130x + 300y$$

Since, salesman gains profit of 45%

$\therefore$ S.P. $= (100x + 200y) + (100x + 200y) \times \dfrac{45}{100}$

$= 145x + 290y$

Now, $130x + 300y = 145x + 290y$

$\Rightarrow \qquad 15x = 10y$

$\Rightarrow \qquad x = \dfrac{2y}{3}$

Use this relation for further calculation.

48. (*b*) The marked price of bicycle is ₹5000.

Let the cost price be p.

Successive discounts are 10% and 20%

$\therefore 5000 \times 0.9 \times 0.8 - 0.2\,p = p$

$\Rightarrow \quad p = \dfrac{5000 \times 0.72}{1.2}$

$\Rightarrow \quad p = ₹\,3000$

49. (*a*) Since the production increases by $\dfrac{200}{3}\%$ when production is increased from 20 to 40 units.

$\therefore \dfrac{(240 + 40b + 40^2 c) - (240 + 20b + 20^2 c)}{240 + 20b + 20^2 c} = \dfrac{200}{300} = \dfrac{2}{3}$ \qquad (1)

and $\dfrac{(240 + 60b + 60^2 c) - (240 + 40b + 40^2 c)}{240 + 40b + 40^2 c} = \dfrac{1}{2}$ \qquad (2)

Solving the equations (1) and (2), we get

$c = \dfrac{1}{10}$ and $b = 10$.

So, cost of producing x units $= 240 + 10x + \dfrac{x^2}{10}$.

Profit earned in producing x units

$= 30x - \left(240 + 10x + \dfrac{x^2}{10}\right) = 20x - \dfrac{x^2}{10} - 240$

Clearly from the options, we find that profit is maximum at $x = 100$.

50. (*c*) For $x = 100$, profit

$= 20 \times 100 - \dfrac{100 \times 100}{10} - 240 = 760$.

51. (*a*) Let the CP be ₹100, then SP = ₹114.28 as profit is 14.28%

This SP is arrived after giving a discount of 11.11% on marked price, hence if marked price $= x$.

Then

$x \times 0.8889 = 114.28 \Rightarrow x = ₹128.56$

which is 28.56% more than the CP.

52. (*d*) Cost price of $(3 + 4 + 5) = 12$ kg of fruits $= ₹(300 + 320 + 300) = ₹920$.

SP at a profit of 50% = ₹1380.

$\therefore$ SP of fruits per kg $= \dfrac{1380}{12} = ₹115$.

53. (*b*) Production cost of 1500 watches

$= (1500 \times 150 + 30,000) = ₹255,000$

Amount realized on the sale of 1500 watches

$= (1200 \times 250 + 300 \times 100) = ₹330,000$

$\therefore$ Profit earned

$= (330,000 - 255,000) = ₹75,000$

54. (*b*) Production cost of 1500 watches $= ₹255,000$

Let he sells x watches during the season, therefore number of watches sold after the season $= (1500 - x)$ watches.

Amount realized on the sale of 1500 watches

$= 250 \times x + 100(1500 - x) = 150x + 150,000$

New, break-even is achieved if production cost is equal to the selling price.

$\therefore \quad 150x + 150,000 = 255,000 \quad \Rightarrow \quad x = 700$.

55. (*a*) Let the price of 100 cm of cloth be ₹100, but he gets 120 cm of cloth for ₹100. Hence, his actual cost for

$1 \text{ cm} = \dfrac{100}{120} = ₹\dfrac{5}{6}$

New, instead of selling 100 cm, by cheating he sells 80 cm of cloth for the cost price of 100 cm of cloth. To calculate his profit, the cost price of 80 cm of cloth

$= \dfrac{5}{6} \times 80 = ₹66.66$

Selling price of 80 cm of cloth (actually 100 cm for the buys) at a discount of 20%

$= 100 \times 0.8 = ₹80$

$\therefore$ Profit percentage $= \dfrac{80 - 66.66}{66.66} \times 100 = 20.01\%$

or 20% (approximately).

56. (*b*) Let the CP of 1 kg of sugar be ₹100.

Then, CP of 900 g of sugar $= \dfrac{100}{1000} \times 900 = ₹90$

Hence, profit percent in Case II

$= \dfrac{100 - 90}{1000} \times 100 = 11.11\%$

If he adds 10% impurity then his CP for 1 kg

$= \dfrac{100}{1000} \times 1000 = ₹90.90$

Hence, profit percent in Case III $= \dfrac{100 - 90 \cdot 90}{90 \cdot 90} \times 100 = 10.01\%$

If reduces weight by 5%

Then, cost price of 950 g

$$= \frac{100}{1000} \times 950 = ₹ 95 \text{ and SP} = ₹105$$

Hence, profit percent in Case IV

$$= \frac{105-95}{95} \times 100 = 10.52\%.$$

Thus, method II maximizes his profit.

57. (a) Let the CP of the article be ₹x, since he earns a profit of 20%, hence SP = 1.2x.

It is given that he incurs loss by selling 16 articles at the cost of 12 articles

$$\left(\text{loss} = \frac{16-12}{16} \times 100 = 25\% \right)$$

∴ His selling price = SP × 0.75.

Now, SP × 0.75 = 1.2x ⟹ SP $= \frac{1.2}{0.75} x = 1.6x$

This SP is arrived after giving a discount of 20% on MP.

Hence, MP $= \frac{1.6x}{0.8} = 2x$. It means that article has been marked 100% above the cost price.

58. (c) Let the price paid per trip by a passenger be ₹x.

and auto rickshaw consumes y L petrol

Total expenditure in a trip = 30 × y = ₹30y

Total earning in a trip = 30 × x = ₹3x

We are given,

$3x - 30y = 20\%$ of $30y$

$$\Rightarrow \quad 3x - 30y = \frac{20 \times 30}{100} y$$

$$\Rightarrow \quad 3x - 30y = 6y$$

$$\Rightarrow \quad 3x = 36y$$

∴ $x = 12$,

Now, the price of petrol is reduced to ₹24 and passengers taken by auto-rickshaw are four.

∴ Total expenditure in a trip = 24 × y = ₹24y

Total earning in a trip = 4 × x = ₹4x

$$\text{Profit per cent} = \frac{\text{Total earning} - \text{Total expenditure}}{\text{Total expenses}} \times 100\%$$

$$= \frac{4x - 24y}{24y} \times 100\%$$

$$= \frac{4 \times 12y - 24y}{24y} \times 100 \quad [\because x = 12y]$$

$$= \frac{48y - 24y}{24y} \times 100$$

$$= \frac{24y}{24y} \times 100 = 100\%$$

59. (d) Let the cost price of watch = ₹x

Now, loss = 10%

∴ Sale price $= x - \frac{x \times 10}{100} = ₹\frac{9x}{10}$

We are given,

$$\frac{9x}{10} + 27 = x + \frac{x \times 5}{100}$$

$$\Rightarrow \quad \frac{9x}{10} + 27 = x + \frac{x}{20}$$

$$\Rightarrow \quad x + \frac{x}{20} - \frac{9x}{10} = 27$$

$$\Rightarrow \quad \frac{20x + x - 18x}{20} = 27$$

$$\Rightarrow \quad \frac{3x}{20} = 27 \quad \Rightarrow \quad x = \frac{20 \times 27}{3}$$

∴ $x = ₹180$

∴ CP = ₹180, Loss = 10% of ₹180 = ₹18

and profit = 5% of ₹180 = ₹9

∴ Required percentage $= \frac{18}{9} \times 100\% = 200\%$

60. (a) Let the quantity bought be 12x, 15x, and 20x kg respectively.

Total cost price = 100 × 12x + 80 × 15x + 60 × 20x

= 1200x + 1200x + 1200x = 3600x

Selling price of first two quantities at profit of 20%

$$= \frac{120}{100} \times 2400x = 2880x$$

Total selling price = 3600x (No profit no loss)

∴ Selling price of third quantity = 3600x − 2880x = 720x

∴ Loss percentage $= \frac{1200x - 720x}{1200x} \times 100 = 40\%$

61. (c) Dividend for the preferred share

$$= 50000 \times 10 \times \frac{20}{100} = 1,00,000$$

Rest of the dividend = 180000 − 100000 − 30000 = ₹50000

% of dividend for general shares $= \frac{50000 \times 100}{20000 \times 10} = 25\%$

62. (d) Let x be no. of units.

∴ Profit per unit $x = (60 - 40)x = 20x$.

Now, additional cost = 3000

∴ To make a profits of at least 1000, we have

20x − 3000 = 1000 ⟹ 20x = 4000 ⟹ x = 200