CHAPTER - 8
PROFIT, LOSS & DISCOUNT

EXERCISE 8(A)

Question 1.
Megha bought 10 note-books for Rs.40 and sold them at Rs.4.75 per note-book. Find, her gain percent.
Solution:

$$\text{C.P. of 10 note-books} = \text{Rs.40}$$

S.P. of 10 note-books@Rs.4·75 per note-book

$$= 4·75 \times 10 = \text{Rs.47·50}$$

$$\text{Gain} = \text{S.P.} - \text{C.P.}$$

$$= \text{Rs.47·50} - \text{Rs.40} = \text{Rs.7·50}$$

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

$$= \frac{7·50}{40} \times 100 = \frac{750}{40}\%$$

$$= \frac{75}{4}\% = 18\frac{3}{4}\%$$

Question 2.
A fruit-seller buys oranges at 4 for Rs.3 and sells them at 3 for Rs.4 Find his profit percent.
Solution:

Let number of oranges bought = 12

[Note : L.C.M. of 4 and 3 = 12]

$$\therefore \quad \text{C.P. of oranges} = \text{Rs.} \frac{3}{4} \times 12 = \text{Rs.9}$$

and $\quad$ S.P. of oranges $= \text{Rs.} \dfrac{4}{3} \times 12$

$$= \text{Rs.16}$$

$$\therefore \quad \text{Profit} = 16 - 9$$

$$= \text{Rs.7}$$

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

$$= \frac{7}{9} \times 100 = \frac{700}{9}\% = 77\frac{7}{9}\%$$

Question 3.
A man buys a certain number of articles at 15 for Rs. 112.50 and sells them at 12 for Rs.108. Find ;
(i) his gain as percent;
(ii) the number of articles sold to make a profit of Rs.75.
Solution:

Let number of articles bought = 60

Note : L.C.M. of 15 and 12 = 60

$$\therefore \quad \text{C.P. of the articles} = \text{Rs.} \frac{112.50}{15} \times 60$$

$$= \text{Rs.} \frac{112.50 \times 60}{15} = 112.50 \times 4 = \text{Rs.}450.00$$

$$\text{and} \quad \text{S.P. of the articles} = \text{Rs.} \frac{108}{12} \times 60$$

$$= \text{Rs.}108 \times 5 = \text{Rs.}540$$

(i) Gain = S.P. – C.P. = Rs.540 – Rs.450

$$= \text{Rs.}90$$

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

$$= \frac{90}{450} \times 100 = \frac{100}{5} = 20\%$$

(ii) To make a profit of Rs.90, the number of articles needed to be sold = 60

To make a profit of Re.1 the number of articles needed to be sold $= \dfrac{60}{90}$

To make a profit of Rs.75, the number of articles needed to be sold

$$= \frac{60}{90} \times 75 = \frac{4500}{90} = 50$$

Question 4.
A boy buys an old bicycle for Rs. 162 and spends Rs. 18 on its repairs before selling the bicycles for Rs. 207. Find his gain or loss percent.
Solution:
Buying price of the old bicycle = Rs.162

Money spent on repairs = Rs. 18
Real C.P. of the bicycle= 162+18 = Rs.180
S.P. of the bicycle = Rs.207
Profit = S.P. – C.P. = 207 – 162 = Rs. 45

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

$$= \frac{45}{180} \times 100 = \frac{100}{4} = 25\%$$

Question 5.
An article is bought from Jaipur for Rs. 4,800 and is sold in Delhi for Rs. 5,820. If Rs. 1,200 is spent on its transportations, etc. ; find he loss or the gain as percent.
Solution:
Cost price = Rs. 4,800
Selling Price = Rs. 5,820
Transport etc. charges = Rs. 1,200
Total cost price = Rs, 4,800 + Rs. 1,200 = Rs. 6,000
Loss = Rs. 6000 – Rs. 5820 = Rs. 180

$$\therefore \text{Loss}\% = \frac{180}{6000} \times 100 = 3\%$$

Question 6.
Mohit sold a T.V. for Rs. 3,600 ; gaining one-sixth of its selling price. Find :
(i) the gain
(ii) the cost price of the T.V.
(iii) the gain percent.
Solution:
S.P. of T.V. = Rs. 3,600

$$\text{Gain} = \frac{1}{6} \text{ of } (3600) = \frac{1}{6} \times 3600 = \text{Rs. } 600$$

(i) Thus gain = Rs. 600

(ii) Cost price = 3600 – 600 = Rs. 3000

(iii) Gain % = $\frac{600}{3000} \times 100 = \frac{60}{3} = 20\%$

Question 7.
By selling a certain number of goods for Rs. 5,500; a shopkeeper loses equal to one-tenth of their selling price. Find :
(i) the loss incured
(ii) the cost price of the goods

(iii) the loss as percent.
Solution:

S.P. = Rs. 5,500

$$\text{Loss} = \frac{1}{10} \text{ of (S.P.)} = \frac{1}{10} \times 5500 = \text{Rs. } 550$$

(i) Loss incurred = Rs. 550

(ii) C.P. = Rs. 5,500 + Rs. 550 = Rs. 6,050

(iii) Loss % = $\dfrac{550 \times 100}{6050} = \dfrac{10 \times 100}{110} = \dfrac{100}{11} = 9\dfrac{1}{11}\%$

Question 8.

The selling price of a sofa-set is $\frac{4}{5}$ times of its cost price. Find the gain or the loss as percent.
Solution:

Let the cost price (C.P.) = 1

$$\text{S.P.} = 1 \times \frac{4}{5} = \frac{4}{5}$$

$$\therefore \text{Loss} = 1 - \frac{4}{5} = \frac{5-4}{5} = \frac{1}{5}$$

$$[\because \text{ loss } = \text{C.P.} - \text{S.P.}]$$

$$\therefore \text{Loss\%} = \frac{\text{Loss}}{\text{C.P.}} = \frac{\frac{1}{5}}{1} \times 100 = \frac{1}{5} \times 100 = 20\%$$

Question 9.

The cost price of an article is $\frac{4}{5}$ times of its selling price. Find the loss or the gain as

Solution:

Let S.P. = 1

$$C.P. = \frac{4}{5} \times 1 = \frac{4}{5}$$

$\therefore$ Gain = S.P. – C.P.   [$\because$ Gain = S.P. – C.P.]

$$= 1 - \frac{4}{5} = \frac{5-4}{5} = \frac{1}{5}$$

$\therefore$ Gain % $= \dfrac{\text{Gain}}{\text{C.P.}} \times 100 = \dfrac{\frac{1}{5}}{\frac{4}{5}} \times 100$

$$= \frac{1}{5} \times \frac{5}{4} \times 100 = 25\%$$

Question 10.

A shopkeeper sells his goods at 80% of their cost price. Find the percent gain or loses ?

Solution:

Let C.P. of goods = Rs.100

$\therefore$ S.P. of goods $= \dfrac{80}{100} \times 100 = Rs.80$

Loss = C.P. – S.P.

      = Rs.100 – Rs.80 = Rs.20

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

$$= \frac{20}{100} \times 100 = 20\%$$

Question 11.

The cost price of an article is 90% of its selling price. What is the profit or the loss as percent ?

Solution:

Let S.P. of the article = Rs.100

$$\therefore \text{C.P. of the article} = \frac{90}{100} \times 100$$

$$= Rs.90$$

$$\text{Gain} = Rs.100 - Rs,90 = Rs.10$$

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

$$= \frac{10}{90} \times 100 = \frac{100}{9}\% = 11\frac{1}{9}\%$$

Question 12.

The cost price of an article is 30 percent less than its selling price. Find, the profit or loss as percent.

Solution:

Let S.P. of the article = Rs.100

$$30\% \text{ of S.P.} = Rs. \frac{30}{100} \times 100 = Rs.30$$

$$\therefore \text{C.P. of the article} = 100 - 30 = Rs.70$$

$$\text{Profit} = S.P. - C.P.$$

$$= Rs.100 - Rs.70 = Rs.30$$

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

$$= \frac{30}{70} \times 100 = \frac{300}{7}\% = 42\frac{6}{7}\%$$

Question 13.

A shop-keeper bought 300 eggs at 80 paisa each. 30 eggs were broken in transaction and then he sold the remaining eggs at one rupee each. Find, his gain or loss as percent.

Solution:

C.P. of 300 eggs@80 Paise each

$$= 300 \times 80 = 24000 \text{ Paise} = Rs.240$$

No. of eggs which were broken in transaction = 30

Remaining eggs = 300 − 30

$$= 270$$

S.P. of eggs@Rs.1 each = 270×1 = Rs.270

Gain = S.P. − C.P.

$$= Rs.270 - Rs.240 = Rs.30$$

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

$$= \frac{30}{240} \times 100$$

$$= \frac{100}{8}\% = 12 \cdot 5\% .$$

Question 14.
A man sold his bicycle for Rs.405 losing one-tenth of its cost price, find :
(i) its cc price;
(ii) the loss percent.
Solution:
(i) Let C.P. of the bicycle = Rs. x

$$\therefore \quad \text{Loss} = Rs.\frac{x}{10}$$

$$S.P = C.P - \text{Loss}$$

$$= x - \frac{x}{10}$$

But, we are given S.P. = Rs.405

$$\therefore \quad x - \frac{x}{10} = 405$$

$$\Rightarrow \quad \frac{10x - x}{10} = 405$$

$$\Rightarrow \quad \frac{9x}{10} = 405 \quad \Rightarrow \quad x = 405 \times \frac{10}{9}$$

$$\Rightarrow \quad x = \frac{4050}{9} \quad \Rightarrow \quad x = 450$$

$$\therefore \quad C.P. = Rs.450$$

$$(ii) \quad \text{Loss} = \frac{x}{10}$$

$$= \frac{450}{10}$$

...(Substituting the value of x)

$$= Rs.45$$

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

$$= \frac{45}{450} \times 100 = \frac{4500}{450} = 10\%$$

Question 15.
A man sold a radio-set for Rs.250 and gained one-ninth of its cost price. Find ;
(i) its cost price;
(ii) the profit percent.
Solution:

(i) Let C.P. of the radio-set = Rs.x

Gain = Rs.$\dfrac{x}{9}$

S.P. = Rs.$\left(x + \dfrac{x}{9}\right)$ = $\left(\dfrac{9x + x}{9}\right)$ Rs. = Rs.$\dfrac{10x}{9}$

But, we are given S.P. of the radio-set = Rs.250

$\therefore$ $\dfrac{10x}{9}$ = 250

$\Rightarrow x = 250 \times \dfrac{9}{10} \Rightarrow x = 25 \times 9 \Rightarrow x = 225$

$\therefore$ C.P. of the radio set = Rs.225

(ii) Profit = Rs.$\dfrac{x}{9}$

= Rs.$\dfrac{225}{9}$

....(Substituting the value of x)

= Rs.25

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

= $\dfrac{25}{225} \times 100$ = $\dfrac{25 \times 100}{225}$ = $\dfrac{100}{9}$ %

= $11\dfrac{1}{9}$ %

Question 1.

Find the selling price, if:
(i) C.P. = Rs. 950 and profit = 8%
(ii) C.P. = Rs. 1,300 and loss = 13%

Solution:

(i) C.P. = Rs. 950 Profit = 8%

$$\therefore S.P. = \frac{950 \times (100 + 8)}{100} = \frac{950 \times 108}{100} = 19 \times 54$$

$$= Rs. 1026$$

(ii) C.P. = Rs. 1,300 Loss = 13%

$$\therefore S.P. = \frac{1300 \times (100 - 13)}{100} = 13 \times 87 = Rs. 1131$$

Question 2.

Find the cost price, if :
(i) S.P. = Rs. 1,680 and profit = 12%
(ii) S.P. = Rs. 1,128 and loss = 6%

Solution:

(i) S.P. = Rs. 1,128, Profit = 12%

$$C.P. = \frac{100}{(100 + profit)} \times S.P.$$

$$\therefore C.P. = \frac{100}{(100 + 12)} \times 1680$$

$$= \frac{100 \times 1680}{112} = \frac{25 \times 1680}{28} = 25 \times 60 = Rs. 1500$$

(ii) S.P. = Rs. 1,128, Loss 6%

$$C.P. = \frac{100}{(100 - loss)} \times S.P.$$

$$\therefore C.P. = \frac{100 \times 1128}{(100 - 6)} = \frac{100 \times 1128}{94} = 100 \times 12$$

$$= Rs. 1200$$

Question 3.
By selling an article for Rs.900; a man gains 20%. Find his cost price and the gain.
Solution:

S.P. of an article = Rs.900

Gain = 20%

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

$$\therefore C.P. = \frac{100}{(100 + 20)} \times Rs.900$$

$$= Rs.\frac{100}{120} \times 900 = Rs.\frac{9000}{12}$$

$$= Rs.750$$

Gain = S.P. - C.P.

$$= Rs.900 - Rs.750 = Rs.150$$

Question 4.
By selling an article for Rs.704; a person loses 12%. Find his cost price and the loss
Solution:

S.P. of an article = Rs.704
Loss = 12%

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

$$= \frac{100}{(100 - 12)} \times Rs.704 = Rs.\frac{100}{88} \times 704$$

$$= Rs.100 \times 8 = Rs.800$$

Loss = C.P. - S.P.

$$= Rs.800 - Rs.704 = Rs.96$$

Question 5.
Find the selling price, if :
(i) C.P. = Rs.352; overheads = Rs.28 and profit = 20
(ii) C.P. = Rs.576; overheads = Rs.44 and loss = 16%

Solution:

(i)   C.P. = Rs.352
Overheads = Rs.28
Net C.P. = Rs.352 + Rs.28 = Rs.380
Profit = 20%

We know :   S.P. $= \dfrac{(100 + \text{gain}\%)}{100} \times \text{C.P.}$

$$= \dfrac{(100 + 20)}{100} \times \text{Rs. } 380 = \text{Rs. } \dfrac{120}{100} \times 380$$

$$= 12 \times 38 = \text{Rs.456}$$

(ii)   C.P. = Rs.576
Overheads = Rs.44
Net C.P. = Rs.576 + Rs.44
= Rs.620
Loss = 16%

We know :   S.P. $= \dfrac{(100 - \text{Loss}\%)}{100} \times \text{C.P.}$

$$= \dfrac{(100 - 16)}{100} \times \text{Rs.620} = \text{Rs. } \dfrac{84}{100} \times 620$$

$$= \text{Rs. } \dfrac{5208}{10} = \text{Rs.520·80}$$

Question 6.
If John sells his bicycle for Rs. 637, he will suffer a loss of 9%. For how much should it be sold, if he desires a profit of 5% ?

Solution:

S.P. = Rs. 637,   Loss = 9%

$\therefore$ C.P. $= \dfrac{100 \times \text{S.P.}}{100 - 9}$

$$= \dfrac{100}{91} \times 637 = 100 \times 7 = \text{Rs. } 700$$

Profit = 5%

S.P. $= \dfrac{(100 + \text{Profit})}{100} \times \text{C.P.}$

S.P. $= \dfrac{(100 + 5)}{100} \times 700 = 105 \times 7 = 735$

Question 7.

A man sells a radio-set for Rs.605 and gains 10%. At what price should he sell another radio of the same kind, in order to gain 16% ?

Solution:

In the first condition,

S.P. of a radio-set = Rs.605

Gain = 10%

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

$$= \frac{100}{(100 + 10)} \times Rs.605 = Rs. \frac{100}{110} \times 605$$

$$= Rs. \frac{100 \times 605}{110} = 10 \times 55 = Rs.550$$

In the second condition :

C.P. = Rs.550

Gain = 16%

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

$$= \frac{(100 + 16)}{100} \times Rs.550 = Rs. \frac{116}{100} \times 550$$

$$= Rs. \frac{116 \times 550}{100} = 58 \times 11 = Rs.638$$

∴ Radio should be sold at Rs.638.

Question 8.
By selling a sofa-set for Rs.2,500; the shopkeeper loses 20%. Find his loss percent or profit percent ; if he sells the same sofa-set for Rs.3150.
Solution:

In the first condition :

$$\text{S.P. of a Sofa-set} = \text{Rs.2500}$$
$$\text{Loss} = 20\%$$

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

$$= \frac{100}{(100 - 20)} \times \text{Rs.2500} = \text{Rs.} \frac{100}{80} \times 2500$$

$$= \text{Rs.} \frac{100 \times 2500}{80} = \frac{5 \times 2500}{4} = 5 \times 625$$

$$= \text{Rs.3125}$$

In the second condition :

$$\text{S.P. of the sofa-set} = \text{Rs.3150}$$
$$\text{C.P. of the sofa-set} = \text{Rs.3125}$$
$$\text{Gain} = \text{S.P.} - \text{C.P.}$$
$$= \text{Rs.3150} - \text{Rs.3125} = \text{Rs.25}$$

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

$$= \frac{25}{3125} \times 100 = \frac{25 \times 100}{3125} = \frac{100}{125}$$

$$= \frac{4}{5}\% = 0{\cdot}8\%$$

Question 9.
Mr. Sinha sold two tape-recorders for Rs.990 each; gaining 10% on one and losing 10% on the other. Find his total loss or gain as percent on the whole transaction.
Solution:

In the case of first tape-recorder :

S.P. = Rs.990

Gain = 10%

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

$$= \frac{100}{(100 + 10)} \times Rs.990 = Rs. \frac{100}{110} \times 990$$

$$= Rs. 100 \times 9 = Rs.900$$

In the case of second tape-recorder :

S.P. = Rs.990

Loss = 10%

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

$$= \frac{100}{(100 - 10)} \times Rs.990 = \frac{100}{90} \times 990$$

$$= 100 \times 11 = Rs.1100$$

Total C.P. of both the tape-recorders

= Rs.900 + Rs.1100 = Rs.2000

Total S.P. of both the tape-recorders

= Rs.990 + Rs.990 = Rs.1980

Loss on the whole transaction

= C.P. – S.P. = Rs.2000 – Rs.1980

= Rs.20

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

$$= \frac{Rs.20}{Rs.2000} \times 100 = \frac{2}{2}\% = 1\%$$

Question 10.
A tape-recorder is sold for Rs. 2,760 at a gain of 15% and a C.D. player is sold for Rs. 3,240 at a loss of 10% Find :
(i) the C.P. of the tape-recorder
(ii) the C.P. of the C.D. player.
(iii) the total C.P. of both.
(iv) the total S.P. of both
(v) the gain % or the loss % on the whole

Solution:

S.P. of tape-recorder = Rs. 2,760

Gain = 15%

(i) C.P. $= \dfrac{100 \times \text{S.P.}}{115}$ $\left[\text{C.P.} = \dfrac{100 \times \text{S.P.}}{(100 + \text{Gain})} \right]$

$= \dfrac{100 \times 2760}{115} = \dfrac{20 \times 2760}{23} = 20 \times 120 = \text{Rs. } 2400$

(ii) S.P. of C.D. Player = Rs. 3,240

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

$= \dfrac{100}{(100 - 10)} \times 3240 = \dfrac{100}{90} \times 3240$

$= 100 \times 36 = \text{Rs. } 3600$

(iii) Total C.P. of both = Rs. 2400 + Rs. 3600 = Rs. 6000

(iv) Total S.P. of both = Rs. 2760 + Rs. 3240 = Rs. 6000

(v) Since S.P. = C.P.

there is no gain and no loss on the whole.

Question 11.
Rajesh sold his scooter to Rahim at 8% loss and Rahim, in turn, sold the same scooter to Prem at 5% gain. If Prem paid Rs. 14,490 for the scooter ; find :
(i) the S.P. and the C.P. of the scooter for Rahim
(ii) the S.P. and the C.P. of the scooter for Rajesh

Solution:

Let C.P. of the scooter for Rajesh = Rs. $100x$

$$\text{S.P. for Rajesh} = \frac{100x \times 92}{100} = 92x$$

This will be C.P. for Rahim = $92x$, Gain = 5%

$$\therefore \text{S.P. for Rahim} = \frac{92x \times 105}{100}$$

$$= \frac{92x \times 21}{20} = \frac{46x \times 21}{10} = \frac{966x}{10}$$

This will be C.P. for Prem = Rs. 14,490

$$\therefore \frac{966x}{10} = 14,490$$

$$\Rightarrow x = \frac{14490}{966} \times 10 = \frac{14490}{483} \times 5 = 30 \times 5 = 150$$

(i) C.P. of scooter for Rahim $= 92x = 92 \times 150$

$$= \text{Rs. } 13800$$

$$\text{S.P. of scooter for Rahim} = \frac{966x}{10} = \frac{966}{10} \times 150$$

$= \text{Rs. } 966 \times 15 = \text{Rs. } 14490$

(ii) $\therefore$ C.P. of Scooter for Rajesh $= 100x = 100 \times 150$

$$= \text{Rs. } 15000$$

S.P. of Scooter for Rajesh $= 92x = \text{Rs. } 92 \times 150$

$$= \text{Rs. } 13800$$

Question 12.
John sold an article to Peter at 20% profit and Peter sold it to Mohan at 5% loss. If Mohan paid Rs.912 for the article; find how much did John pay for it ?
Solution:

Mohan paid for the article = Rs.912

∵ Peter sold the article to Mohan

∴ **For Peter :**

$$\text{S.P.} = \text{Rs.}912$$
$$\text{Loss} = 5\%$$

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

$$= \frac{100}{(100 - 5)} \times \text{Rs.}912 = \text{Rs.} \frac{100 \times 912}{95}$$

$$= 20 \times 48 = \text{Rs.}960$$

John sold the same article to Peter

∴ **For John :**

$$\text{S.P.} = \text{Rs.}960$$
$$\text{Profit} = 20\%$$

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

$$= \frac{100}{(100 + 20)} \times \text{Rs.}960 = \text{Rs.} \frac{100}{120} \times 960$$

$$= \text{Rs.}100 \times 8 = \text{Rs.}800$$

Hence, John paid for the article = Rs.800

Question 1.
A stationer buys pens at 5 for Rs.28 and sells them at a profit of 25 %. How much should a customer pay; if he buys
(i) only one pen ;
(ii) three pens ?

Solution:

For Stationer :

C.P. of 5 pens = Rs.28

C.P. of 1 pen $= \dfrac{28}{5}$ Rs. = Rs.5·60

Profit = 25%

∴   S.P. of 1 pen

$$= \dfrac{(100 + Profit\%)}{100} \times \text{C.P. of 1 pen}$$

$$= \left(\dfrac{100 + 25}{100}\right) \times Rs.5\cdot60 = Rs.\dfrac{125}{100} \times 5\cdot60$$

$$= Rs.\dfrac{125 \times 5.6}{100} = Rs.5 \times 1\cdot4 = Rs.7$$

S.P. of 3 pens = 3×7 = Rs.21

∴   Customer pays for

(i) only one pen = Rs.7

(ii) Three pens = Rs.21

Question 2.
A fruit-seller sells 4 oranges for Rs. 3, gaining 50%. Find :
(i) C.P. of 4 oranges,
(ii) C.P. of one orange.
(iii) S.P. of one orange.
(iv) profit made by selling one orange.
(v) number of oranges brought and sold in order to gain Rs. 24.
Solution:

S.P. of 4 oranges = Rs. 3

∴ S.P. of 1 orange = Rs. $\dfrac{3}{4}$,   Gain = 50%

S.P. = $\dfrac{\text{C.P.} \times 150}{100}$

∴ C.P. of 1 orange = $\dfrac{100 \times \text{S.P.}}{(100 + 50)}$

$= \dfrac{100 \times \dfrac{3}{4}}{150} = \dfrac{75}{150} = $ Re $\dfrac{1}{2}$

(i) C.P. of 4 oranges = 4 × $\dfrac{1}{2}$ = Rs. 2

(ii) C.P. of 1 orange = Rs. $\dfrac{1}{2}$ = Rs. (0.50)

(iii) S.P. of 1 orange = Rs. $\dfrac{3}{4}$ = Rs. 0.75

(iv) Profit made by selling one orange

= Rs. $\dfrac{3}{4}$ – Rs. $\dfrac{1}{2}$ = Rs $\dfrac{1}{4}$ = Rs 0.25

(v) If gain is Rs $\dfrac{1}{4}$; number of oranges = 1

If gain is Rs. 24, number of oranges = $\dfrac{1}{\dfrac{1}{4}}$ × 24

$1 \times \dfrac{4}{1} \times 24 = 96$

Question 3.

A man sells 12 articles for Rs. 80 gaining $33\frac{1}{3}$ %. Find the number of articles bought by the man for Rs. 90.

Solution:

S.P. of 12 articles = Rs. 80,

$$\text{Gain} = 33\frac{1}{3}\% = \frac{100}{3}\%$$

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

$$= \frac{100}{100 + \dfrac{100}{3}} \times 80 = \frac{100}{\dfrac{300 + 100}{3}} \times 80$$

$$= \frac{100}{\dfrac{400}{3}} \times 80 = 100 \times \frac{3}{400} \times 80 = \text{Rs. } 60$$

Rs. 60 is the cost of 12 articles

Re. 1 is the cost of $= \dfrac{12}{60}$ article

Rs. 90 is the cost of $= \dfrac{12}{60} \times 90$

$$= \frac{1}{5} \times 90 = 18$$

Man can buy article for Rs. 90 = 18

Question 4.
The cost price of 20 articles is same as the selling price of 16 articles. Find the gain percent.
Solution:
C.P. of 20 articles = S.P. of 16 articles.
Let C.P. of 1 article = Re. 1
C.P. of 20 articles = Rs.20
and C.P. of 16 articles = Rs.16
S.P. of 16 articles = Rs.20
[S.P. of 16 articles = C.P. of 20 articles]
Gain = Rs.20 – Rs.16 = Rs.4
Gain% = $\frac{4}{16}$ x 100
= $\frac{4 \times 100}{16}$
= 25%

Question 5.
The selling price of 15 articles is equal to the cost price of 12 articles. Find the gain or loss as percent.
Solution:
S.P. of 15 articles = C.P. of 12 articles
Let C.P. of 1 article = Re.1
C.P. of 12 article = Rs.12
and C.P. of 15 articles = Rs.15
S.P. of 15 articles = Rs.12
[S.P. of 15 articles = C.P. of 12 articles]
Loss = Rs.15 – Rs.12 = Rs.3
Loss% = $\frac{3}{15}$ x 100 = 20%

Question 6.
By selling 8 pens, Shyam loses equal to the cost price of 2 pens. Find his loss percent.
Solution:
Let C.P. of 1 pen = Re.1
C.P. of 2 pens = Rs.2
and C.P. of 8 pens = Rs.8
Loss = Rs.2 ….[Loss = C.P. of 2 Pens]
Loss% = $\frac{2}{8}$ x 100 = 25%

Question 7.
A shop-keeper bought rice worth Rs.4,500. He sold one-third of it at 10% profit.
If he desires a profit of 12% on the whole ; find :
(i) the selling price of the rest of the rice ;
(ii) the percentage profit on the rest of the rice.
Solution:

C.P. of the rice = Rs.4500
Profit desired on the whole = 12%

$\therefore$ S.P. of the whole rice = $\dfrac{(100 + \text{gain\%})}{100} \times C.P.$

$= \dfrac{(100 + 12)}{100} \times \text{Rs.}4500 = \text{Rs.}\dfrac{112}{100} \times 4500$

$= 112 \times 45 = \text{Rs.}5040$

C.P. of $\dfrac{1}{3}$ of rice $= \dfrac{1}{3} \times \text{Rs.}4500$

$= \text{Rs.}1500$

Since, gain on $\dfrac{1}{3}$ of rice = 10%

$\therefore$ S.P. on it $= \left(\dfrac{100 + \text{gain\%}}{100}\right) \times C.P.$

$= \dfrac{100 + 10}{100} \times \text{Rs.}1500 = \text{Rs.}\dfrac{110}{100} \times 1500$

$= 11 \times 150 = \text{Rs.}1650$

Remaining C.P. of the rice
= Rs.4500 – Rs.1500 = Rs.3000
Remaining S.P. of the rice
= Rs.5040 – Rs.1650 = Rs.3390
Profit on the remaining rice
= Rs.3390 – Rs.3000 = Rs.390

Gain % on the remaining rice $= \dfrac{390}{3000} \times 100$

$= \dfrac{390 \times 100}{3000} = 13\%$

$\therefore$ (i) S.P. of the rest of the price = Rs.3390
(ii) % profit on the rest of the rice = 13%

Question 8.

Mohan bought a certain number of note-books for Rs.600. He sold $\dfrac{1}{4}$ of them at 5 percent loss. At what price should he sell the remaining note-books so as to gain 10% on the whole ?
Solution:

$$\text{C.P. of note books } = \text{Rs.600}$$

Gain desired on the whole = 10%

∴ Total S.P. of all the note-books

$$= \frac{(100 + \text{gain\%})}{100} \times \text{C.P.} = \left(\frac{100 + 10}{100}\right) \times \text{Rs.600}$$

$$= \text{Rs.} \frac{110}{100} \times 600 = \text{Rs.660}$$

C.P. of $\frac{1}{4}$ of the note-books $= \frac{1}{4} \times \text{Rs.600}$

$$= \text{Rs.150}$$

Loss on these note-books = 5%

∴ S.P. of these note-books

$$= \frac{(100 - \text{Loss\%})}{100} \times \text{C.P.} = \frac{(100 - 5)}{100} \times \text{Rs.150}$$

$$= \text{Rs.} \frac{95}{100} \times 150 = \text{Rs.} \frac{14250}{100} = \text{Rs.142·50}$$

Now, C.P. of the remaining note-books

$$= \text{Rs.600} - \text{Rs.150} = \text{Rs.450}$$

Required S.P. of the remaining note-books

$$= \text{Rs.660} - \text{Rs.142·50} = \text{Rs.517·50}$$

Question 9.
Raju sells a watch at 5% profit. Had he sold it for Rs.24 more ; he would have gained 11%. Find the cost price of the watch.
Solution:
Let C.P. of the watch = Rs.100
When profit = 5%; S.P. = Rs.(100+5) = Rs.105
When profit = 11%;
S.P. = Rs.(100 + 11) = Rs .111
Difference of two selling prices = Rs. 111 – Rs. 105 = Rs.6
When watch sold for Rs.6 more; then C.P. of the watch = Rs.100
When watch sold for Re. 1 more; then C.P. of the watch = Rs. $\frac{100}{6}$
When watch sold for Rs.24 more; then C.P. of the watch = Rs. $\frac{100}{6}$ x 24 = Rs.400

Question 10.
A man sold a bicycle at 5% profit. If the cost had been 30% less and the selling price

Rs.63 less, he would have made a profit of 30%. What is the cost price of the bicycle ?
Solution:
Let C.P. of the bicycle = Rs.100
In the I case :
When Profit = 5% ;

$$S.P. = Rs.(100+5) = Rs.105$$

In the II case :

$$C.P. = \left(100 - \frac{30}{100} \times 100\right)$$

$$= Rs.(100-30) = Rs.70$$

Profit = 30%

$$S.P. = \frac{(100 + Profit)}{100} \times C.P.$$

$$= \frac{(100 + 30)}{100} \times Rs.70 = \frac{130}{100} \times Rs.70$$

$$= Rs. \frac{130 \times 70}{100} = Rs.91$$

Difference of two selling prices

$$= Rs.105 - Rs.91 = Rs.14$$

If difference is Rs.14 then C.P. of the bicycle

$$= Rs.100$$

$$" \quad Re.1 \quad " \quad = Rs. \frac{100}{14}$$

$$Rs.63 \quad " \quad = Rs. \frac{100}{14} \times 63$$

$$= Rs. \frac{100 \times 63}{14} = Rs.50 \times 9 = Rs.450$$

Question 11.
Renu sold an article at a loss of 8 percent. Had she bought it at 10% less and sold for Rs.36 more; she would have gained 20%. Find the cost price of the article.
Solution:

Let C.P. of the article = Rs.100
In the I case : When loss = 8%

$$\text{S.P.} = \text{Rs.}(100 - 8) = \text{Rs.}92$$

In the II case : $\text{C.P.} = \text{Rs.}\left(100 - \dfrac{10}{100} \times 100\right)$

$$= \text{Rs.}(100 - 10) = \text{Rs.}90$$

Profit = 20%

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

$$= \frac{120}{100} \times \text{Rs.}90 = \text{Rs. } 12 \times 9 = \text{Rs.}108$$

Difference of two selling prices

$$= \text{Rs.}108 - \text{Rs.}92 = \text{Rs.}16$$

If the difference of two selling prices is Rs.16
then C.P.   = Rs.100

$$\text{" " " Re.1 " " } = \text{Rs.}\frac{100}{16}$$

$$\text{" " Rs.36 " " } = \text{Rs.}\frac{100}{16} \times 36$$

$$= \text{Rs.}\frac{100 \times 36}{16} = \text{Rs.}25 \times 9 = \text{Rs.}225$$

EXERCISE 8(D)

Question 1.
An article is marked for Rs. 1,300 and is sold for Rs. 1,144 ; find the discount percent.
Solution:

Marked price = Rs. 1,300, S.P. = Rs. 1,144
Discount = Rs. 1,300 – Rs. 1,144 = Rs. 156

$$\therefore \text{ Discount \% } = \frac{156}{1300} \times 100 = \frac{156}{13} = 12\%$$

Question 2.
The marked price of a dinning table is Rs. 23,600 and is available at a discount of 8%.

Find its selling price.
Solution:

Marked price = Rs. 23,600, Discount = 8%

$$\therefore \text{S.P.} = \frac{23,600 \times (100 - 8)}{100} = 236 \times 92$$

$$= \text{Rs. } 21,712$$

Question 3.

A wrist-watch is available at a discount of 9%. If the list-price of the watch is Rs. 1,400 ; find the discount given and the selling price of the watch.
Solution:
List price of the watch = Rs. 1,400
Discount = 9%
Discount = $\frac{1400 \times 9}{100}$ = 14 x 9 = Rs. 126
S.P. = (List price – Discount) = Rs. (1400 – 126) = Rs. 1274

Question 4.

A shopkeeper sells an article for Rs. 248.50 after allowing a discount of 10%. Find the list price of the article.
Solution:

S.P. of the article = Rs. 248·50

Discount = 10%

Let M.P. = Rs. 100

$$\text{Discount} = \frac{10}{100} \times \text{Rs.} 100 = \text{Rs.} 10$$

Selling Price = Rs. 100 – Rs. 10 = Rs. 90

If S.P. is Rs. 90; then M.P. = Rs. 100

" " Re. 1 " " = Rs. $\frac{100}{90}$

" " Rs. 248·50 " " = Rs. $\frac{100}{90} \times 248·50$

$$= \text{Rs.} \frac{100 \times 248·50}{90} = \text{Rs.} \frac{24850}{90}$$

$$= \text{Rs.} 276.11 \text{ (Approx.)}$$

Question 5.
A shop-keeper buys an article for Rs.450. He marks it at 20% above the cost price. Find :
(i) the marked price of the article.
(ii) the selling price, if he sells the articles at 10 percent discount.
(iii) the percentage discount given by him, if he sells the article for Rs.496.80
Solution:

C.P. of the article = Rs.450

(*i*) Marked price of the article

$$= \frac{100+20}{100} \times \text{Rs.450}$$

$$= \text{Rs.} \frac{120}{100} \times 450 = 12 \times 45 = \text{Rs.540}$$

∴ Marked price of the article = Rs. 540

(*ii*)   Discount $= \frac{10}{100} \times \text{M.P.}$

$$= \frac{10}{100} \times \text{Rs.540}$$

$$= \text{Rs.54}$$

S.P. $= \text{M.P.} - \text{Discount}$

$= \text{Rs.540} - \text{Rs.54}$

$= \text{Rs.486}$

(*iii*)   S.P. $= \text{Rs.496·80}$

M.P. $= \text{Rs.540}$

Discount $= \text{M.P.} - \text{S.P.}$

$= \text{Rs.540} - \text{Rs.496·80}$

$= \text{Rs.43·20}$

Discount % $= \frac{\text{Discount}}{\text{M.P.}} \times 100$

$$= \frac{43 \cdot 20}{540} \times 100$$

$$= \frac{4320}{540} \%$$

$$= 8\%$$

Question 6.
The list price of an article is Rs.800 and is available at a discount of 15 percent. Find :

(i) selling price of the article ;

(ii) cost price of the article, if a profit of $13\frac{1}{3}$ % is made on selling it.

Solution:

List price of the article = Rs.800

$$\text{Discount @ } 15\% = \frac{15}{100} \times \text{Rs.800}$$

$$= \text{Rs.120}$$

(i) S.P. of the article = Rs.800 – Rs.120

$$= \text{Rs.680}$$

(ii) S.P. of the article = Rs.680

$$\text{Profit} = 13\frac{1}{3}\% = \frac{40}{3}\%$$

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

$$= \frac{100}{100+\dfrac{40}{3}} \times \text{Rs.680}$$

$$= \frac{100}{\dfrac{340}{3}} \times \text{Rs.680}$$

$$= \frac{3}{340} \times 100 \times 680 = 3 \times 100 \times 2 \text{ Rs.}$$

$$= \text{Rs.600}$$

Question 7.

An article is marked at Rs. 2,250. By selling it at a discount of 12%, the dealer makes a profit of 10%. Find :

(i) the selling price of the article.

(ii) the cost price of the article for the dealer.

Solution:

(i) Market price = Rs. 2,250

$$\text{S.P.} = \frac{2250(100-12)}{100} = \frac{2250 \times 88}{100} = 45 \times 44$$

$$= \text{Rs. } 1980$$

(ii) S.P. = Rs. 1980,   Profit = 10%

$$\therefore \text{C.P. of the article} = \frac{100}{110} \times 1980 = 100 \times 18$$

$$= \text{Rs. } 1800$$

Question 8.

By selling an article at 20% discount, a shopkeeper gains 25%. If the selling price of the article is Rs. 1,440 ; find :
(i) the marked price of the article.
(ii) the cost price of the article.

Solution:

S.P. of the article = Rs. 1440

Let marked price = Rs. 100x

Discount = 20%

$$\therefore \text{S.P.} = \frac{100x(100-20)}{100} = 80x$$

According to statement, $80x = 1440$

$$x = \frac{1440}{80} \qquad \Rightarrow \qquad x = 18$$

$$\therefore \qquad x = 18$$

$\therefore$ Marked price = 100x = 100 × 18 = Rs. 1800

S.P. = Rs. 1440

Profit = 25%

$$\therefore \text{C.P.} = \frac{100 \times \text{S.P.}}{100+25} = \frac{100 \times 1440}{125} = \frac{4}{5} \times 1440$$

$$= 4 \times 288 = \text{Rs. } 1152$$

Question 9.

A shop-keeper marks his goods at 30 percent above the cost price and then gives a

discount of 10 percent. Find his gain percent.
Solution:

Let C.P. of the goods $=$ Rs.100

M.P. of the goods $=$ Rs.100 $+$ Rs.30

$\qquad\qquad\qquad = $ Rs.130

Discount $= \dfrac{10}{100} \times$ Rs.130

$\qquad\qquad = $ Rs. $\dfrac{1300}{100}$

$\qquad\qquad = $ Rs.13

S.P. of the goods $=$ M.P. $-$ Discount

$\qquad\qquad\qquad = $ Rs.130 $-$ Rs.13

$\qquad\qquad\qquad = $ Rs.117

Gain $=$ S.P. $-$ C.P.

$\qquad = $ Rs.117 $-$ Rs.100

$\qquad = $ Rs.17

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

$\qquad\quad = \dfrac{17}{100} \times 100$

$\qquad\quad = 17\%$

Question 10.
A ready-made garments shop in Delhi, allows 20 percent discount on its garments and still makes a profit of 20 percent. Find the marked price of a dress which is bought by the shop-keeper for Rs.400.
Solution:

C.P. of the dress = Rs.400

$$\text{Profit} = \frac{20}{100} \times \text{Rs.}400 = \text{Rs.}80$$

$$\text{S.P.} = \text{C.P.} + \text{Profit}$$
$$= \text{Rs.}400 + \text{Rs.}80$$
$$= \text{Rs.}480$$

Let, M.P. of the dress = Rs.100

$$\text{Discount @ } 20\% = \frac{20}{100} \times \text{Rs.}100 = \text{Rs.}20$$

$$\text{S.P. of the dress} = \text{M.P.} - \text{Discount}$$
$$= \text{Rs.}100 - \text{Rs.}20$$
$$= \text{Rs.}80$$

If S.P. of the dress is ₹80; then M.P. = ₹100

If S.P. of the dress is ₹1 then M.P. = ₹ $\frac{100}{80}$

If S.P. of the dress is ₹480 then M.P.

$$= ₹ \frac{100}{80} \times 480$$

$$= ₹100 \times 6 = 600$$

∴ M.P. of the dress = ₹ 600

Question 11.
At 12% discount, the selling price of a pen is Rs. 13.20. Find its marked price. Also, find the new selling price of the pen, if it is sold at 5% discount.

Solution:

Let marked price = ₹$100x$

Discount = 12%

$\therefore$ S.P. = $\dfrac{100x(100-12)}{100} = \dfrac{100x \times 88}{100} = 88x$

According to statement,

$88x = 13.20$

$\therefore x = \dfrac{13.20}{88} = \dfrac{1320}{88 \times 100} = \dfrac{30}{200} = \dfrac{3}{20}$

$\therefore$ Marked price $100x = \dfrac{100 \times 3}{20} = ₹15$

New S.P. = $\dfrac{15 \times 95}{100}$ [$\because$ discount = 5%]

$= \dfrac{15 \times 19}{20} = \dfrac{3 \times 19}{4} = \dfrac{57}{4} = ₹14.25$

Question 12.

The cost price of an article is Rs. 2,400 and it is marked at 25% above the cost price. Find the profit and the profit percent, if the article is sold at 15% discount.

Solution:

C.P. = ₹2,400

$\therefore$ Marked price $= \dfrac{2400(100+25)}{100}$

$= 24 \times 125$

$= ₹3000$

Discount = 15%

$\therefore$ S.P. = $\dfrac{3000 \times (100-15)}{100} = 30 \times 85 = ₹2550$

$\therefore$ Profit = ₹2550 – ₹2400 = ₹150

Profit% $= \dfrac{150}{2400} \times 100 = \dfrac{50}{8} = \dfrac{25}{4} = 6\dfrac{1}{4}\%$

Question 13.
Thirty articles are bought at Rs. 450 each. If one-third of these articles be sold at 6% loss; at what price must each of the remaining articles be sold in order to make a profit of 10% on the whole?

Solution:

C.P. of one article = ₹450

C.P. of 30 articles = ₹450 × 30 = ₹13500

C.P. of $\frac{1}{3}$ articles = ₹450 × $\frac{30}{3}$ = ₹4500

Loss of = 6%

∴ S.P. of 10 articles = $\dfrac{\text{C.P.} \times (100 - \text{Loss\%})}{100}$

= ₹ $\dfrac{4500 \times (100 - 6)}{100}$

= ₹ $\dfrac{4500 \times 94}{100}$ = ₹4230

C.P. of remaining articles = ₹4500 × 20

= ₹9000

Profit on the whole = 10%

∴ Total S.P. of 30 articles

= ₹ $\dfrac{13500 \times (100 + 10)}{100}$

= ₹ $\dfrac{13500 \times 110}{100}$ = ₹14850

∴ S.P. of remaining 20 articles
= ₹14850 – 4230 = ₹10620

∴ S.P. of 1 article = ₹ $\dfrac{10620}{20}$ = ₹531

Question 14.
The cost price of an article is 25% below the marked price. If the article is available at 15% discount and its cost price is Rs. 2,400; find:
(i) Its marked price
(ii) its selling price
(iii) the profit percent.

Solution:

Let M.P. of an article = ₹100

$\therefore$ Cost price = $\dfrac{100 \times (100 - 25)}{100}$

$= ₹\dfrac{100 \times 75}{100} = ₹75$

Discount = 15%

$\therefore$ S.P. = ₹100 − 15 = ₹85

But cost price = ₹2400

(i) $\therefore$ Marked price = ₹2400 × $\dfrac{100}{75}$

$= ₹32 \times 100 = ₹3200$

(ii) and S.P. = ₹$\dfrac{3200 \times 85}{100} = ₹2720$

(iii) Profit = S.P. − C.P. = ₹2720 − 2400 = ₹320

$\therefore$ Profit% = $\dfrac{\text{Profit} \times 100}{\text{C.P.}} = \dfrac{320 \times 100}{2400}$

$= \dfrac{40}{3}\% = 13\dfrac{1}{3}\%$

Question 15.

Find a single discount (as percent) equivalent to following successive discounts:

(i) 20% and 12%

(ii) 10%, 20% and 20%

(iii) 20%, 10% and 5%

Solution:

(i) Successive discount = 20% and 12%

Let M.P. = ₹100

First discount = 20%

Second discount = 12%

$\therefore$ S.P. $= \dfrac{M.P.(100 - Discount\%)}{100}$

$= \dfrac{100 \times (100 - 20)(100 - 12)}{100 \times 100}$

$= \dfrac{100 \times 80 \times 88}{100 \times 100} = \dfrac{352}{5}$

$\therefore$ Total discount on ₹100 $= 100 - \dfrac{352}{5}$

$= \dfrac{500 - 352}{5} = ₹\dfrac{148}{5}$

$\therefore$ Single discount $= \dfrac{148}{5}\% = 29\dfrac{3}{5}\%$

(ii) Successive discounts 10%, 20% and 20%

Let M.P. = ₹100

$\therefore$ S.P. after 3 discounts

$= \dfrac{100(100 - 10)(100 - 20)(100 - 20)}{100 \times 100 \times 100}$

$= \dfrac{100 \times 90 \times 80 \times 80}{100 \times 100 \times 100} = \dfrac{576}{10}$

$\therefore$ Total discount $= ₹100 - \dfrac{576}{10}$

$= ₹\dfrac{1000 - 576}{10} = \dfrac{424}{10}$

$\therefore$ Single discount $= \dfrac{424}{10}\% = 42.4\%$

(*iii*) Successive discounts = 20%, 10%, 5%

Let M.P. = ₹100

∴ S.P. after three discounts

$$= ₹ \frac{100(100-20)(100-10)(100-5)}{100 \times 100 \times 100}$$

$$= ₹ \frac{100 \times 80 \times 90 \times 95}{100 \times 100 \times 100} = ₹ \frac{342}{5}$$

∴ Total discount $= 100 - \frac{342}{5}$

$$= \frac{500-342}{5} = \frac{158}{5}$$

∴ Single discount $= \frac{158}{5}\% = 31.6\%$

Question 16.
Find the single discount (as percent) equivalent to successive discounts of:
(i) 80% and 80%
(ii) 60% and 60%
(iii) 60% and 80%
Solution:
(i) Successive discounts = 80% and 80%

Let M.P. = ₹100

Then S.P. after two discounts

$$= ₹ \frac{100(100-80) \times (100-80)}{100 \times 100}$$

$$= \frac{100 \times 20 \times 20}{100 \times 100} = ₹4$$

∴ Total discounts = ₹100 – 4 = ₹96

∴ Single discount = 96%

(ii) Successive discounts = 60% and 60%

Let M.P. = ₹100

Then S.P. after two discounts,

$$= \frac{100(100-60)(100-60)}{100 \times 100}$$

$$= \frac{100 \times 40 \times 40}{100 \times 100} = ₹16$$

∴ Total discount = ₹100 – 16 = ₹84

Single discount = 84%

(iii) Successive discounts = 60% and 80%

Let M.P. = ₹100

∴ S.P. after two discounts

$$= ₹ \frac{100(100-60)(100-80)}{100 \times 100}$$

$$= ₹ \frac{100 \times 40 \times 20}{100 \times 100} = ₹8$$

∴ Total discount = ₹100 – 8 = ₹92

∴ Single discount = 92%

EXERCISE 8(E)

Question 1.
Rajat purchases a wrist-watch costing Rs. 540. The rate of Sales Tax is 8%. Find the total amount paid by Rajat for the watch.
Solution:

Cost of watch = ₹540

Rate of Sales Tax = 8%

∴ Amount of Sales Tax = ₹540 × $\frac{8}{100}$

= ₹$\frac{4320}{100}$ = ₹43.20

Total Amount of Watch = Rs. 540 + Rs. 43.20 = Rs. 583.20

Question 2.
Ramesh paid Rs. 345.60 as Sales Tax on a purchase of Rs. 3,840. Find the rate of Sales Tax.
Solution:

On ₹3840, sales-tax is = ₹345.60

∴ Percent of Sale Tax = $\frac{345.60 \times 100}{3840}$

= $\frac{34560 \times 100}{100 \times 3840}$ = 9%

Question 3.
The price of a washing machine, inclusive of sales tax is Rs. 13,530/-. If the Sales Tax is 10%, find its basic (cost) price.
Solution:

Selling price of washing machine = ₹13,530.

Rate of Sales Tax = 10%

∴ Cost price = $\frac{\text{Selling Price} \times 100}{(100 + \text{Rate of Sales Tax})}$

= $\frac{13530 \times 100}{100 + 10}$

= $\frac{13530 \times 100}{110}$ = ₹12,300

Question 4.
Sarita purchases biscuits costing Rs. 158 on which the rate of Sales Tax is 6%. She also purchases some cosmetic goods costing Rs. 354 on which rate of Sales Tax is 9%. Find the total amount to be paid by Sarita.

Solution:

Cost of biscuits = ₹158.

Sales Tax @ 6% = ₹158 × $\dfrac{6}{100}$ = $\dfrac{948}{100}$

= ₹9.48

Total price of biscuits = ₹158 + ₹9.48

= ₹167.48

Cost of cosmetic-goods = ₹354.

Sales Tax @ 9% = ₹354 × $\dfrac{9}{100}$

= $\dfrac{3186}{100}$ = ₹31.86

Total cost of cosmetic goods = Rs. 354 + Rs. 31.86 = Rs. 385.86
Total amount paid by Sarita = Rs. 167. 48 + 385.86 = Rs. 553. 34

Question 5.
The price of a T.V. set inclusive of sales tax of 9% is Rs. 13,407. Find its marked price. If Sales Tax is increased to 13%, how much more does the customer has to pay for the T.V. ?

Solution:

Sale price of T.V. set = ₹13,407

Rate of sales tax = 9%

Let marked price of T.V. = x

Then sale price

$= x + \dfrac{x \times 9}{100} = \dfrac{100x + 9x}{100} = \dfrac{109x}{100}$

∴ $\dfrac{109x}{100}$ = ₹13,407

$x = \dfrac{13407 \times 100}{109}$ = ₹12,300

∴ Marked Price = ₹12,300

In second case, Sales Tax = 13%

∴ Amount of sales tax = ₹12300 × $\dfrac{13}{100}$

= ₹1,599

∴ Sale price = ₹12,300 + 1,599 = ₹13,899

Difference between the two sales price

= ₹13,899 – ₹13,407 = ₹492

Question 6.

The price of an article is Rs. 8,250 which includes Sales Tax at 10%. Find how much more or less does a customer pay for the article, if the Sales Tax on the article:
(i) increases to 15%
(ii) decreases to 6%
(iii) increases by 2%
(iv) decreases by 3%

Solution:

Price of an article = Rs. 8,250
Rate of Sales Tax = 10%
Let the list price = x

$$\therefore \text{ Sales Tax} = x \times \frac{}{100} = \frac{}{10}$$

$$\text{Sales price} = x + \frac{x}{10} = \frac{11x}{10}$$

$$\therefore \frac{11x}{10} = 8250$$

$$x = \frac{8250 \times 10}{11} = 7,500$$

$\therefore$ List price = ₹7,500

(*i*) Rate of sales tax = 15%

$$\therefore \text{ Sale price} = ₹7,500 \, \frac{(100 + 15)}{100}$$

$$= ₹7,500 \times \frac{115}{100} = ₹8,625$$

$\therefore$ Customer will pay more.
Hence increase = 8,625 − 8,250 = ₹375

(*ii*) Rate of Sales Tax = 6%

$$\therefore \text{Sale price} = ₹7,500 \ \frac{(100+6)}{100}$$

$$= ₹7,500 \times \frac{106}{100} = ₹7,950$$

$\therefore$ The customer will pay less the amount of
$$= ₹8,250 - ₹7,950 = ₹300$$

(*iii*) Rate of sales tax = (10 + 2)% = 12%

$$\therefore \text{Sale price} = ₹7,500 \times \frac{(100+12)}{100}$$

$$= ₹7,500 \times \frac{112}{100} = ₹8,400$$

$\therefore$ The Customer will have to pay more the amount of ₹8,400 – ₹8,250
$$= ₹150$$

(*iv*) Rate of Sales Tax = 10 – 3 = 7%

$$\therefore \text{Sale price} = ₹7,500 \ \times \frac{(100+7)}{100}$$

$$= ₹7,500 \times \frac{107}{100} = ₹8,025$$

$\therefore$ The customer will have to pay less
$$= ₹8,250 - ₹8,025 = ₹225$$

Question 7.
A bicycle is available for Rs. 1,664 including Sales Tax. If the list price of the bicycle is ₹ 1,600, find :
(i) the rate of Sales Tax
(ii) the price a customer will pay for the bicycle if the Sales Tax is increased by 6%.

Solution:

Sale price of bicycle = ₹1,664.

List price = ₹1,600

∴ Amount of Sales Tax = ₹1,664 − 1,600

= ₹64.

∴ Rate of Sales Tax = $\dfrac{64 \times 100}{1600}$ = 4%

In second case, rate of sales-tax = 4 + 6 = 10%

∴ Amount of Sales Tax = $\dfrac{1600 \times 10}{100}$ = ₹160

∴ Sales price = ₹1,600 + ₹160 = ₹1,760

Question 8.

When the rate of sale-tax is decreased from 9% to 6% for a coloured T.V. ; Mrs Geeta will save Rs. 780 in buying this T.V. Find the list price of the T.V.

Solution:

Rate of sales tax in the beginning = 9%

and Reduced rate = 6%

∴ Diff. = 9 − 6 = 3%

Total saving = ₹780

∴ List. price of TV = Total saving × $\dfrac{100}{3}$

= $\dfrac{780 \times 100}{3}$ = ₹26000

Question 9.

A shopkeeper sells an article for Rs. 21,384 including 10% sales-tax. However, the actual rate of sales-tax is 8%. Find the extra profit made by the dealer.

Solution:

Sale Price of an article including S.T. = Rs. 21384

Rate of Sales Tax = 10%

$$\therefore \text{ Actual price} = \frac{Total\ price \times 100}{(100 + ST\%)}$$

$$= \frac{21384 \times 100}{100 + 10}$$

$$= \frac{21384 \times 100}{110} = ₹19440$$

In second case, rate of sales tax = 8%

$$\therefore \text{ S.P.} = ₹ \frac{19440 \times (100 + 8)}{100}$$

$$= ₹ \frac{19440 \times 108}{100}$$

$$= ₹ \frac{2099520}{100} = ₹20995.20$$

$$\therefore \text{ Extra profit} = ₹21384 - ₹20995.20$$

$$= ₹388.80$$

[In this exercise, all the prices are excluding tax/VAT unless specified]
Question 1.
A shopkeeper buys an article for Rs. 8,000 and sells it for Rs. 10,000. If the rate of tax under VAT is 10%, find :
(i) tax paid by the shopkeeper
(ii) tax charged by the shopkeeper
(iii) VAT paid by the shopkeeper
Solution:

Cost price of an article = ₹8000
And, selling price = ₹10,000
(i) Tax paid by Shopkeeper under VAT 10%

$$= ₹\frac{8,000 \times 10}{100} = ₹800$$

(ii) Tax charged by the shopkeeper
∵ Selling price = ₹10,000 under VAT 10%

$$= ₹\frac{10,000 \times 10}{100} = ₹1000$$

(iii) VAT paid by the shopkeeper = Rs.1000 – Rs. 800 = Rs. 200

Question 2.
A trader buys some goods for Rs. 12,000 and sells them for Rs. 15,000. If the rate of tax under VAT is 12%, find the VAT paid by the trader?
Solution:

Cost price of goods = ₹12,000
VAT charged, Under VAT 12%

$$= \frac{12,000 \times 12}{100} = ₹1440$$

Selling price of goods = ₹15,000
VAT charged, Under VAT 12%

$$= \frac{15,000 \times 12}{100} = ₹1800$$

VAT paid by trader = ₹1800 – ₹1440 = ₹360

Question 3.
The marked price of an article is Rs. 7,000 and is available at 20% discount. Manoj buys this article and then sold it at its marked price. If the rate of tax at each state is 10%, find the VAT paid by Manoj.

Solution:

M.P. an article = ₹7000

Discount rate = 20%

C.P. for Manoj = ₹7000 – 20% of ₹7000

= ₹7000 – ₹1400 = ₹5600

$\therefore$ Tax paid by Manoj = ₹ $\dfrac{5600 \times 10}{100}$ = ₹560

S.P. of an article = ₹7000

Tax charged by Manoj = ₹ $\dfrac{7000 \times 10}{100}$ = ₹700

VAT paid = Tax charged – Tax paid

= ₹700 – ₹560 = ₹140

Question 4.

A buys some goods for Rs. 4,000 and sold them to B for Rs. 5,000. B sold these goods to C for Rs. 6,000. If the rate of tax (under VAT) at each stage is 5%, find :

(i) VAT paid by A

(ii) VAT paid by B

Solution:

C.P. of some goods for A = Rs. 4000

C.P. of some goods for B = Rs. 5000

and C.P. for C = Rs. 6000

Rate of VAT in each case = 5%

$\therefore$ VAT charged by A = ₹4000 × $\dfrac{5}{100}$ = ₹200

VAT charged by B = ₹5,000 × $\dfrac{5}{100}$ = ₹250

VAT charged by C = ₹6000 × $\dfrac{5}{100}$ = ₹300

(i) Now VAT paid by A = ₹250 – ₹200 = ₹50

(ii) Now VAT paid by B = ₹300 – ₹250 = ₹50

Question 5.

A buys an article for ₹ 8,000 and sold it to B at 20% profit. If the rate of tax under VAT is 8%, find :

(i) tax paid by A

(ii) tax charged by A
(iii) VAT paid by A
Solution:

C.P. of an article for A = ₹8000
Tax rate = 8%

(i) Tax paid by A = C.P. $\times \dfrac{\text{Rate}}{100}$

$= ₹8000 \times \dfrac{8}{100} = ₹640$

(ii) C.P. of an article for B = ₹8000 + 20% of ₹8000

$= ₹8000 + 1600 = ₹9600$

Tax charged by A or = C.P. $\times \dfrac{\text{Rate}}{100}$

Tax paid by B = ₹9600 $\times \dfrac{8}{100} = ₹768$

(iii) VAT paid by A = Tax charged – Tax paid

$= ₹768 – ₹640 = ₹158$

Question 6.
A shopkeeper purchases an article for ₹ 12,400 and sells it to a customer for ₹ 17,000.
If the tax under VAT is 8%, find the VAT paid by the shopkeeper.
Solution:
C.P. of article = ₹ 12,400
Rate of VAT =8%

Total VAT = ₹ 12,400 x $\frac{8}{100}$ = Rs. 992
S.P. of the article = ₹ 17000

VAT charge 8% = Rs. 17000 x $\frac{8}{100}$ = Rs. 1360
Amount of VAT paid by the shopkeeper = Rs. 1360 – Rs. 992 = Rs. 368

Question 7.
A purchases an article for ₹ 7,200 and sells it to B for Rs. 9,600. B, in turn, sells the
article to C for Rs. 11,000. If the tax (under VAT) is 10%, find the VAT paid by A and B.

Solution:

C.P. of an article for A = ₹7200
C.P. of the article for B = ₹9600
and C.P. for C = ₹11000
Rate of VAT in each case = 10%

∴ VAT charged by A = ₹7200 × $\frac{10}{100}$ = ₹720

VAT charged by B = ₹9600 × $\frac{10}{100}$ = ₹960

and VAT charged by C = ₹11000 × $\frac{10}{100}$

= ₹1100

Now VAT levied on A = ₹960 – ₹720

= ₹240

and VAT levied on B = ₹1100 – ₹960

= ₹140

Question 8.

A manufacturer buys some goods for Rs. 60,000 and pays 5% tax. He sells these goods for Rs. 80,000 and charges tax at the rate of 12%. Find the VAT paid by the manufacturer.

Solution:

C.P. of raw material = ₹60000
Rate of tax = 5%

∴ Total tax = ₹60000 × $\frac{5}{100}$ = ₹3000

S.P. of that material = ₹80,000
Rate of tax = 12%

∴ Total tax = ₹80,000 × $\frac{12}{100}$ = ₹9600

VAT paid by the manufacturer = Rs. 9600 – Rs. 3000 = Rs. 6600

Question 9.
The cost of an article is Rs. 6,000 to a distributor, he sells it to a trader for Rs. 7,500 and the trader sells it further to a customer for Rs. 8,000. If the rate of tax under VAT is 8%; find the VAT paid by the:
(i) distributor
(ii) trader

Solution:

Cost price of an article to a distributor
= ₹6000

and selling price of distributor = ₹7500
and selling price of trader = ₹8000

Rate of VAT = 12.5% = $\dfrac{25}{2}$%

Now, VAT for two distributor

= ₹$\dfrac{6000 \times 25}{100 \times 2}$ = ₹750

and VAT for two trader = $\dfrac{7500 \times 25}{100 \times 2}$

= ₹937.50

and VAP for customer = $\dfrac{8000 \times 25}{100 \times 2}$ = ₹1000

(i) Now VAT paid by distributor
= ₹937.50 – ₹750 = ₹187.50

(ii) and VAT paid by trader
= ₹1000 – ₹937.50 = ₹62.50

Question 10.
The marked price of an article is Rs. 10,000. A buys it at 30% discount on the marked price and sells it at 10% discount on the marked price. If the rate of tax under VAT is 5%, find the amount of VAT paid by A.

Solution:

M.P. of an article = ₹10,000

A purchased it at discount of = 30%

C.P. of an article

$$= M.P. - \frac{\text{Discount rate} \times \text{M.P.}}{100}$$

$$= ₹10,000 - \frac{30 \times 10,000}{100}$$

$$= ₹10,000 - ₹3000 = ₹7000$$

Tax rate = 5%

$$\text{Tax paid by A} = \text{C.P.} \times \frac{\text{Tax rate}}{100}$$

$$= ₹7000 \times \frac{5}{100} = ₹350$$

Now, A sold the article at 10% discount

∴ S.P. of an article

$$= M.P. - \frac{\text{Discount rate} \times \text{M.P.}}{100}$$

$$= ₹10,000 - \frac{10 \times ₹10,000}{100}$$

$$= ₹10,000 - ₹1000 = ₹9000$$

$$\text{Tax charged by A} = \text{S.P.} \times \frac{\text{Tax rate}}{100}$$

$$= ₹9000 \times \frac{5}{100} = ₹450$$

∴ VAT paid by A = Tax charged − Tax paid
$$= ₹450 - ₹350 = ₹100$$