Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.1

Question 1.
Find 77% of 580 + 34% of 390.
Solution:

$$77\% \text{ of } 580 + 34\% \text{ of } 390$$
$$= \frac{77}{100} \times 580 + \frac{34}{100} \times 390$$
$$= \frac{77}{5} \times 29 + \frac{17}{5} \times 39$$
$$= \frac{2233 + 663}{5}$$
$$= \frac{2896}{5}$$
$$= 579.2$$

Question 2.
240 candidates appeared for an examination, of which 204 passed. What is the pass percentage?
Solution:
We find the pass percentage using the unitary method

Total number of students	Number of students passed
240	204
100	$= \frac{204 \times 100}{240}$
	$= \frac{51 \times 100}{60}$
	$= \frac{17 \times 10}{2}$
	$= 85$

∴ The pass percentage for the examination is 85%.

Question 3.
What percent of 8.4 kg are 168 grams?
Solution:
Let 168 gms be x% of 8.4 kg
i.e., let 168 gms be $\frac{x}{100}$ of 8400 gms
∴ 168 = $\frac{x}{100}$ × 8400
∴ x = $\frac{16884}{}$ = 2
∴ 168 gms is 2% of 8.4 kg.

Question 4.
If the length of a rectangle is decreased by 20%, what should be the increase in the breadth of the rectangle so that the area remains the same?
Solution:
Let x and y represent the length and breadth of the rectangle respectively.
∴ The original area of the rectangle = xy
There is a 20% decrease in length.

$$\therefore \quad \text{New length} = x - \frac{20}{100}\,x = x - \frac{1}{5}\,x$$
$$= x\left(1 - \frac{1}{5}\right) = x\left(\frac{5-1}{5}\right) = \frac{4}{5}\,x$$

Let k % be the required increase in breadth

$$\therefore \quad \text{New breadth} = y + \frac{k}{100}\,y$$
$$= y\left(1 + \frac{k}{100}\right)$$

Given that the new and old areas should be equal.

$$\therefore \quad \left(\frac{4}{5}x\right)\left(1 + \frac{k}{100}\right)y = xy$$

$$\therefore \quad \left(\frac{4}{5}\right)\left(\frac{100+k}{100}\right) = 1$$

$$\therefore \quad \frac{100+\kappa}{100} = \frac{\circ}{4}$$

∴ 100 + k = 125
∴ k = 125 – 100 = 25
∴ Breadth should be increased by 25% so that the area remains same.

Question 5.
The price of rice increased by 20%, as a result, a person can have 5kg rice for ₹ 600. What was the initial price of rice per kg?
Solution:
A person can buy 5 kg of rice for ₹ 600 after the increase in price
∴ New price of rice = $\frac{600}{5}$ = ₹ 120/kg .....(i)
Let 'x' be the initial price per kg of rice.
There is a 20% increase in the price of rice.
Thus the new price of the rice will be given as

$$x\left(1+\frac{20}{100}\right)$$

Equation with (i), we get

$$x\left(1+\frac{20}{100}\right)=120$$

$$\therefore \quad x\left(\frac{100+20}{100}\right)=120$$

$$\therefore \quad \frac{120x}{100}=120$$

$$\therefore \quad x=100$$

∴ The initial price of rice is ₹ 100 per kg

Question 6.
What percent is 3% of 5%?
Solution:
Let 3% be x % of 5%.
Then $\frac{3}{100}=\frac{x}{100}\times\frac{5}{100}$
∴ x = $\frac{3\times100}{5}$ = 60
∴ 3% is 60% of 5%.

Question 7.
After availing of two successive discounts of 20% each, Madhavi paid ₹ 64 for a book. If she would have got only one discount of 20%, how much additional amount would she have paid?
Solution:
Let the price of the book be ₹ x.
After the first 20% discount, the price of the book becomes

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

$$= x\left(1-\frac{1}{5}\right)$$

$$= \frac{4x}{5} \quad \ldots(i)$$

After another 20% discount, the price of the book becomes

$$= \left(1-\frac{20}{100}\right)\left(\frac{4}{5}x\right)$$

$$= \left(1-\frac{1}{5}\right)\left(\frac{4}{5}x\right)$$

$$= \left(\frac{4}{5}\right)\left(\frac{4}{5}\right)x$$

$$= \frac{16}{25}x$$

This price = ₹ 64 .....[Given]

$\therefore 1625x = 64$

$\therefore x = 4 \times 25 = 100$

Thus, Amount of the book after one discount = $45(100) = 80$ .....[from (i)]

∴ The additional amount that Madhavi would have paid = 80 – 64 = ₹ 16

Question 8.

The price of the table is 40% more than the price of a chair. By what percent price of a chair is less than the price of a table?

Solution:

Let ₹ x and ₹ y be the price of a table and chair respectively.

The price of the table is 40% more than the price of a chair

$\therefore x-yy \times 100 = 40$

$$\therefore \quad \frac{x-y}{y} = \frac{40}{100} = \frac{2}{5}$$

$$\therefore \quad \frac{x}{y} - \frac{y}{y} = \frac{2}{5}$$

$$\therefore \quad \frac{x}{y} - 1 = \frac{2}{5}$$

$$\therefore \quad \frac{x}{y} = 1 + \frac{2}{5}$$

$$\therefore \quad \frac{x}{y} = \frac{7}{5} \quad \ldots(i)$$

We need to find by how much percent is the price of a chair less than that of a table.

$$\text{i.e. } \left(\frac{x-y}{x}\right)\times 100 = \left(\frac{x}{x}-\frac{y}{x}\right)\times 100$$

$$= \left(1-\frac{y}{x}\right)\times 100$$

$$= \left(1-\frac{5}{7}\right)\times 100 \quad \ldots\left[\because \frac{x}{y}=\frac{7}{5}\right]$$

$$= \left(\frac{7-5}{7}\right)\times 100$$

$$= \frac{2\times 100}{7} = 28.57\%$$

∴ The price of a chair is 28.57% less than the price of a table.

Question 9.
A batsman scored 92 runs which includes 4 boundaries 5 sixes. He scored other runs by running between the wickets. What percent of his total score did he make by running between the wickets?
Solution:
Batsman scores 4 fours (boundaries) and 5 sixes in 92 runs.
Number of runs scored by fours and sixes = 4 × 4 + 5 × 6 = 46
∴ 92 – 46 = 46
Let 46 be x% of 92.
Then 46 = $\frac{x}{100}$ × 92
∴ x = $\frac{46\times 100}{92} = \frac{100}{2}$ = 50
∴ 50% of the total runs were scored by running between the wickets.

Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.2

Question 1.
Mr. Sarad purchased a laptop for ₹ 24,000 and sold it for ₹ 30,000. What was the profit percentage?
Solution:
Cost price (C.P.) = ₹ 24000
Selling price (S. P.) = ₹ 30,000
Profit = S.P. – C.P.
= 30,000 – 24,000
= 6,000

$$\text{Profit \%} = \frac{\text{Profit} \times 100}{\text{C.P.}}$$
$$= \frac{6000 \times 100}{24000}$$
$$= \frac{6}{24} \times 100 = \frac{100}{4} = 25$$

∴ Profit Percentage = 25%

Question 2.
Shraddha purchased a mobile phone and refrigerator for ₹ 18,000 and ₹ 15,000 respectively. She sold the refrigerator at a loss of 20% and the mobile at a profit of 20%. What is her overall profit or loss?
Solution:
C.P. of mobile phone = ₹ 18,000
Profit percentage on mobile phone = 20%
Selling price (S.P.) of mobile phone = 18,000 $(1 + \frac{20}{100})$
= 18,000 $(1 + \frac{1}{5})$
= 18,000 × $\frac{6}{5}$
= ₹ 21,600
C.P. of refrigerator = 15,000
Loss percentage on refrigerator = 20%
∴ Selling price (S.P.) = 15,000$(1 - \frac{20}{100})$
= 15,000$(1 - \frac{1}{5})$
= 15,000 × $\frac{4}{5}$

= ₹ 12,000
∴ Total gelling price for the transaction = 21,600 + 12,000 = ₹ 33,600
Total cost price (purchase price) for the transaction = 18,000 + 15,000 = ₹ 33,000
∴ Overall profit made by Shraddha = Total S.P. – Total C.P.
= 33,600 – 33,000
= ₹ 600
Thus, Shraddha made on overall profit of ₹ 600.

Question 3.
A vendor bought toffees at 6 for ₹ 10. How many for ₹ 10 must he sell to gain 20%?
Solution:
Vendor bought toffees at the rate of 6 for ₹ 10
∴ Cost price of one toffee = 106
i.e. C.P. = 106 .....(i)
Let x be the number of toffees he must sell in ₹ 10 to gain 20%
i.e. S.P. = $10x$ .....(ii)
Profit percentage = $\text{S.P.} - \text{C.P.}\ \text{C.P.}$
Using (i) and (ii) we have

$$20\% = \frac{\frac{10}{x} - \frac{10}{6}}{\frac{10}{6}}$$

$$\therefore \quad \frac{20}{100} = 10\left(\frac{1}{x} - \frac{1}{6}\right) \times \frac{6}{10}$$

$$\therefore \quad \frac{1}{5} = \left(\frac{1}{x} - \frac{1}{6}\right)6$$

$$\therefore \quad \frac{1}{x} - \frac{1}{6} = \frac{1}{30}$$

$$\therefore \quad \frac{6-x}{6x} = \frac{1}{30}$$

∴ 30(6 – x) = 6x
∴ 180 – 30x = 6x
∴ 36x = 180
∴ x = 5
The vendor must sell 5 toffees for ₹ 10 in order to gain 20%.

Question 4.
The percentage profit earned by selling an article for ₹ 2,880 is equal to the percentage loss incurred by selling the same article for ₹ 1,920. At what price the article should be sold to earn a 25% profit?
Solution:
Let x be C.P. of the article
Let y % be both, the gain and loss made when article is sold at ₹ 2,880 and ₹ 1,920 respectively. Then
$x + \frac{y}{100} x = 2880$ .....(i)
$x - \frac{y}{100} x = 1920$ .....(ii)
Adding (i) and (ii), we get
2x = 4800
∴ x = 2400
i.e. C.P. of the article = ₹ 2400
Required profit percentage = 25%

$$\therefore \quad \text{S.P.} = \text{C.P.}\left[1+\frac{\text{Profit}\%}{100}\right]$$

$$= 2400\left[1+\frac{25}{100}\right]$$

$$= 2400\left[1+\frac{1}{4}\right]$$

$$= 2400 \times \frac{5}{4}$$

$$= 3000$$

∴ The article should be sold at ₹ 3000 to earn 25% profit.

Question 5.
A cloth merchant advertises for selling cloth at a 4% loss. By using a faulty meter scale, he is earning a profit of 20%. What is the actual length of the scale?
Solution:
Let the cost price of the cloth be ₹ 'x' per meter
He claims a loss of 4%
∴ Selling price of the cloth
$\text{S.P.} = \text{C.P.}\left(1 - \frac{\text{loss}}{100}\right)$
$= x\left(1 - \frac{4}{100}\right)$
= 0.96x .....(i)
The actual cost price of the cloth is lower as the cloth is measured by a

faulty meter scale.
Given that shopkeeper's profit = 20%

$$\text{Now, S.P.} = \text{C.P.}\left(1 + \frac{\text{Profit\%}}{100}\right)$$

$$\therefore \quad \text{S.P.} = \text{C.P.} \div \left(1 + \frac{\text{Profit\%}}{100}\right)$$

$$\therefore \quad \text{Actual C.P.} = 0.96x \div \left(1 + \frac{20}{100}\right) \quad \text{...[From (i)]}$$

$$= 0.96x \div \left(1 + \frac{1}{5}\right)$$

$$= 0.96x \div \frac{6}{5}$$

$$= 0.96x \times \frac{5}{6}$$

$$= 0.8x$$

∴ The actual cost price is 0.8 times the cost price as advertised.
In other words, the meter scale used for the fraud is 0.8 times the meter scale that should have been used.
∴ The length of the faulty meter scale used = 0.8 × 1 = 0.8 meter
∴ The actual length of the scale is 0.8 meters.

Question 6.
Sunil sells his bike worth ₹ 25,000 to Rohit at a profit of 20%. After 6 months Rohit sells the bike back to Sunil at a loss of 20%. Find the total profit percent of Sunil considering both the transactions.
Solution:
Sunil sells his bike to Rohit at 20% profit.
So S.P. of the bike for Sunil
= 25000 + $\frac{20}{100}$ × 25000
= 25000 + 5000
= 30000
∴ Cost price of bike to Rohit = ₹ 30000
Rohit sells the bike back to Sunil at 20% loss
∴ S.P. of the bike for Rohit = 30000 – $\frac{20}{100}$ × 30000
= 30000 – 6000
= 24000

∴ In second transaction Sunil pays 24000 to Rohit
In the first transaction, he had received 30000 from Rohit
∴ Sunil made a profit of ₹ (30000 – 24000) = ₹ 6000
Sunil earned this profit on the bike which costed him ₹ 25000
∴ Total profit % that Sunil makes = $\frac{6000}{25000} \times 100$
$= \frac{60}{25}$
= 24
∴ Sunil makes 24% profit considering both the transactions.

Question 7.
By selling a book at ₹ 405 bookseller incurs a loss of 25%. Find the cost price of the book.
Solution:
S.P. = ₹ 405
Loss% = 25
S.P. when there is a loss is given by
S.P. = C.P. × $\frac{\text{Loss \%}}{100}$

$$\therefore \quad 403 = \text{C.P.} \times \left[1 - \frac{25}{100}\right]$$

$$\therefore \quad 403 = \frac{100 - 25}{100} \times \text{C.P.}$$

$$\therefore \quad \text{C.P.} = \frac{405 \times 100}{75}$$

$$= \frac{405 \times 4}{3}$$

$$= 135 \times 4$$

$$= 540$$

∴ The cost price of the book is ₹ 540.

Question 8.
A cloth costs ₹ 675. If it is sold at a loss of 20%, what is its cost price as a percentage of its selling price?
Solution:
C.P. = ₹ 675
Loss% = 20%
∴ Loss made in selling = $\frac{20}{100} \times 675$ = ₹ 135
S.P. = C.P. – Loss
= 675 – 135

= ₹ 540
Let C.P. be x % S.P.,
Then 675 = $\frac{x}{100}$ × 540
∴ x = $\frac{675 \times 100}{540}$ = 125
∴ Cost price is 125% of the selling price.

Question 9.
Ashwin buys an article for ₹ 500. He marks it for sale at 75% more than the cost price. He offers a 25% discount on the marked price to his customer. Calculate the actual percentage of profit made by Ashwin.
Solution:
C.P. = ₹ 500
Marked price = C.P. + $\frac{75}{100}$ × C.P.
= $\frac{75}{100}$ × 500
= 500 + 75 × 5
= 500 + 375
= 875
25% discount was given on marked price
∴ Discount = $\frac{25}{100}$ × 875 = $\frac{875}{4}$
Selling price = marked price – discount

$$= 875 - \frac{875}{4}$$

$$= 875\left(1 - \frac{1}{4}\right)$$

$$= \frac{875 \times 3}{4}$$

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

$$= \frac{875 \times 3}{4} - 500$$

$$= \frac{2625 - 2000}{4}$$

$$= \frac{625}{4}$$

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost price}} \times 100$$

$$= \frac{\frac{625}{4}}{500} \times 100$$

$$= \frac{625}{4 \times 5}$$

$$= \frac{125}{4}$$

$$= 31.25$$

∴ Ashwin makes 31.25% profit.

Question 10.
The combined cost price of a refrigerator and a mixer is ₹ 12,400. If the refrigerator costs 600% more than the mixer, find the cost price of the mixer.
Solution:
Let ₹ x be the cost price of the mixer.
The cost price of the refrigerator = x + $\frac{600}{100}$ x
= x + 6x
= 7x
Total cost price =12400 .....[Given]
i.e. x + 7x = 12400
i.e. 8x = 12400
∴ x = $\frac{12400}{8}$ = 1550
∴ The cost price of mixer is ₹ 1550.

Question 11.
Find the single discount equivalent to the discount series of 5%, 7%, and 9%.
Solution:
Let the marked price be ₹ 100
After 1st discount the price = $100(1 - \frac{5}{100}) = 95$
After 2nd discount the price = $95(1 - \frac{7}{100}) = \frac{95 \times 93}{100}$
After 3rd discount the price = $\frac{95 \times 93}{100}(1 - \frac{9}{100})$
$= \frac{95 \times 93 \times 91}{100 \times 100}$
$= \frac{80398}{510000}$
= 80.3985 ~ 80.4
Selling price after 3 discounts is ₹ 80.4
Single equivalent discount = Marked price – Selling price
= 100 – 80.4
= ₹ 19.6
∴ Single equivalent discount is 19.6%.

Question 12.
The printed price of a shirt is ₹ 390. Lokesh pays ₹ 175.50 for it after getting two successive discounts. If the first discount is 10%, find the second discount.
Solution:
Marked price = ₹ 390
After the first discount of 10%, the price of the shirt

$$= 390 - \frac{10}{100}(390)$$

$$= 390\left(1 - \frac{1}{10}\right)$$

$$= 390\left(\frac{9}{10}\right)$$

Let second discount be x %. Then

$$390\left(\frac{9}{10}\right)\left(1 - \frac{x}{100}\right) = 175.5$$

$\ldots$ [Given that Lokesh bought the shirt for ₹ 175.50]

$$\therefore \quad 1 - \frac{x}{100} = \frac{175.5 \times 10}{390 \times 9}$$

$$= \frac{19.5 \times 10}{390}$$

$$= \frac{195}{390}$$

$$= \frac{1}{2}$$

$$\therefore \quad \frac{x}{100} = 1 - \frac{1}{2} = \frac{1}{2}$$

∴ x = 50
∴ Second discount is 50%

Question 13.
Amar, a manufacturer, gives a discount of 25% on the list price to his distributor Akbar, Akbar sells at a 10% discount on the list price to his customer Anthony. Anthony paid ₹ 540 for the article. What is the profit percentage of Akbar on his cost price?
Solution:
Let ₹ 'x' be the list price of the article.
Amar gives a discount of 25% on the list price.
∴ Selling price for Amar = $x(1-25100)$
= $x(1-14)$
= ₹ $3x4$
Amar sells the article to Akbar
Cost price of article for Akbar = ₹ $3x4$ .....(i)
Akbar sells the article to Anthony at 10% discount on list price

∴ Selling price for Akbar = $x(1-\frac{10}{100})$
= $x(1-\frac{1}{10})$
= ₹ $\frac{9x}{10}$ .....(ii)
Profit percentage = $\frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$
Using (i) and (ii), we have the profit percentage for Akbar as,

$$\text{Profit percentage} = \frac{\frac{9x}{10} - \frac{3x}{4}}{\frac{3x}{4}} \times 100$$

$$= \frac{36x - 30x}{40} \times \frac{4}{3x} \times 100$$

$$= \frac{6x}{40} \times \frac{4}{3x} \times 100$$

$$= 20\%$$

∴ Akbar gets a profit of 20% on his cost price.

Question 14.
A man sells an article at a profit of 25%. If he had bought it at a 10% loss and sold it for ₹ 7 less, he would have gained 35%. Find the cost price of the article.
Solution:
Let ₹ 'x' be the C.P. of the article
∴ Article was sold at 25% profit
∴ S.P. of the article = $x(1+\frac{25}{100})$
= $x(1+\frac{1}{4})$
= 1.25x
If the article was bought at 10% loss
i.e., the new C.P. = $x(1-\frac{10}{100})$
= $x(\frac{9}{10})$
= 0.9x
and sold at ₹ 7 less
∴ New S.P. = 1.25x – 7
Then, the profit would have been 35%
Using profit percentage = $\frac{\text{S.P.-C.P.}}{\text{C.P.}} \times 100$

$$\therefore \quad 35 = \frac{(1.25x - 7) - 0.9x}{0.9x} \times 100$$

$$\therefore \quad \frac{35}{100} = \frac{0.35x - 7}{0.9x}$$

$$\therefore \quad \frac{7}{20} = \frac{0.35x - 7}{0.9x}$$

$$\therefore \quad 6.3x = 20(0.35x - 7)$$

$$\therefore \quad 6.3x = 7x - 140$$

$$\therefore \quad 7x - 6.3x = 140$$

$$\therefore \quad 0.7x = 140$$

$$\therefore \quad x = \frac{140}{0.7}$$

$$\therefore \quad x = 200$$

∴ Cost price of the article is ₹ 200

Question 15.
Mr. Mehta sold his two luxury cars at ₹ 39,10,000 each. On one he gains 15% but on the other, he loses 15%. How much does he gain or lose in the whole transaction?
Solution:
Let x, y be the C.P. of two cars.
S.P. of both the cars = 39,10,000 .....[Given]
∴ One car is sold at 15% loss
∴ S.P. of the first car = x − $\frac{15}{100}$x
∴ $\frac{85}{100}$x = 39,10,000
∴ x = $\frac{39,10,000 \times 100}{85}$
∴ x = 46,000 × 100
∴ x = 46,00,000
Other car is sold at 15% gain
∴ S.P. of second car = y + $\frac{15}{100}$ y
∴ y + $\frac{15}{100}$ y = 39,10,000
∴ $\frac{115}{100}$y = 39,10,000
∴ y = $\frac{39,10,000 \times 100}{115}$
∴ y = 34,000 × 100
∴ y = 34,00,000
x + y = Total C.P. of two cars
= 46,00,000 + 34,00,000

= 80,00,000
Total S.P. = 39,10,000 + 39,10,000 = 78,20,000
∴ S.P. < C.P.
∴ There is a loss of ₹ (80,00,000 – 78,20,000) = ₹ 1,80,000
∴ Loss % = $\frac{1,80,000}{80,00,000} \times 100$
= 188
= 2.25
∴ Mr. Mehta bears a 2.25% loss in the whole transaction.

Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.3

Question 1.
What would be the simple interest on an amount of ₹ 9,600 at the rate of 6% per annum after 3 years?
Solution:
Given Principal P = ₹ 9600
Rate of interest R = 6% p.a.
Number of years = T = 3
Simple Interest I = $\frac{PRT}{100}$
= $9600 \times 3 \times 6100$
= 96 × 18

= 1728
∴ Simple interest after 3 years would be ₹ 1728

Question 2.
What would be the simple interest at the rate of $9\frac{1}{2}$% per annum on ₹ 6,000 for $2\frac{1}{2}$ years?
Solution:
Rate of interest per annum R = $9\frac{1}{2}$% = $\frac{19}{2}$%
Principal P = ₹ 6000
Duration T = $2\frac{1}{2}$ = $\frac{5}{2}$ years
∴ Simple Interest, I = $\frac{PRT}{100}$
= 6000 × $\frac{19}{2} \times \frac{5}{2} \times \frac{1}{100}$
= 15 × 19 × 5
= 1425
∴ Simple interest would be ₹ 1425.

Question 3.
What would be the simple interest on ₹ 8,400 in 9 months at the rate of 8.25 percent per annum?
Solution:
Principal P = ₹ 8400
Rate of interest R = 8.25%
Duration T = 9 months = $\frac{3}{4}$ years

$$\text{Simple interest} = \frac{PRT}{100}$$
$$= \frac{8400 \times 8.25}{100} \times \frac{3}{4}$$
$$= 21 \times \frac{33}{4} \times 3 = \frac{99 \times 21}{4}$$
$$= \frac{2079}{4}$$
$$= 519.75$$

∴ Simple interest would be ₹ 519.75.

Question 4.
What would be the compound interest on ₹ 4200 for 18 months at 10% per annum compounded half yearly?

Solution:
Principal P = ₹ 4200
Rate of interest R = 10%
Duration T = 18 months = 1.5 years
compounding is done half yearly

$$A = P\left(1+\frac{\frac{R}{2}}{100}\right)^{2T}$$
$$= 4200\left(1+\frac{10}{200}\right)^{3}$$
$$= 4200\left(\frac{21}{20}\right)^{3}$$
$$= \frac{4200\times 21^{3}}{20^{3}}$$

$= 4200\times 92612000$
= 4862.025
I = A – P
= 4862.025 – 4200
= 662.025
∴ Compound interest would be ₹ 662.025.

Question 5.
Find compound interest on ₹ 10,000 for 2 years at 8% per annum compounded half yearly.
Solution:
Principal P = ₹ 10,000
Rate of interest R = 8% p.a. compounded half yearly
Duration T = 2 years

$$A = P\left[1+\frac{\left(\frac{R}{2}\right)}{100}\right]^{2T}$$

$$= 10000\left(1+\frac{\frac{8}{2}}{100}\right)^{4}$$

$$= 10000\left(1+\frac{4}{100}\right)^{4}$$

$$= 10000(1.04)^4$$

$$= 11698.58$$

I = A – P
= 11648.58 – 10000
= 1698.58
∴ Compound interest is ₹ 1698.58.

Question 6.
In how many years ₹ 1,00,000 will become ₹ 1,33,100 at compound interest rate of 10% per annum?
Solution:
Principal P = ₹ 1,00,000
Amount A = ₹ 1,33,100
Rate of interest R = 10% p.a.

$$A = P\left(1+\frac{R}{100}\right)^{T}$$

$$\therefore \quad 133100 = 100000\left(1+\frac{10}{100}\right)^{T}$$

$$\therefore \quad \frac{1331}{1000} = \left(1+\frac{1}{10}\right)^{T} = \left(\frac{11}{10}\right)^{T}$$

$$\therefore \quad \left(\frac{11}{10}\right)^{3} = \left(\frac{11}{10}\right)^{T}$$

$$\therefore \quad T = 3 \text{ years}$$

∴ ₹ 1,00,000 will become ₹ 1,33,100 after 3 years.

Question 7.
A certain sum of money becomes three times of itself in 20 years at simple interest. In how many does it become double of itself at the same rate of

simple interest?
Solution:
Given that, sum of money triples itself in 20 years
∴ P + I = 3P
∴ I = 2P
and T = 20 years
Now simple interest I = $\frac{PRT}{100}$
∴ 2P = $\frac{P \times R \times 20}{100}$
∴ R = 10
∴ Rate of interest = 10% per annum
The time period is to be calculated for the condition that the sum doubles itself i.e. for the condition
P + I = 2P
i.e. I = P
$\frac{P \times R \times T}{100}$ = P
∴ $\frac{10 \times T}{100}$ = 1
∴ T = 10
∴ The sum will become double of itself in 10 years.

Question 8.
A person borrows 10,000 for 2 year at 4% p.a. simple interest he immediately lends it to another person at 6.5% p.a. for 2 years. Find his total gain in the transaction.
Solution:
Person borrows money at 4% per annum and lends it at 6.5% per annum.
∴ His gain is (6.5 – 4) = 2.5% on ₹ 10000 for 2 years
i.e. gain = $\frac{1000 \times 2.5 \times 2}{100}$
= 100 × 5
= ₹ 500
∴ The person will gain ₹ 500 in this transaction.

Question 9.
A man deposits X 200 at the end of each year in recurring account at 5% compound interest. How much will it become at the end of 3 years?
Solution:
At end of 1st year, 2nd year and 3rd year ₹ 200 were deposited.

Rate of interest R = 5% p.a.
At end of 3 years, amount
= 200 + $200[1+\frac{5}{100}]+200[1+\frac{5}{100}]^2$
= 200 [1 + 1.05 + (1.05)2]
= 200 [2.05 + 1.1025]
= 200 [3.1525]
= 630.5
At end of 3 years, the account will have a balance of ₹ 630.5.

Question 10.
A man gets a simple interest of ₹ 2,000 on a certain principal at the rate of 5% p.a. in 4 years. What compound interest will the man get on twice the principal in 2 years at the same rate.
Solution:
Let Principal amount = P
Simple Interest I = ₹ 2000
Rate of interest R = 5% p.a.
Time duration T = 4 years
I = $\frac{PRT}{100}$
∴ 2000 = $\frac{P\times5\times4}{100}$
∴ P = 10000
Twice the principal was invested for compound interest with the same rate of interest for 2 years.
Here, P = 2 × 10,000 = ₹ 20,000
∴ Amount received,

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$\therefore \quad A = 20000\left(1+\frac{5}{100}\right)^2$$

$$= 20000\times\frac{21}{20}\times\frac{21}{20}$$

$$= 50\times441 = 22050$$

I = A – P = 22050 – 20000 = 2050
The man will receive ₹ 2050 as compound interest.

Question 11.
The difference between simple interest and compound interest on a certain sum of money is ₹ 32 at 8% per annum for 2 years. Find the amount.
Solution:
Compound Interest = A – P = $P(1+\frac{R}{100})^T - P$
Simple interest = $\frac{PRT}{100}$
Given R = 8%, T = 2 years and
compound interest – simple interest = ₹ 32

$$\therefore \quad P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \frac{PRT}{100} = 32$$

$$\text{i.e. } P\left(\left[\left(1+\frac{8}{100}\right)^2 - 1\right] - \frac{8\times 2}{100}\right) = 32$$

$$P[(1.08)^2 - 1 - 0.16] = 32$$

$$P[1.1664 - 1.16] = 32$$

$$\therefore \quad 0.0064\,P = 32$$

$$P = \frac{32}{0.0064} = 5000$$

∴ The man will receive a compound interest of ₹ 5000.

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Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.4

Question 1.
Kanchan purchased a Maruti car for ₹ 2,45,000/- and the rate of depreciation is $14\frac{2}{7}\%$ per annum. Find the value of the car after two years?
Solution:
Given, purchase price of the car = V = ₹ 2,45,000
Rate of depreciation per annum = r
$= 14\frac{2}{7}\%$
$= \frac{100}{7}\%$
∴ Value of the car after two years = $V\left(1-\frac{r}{100}\right)^n$

$$= 2,45,000\left(1-\frac{\frac{100}{7}}{100}\right)^2$$

$$= 2,45,000\left(1-\frac{1}{7}\right)^2$$

$$= 2,45,000 \times \frac{36}{49}$$

$$= 1,80,000$$

∴ The value of the car after two years is ₹ 1,80,000.

Question 2.
The value of a machine depreciates from ₹ 32,768 to ₹ 21,952/- in three years. What is the rate of depreciation?
Solution:
Given, initial value of machine = V = ₹ 32,768/-
Depreciated value of the machine = D.V. = ₹ 21,952/-
Numher of years = n = 3

$$\text{Using D.V.} = V\left(1-\frac{r}{100}\right)^n$$

$$21,952 = 32,768\left(1-\frac{r}{100}\right)^3$$

$$\therefore \quad \left(1-\frac{r}{100}\right)^3 = \frac{21,952}{32,768}$$

$$\therefore \quad 1-\frac{r}{100} = \sqrt[3]{\frac{21,952}{32,768}}$$

$$= \sqrt[3]{\frac{2^6\times 7^3}{2^{15}}}$$

$$= \sqrt[3]{\left(\frac{2^2\times 7}{2^5}\right)^3}$$

$$\therefore \quad \frac{100-r}{100} = \frac{7}{8}$$

$$800-8r = 700$$

$$r = \frac{100}{8}$$

∴ r = 12.5%
∴ Rate of depreciation is 12.5% per annum.

Question 3.
The value of a machine depreciates at the rate of 10% every year. It was purchased 3 years ago. Its present value is ₹ 2,18,700/-. What was the purchase price of the machine?
Solution:
Given, the rate of depreciation per annum = r = 10%
Number of years = n = 3
Present value of the machine = P.V. = ₹ 2,18,700/-
∴ Purchase price of the machine

$$= P.V \div \left(1 - \frac{r}{100}\right)^n$$

$$= 2,18,700 \div \left(1 - \frac{10}{100}\right)^3$$

$$= 2,18,700 \div \left(\frac{9^3}{10^3}\right)$$

$$= \frac{2,18,700 \times 1,000}{729}$$

$$= 3,00,000$$

∴ The purchase price of the machine is ₹ 3,00,000.

Question 4.
Mr. Manish purchased a motorcycle at ₹ 70,000/-. After some years he sold his motorcycle at its exact depreciated value of it that is ₹ 51,030/-. The rate of depreciation was taken as 10%. Find out how many years he sold his motorcycle.
Solution:
Given, purchase price of the motorcycle = V = ₹ 70,000/-
Depreciated value of the motorcycle = D.V. = ₹ 51,030/-
∴ Rate of depreciation = r = 10%

$$\text{Using, D.V.} = V\left(1 - \frac{r}{100}\right)^n$$

$$\therefore \quad 51,030 = 70,000\left(1 - \frac{10}{100}\right)^n$$

$$\therefore \quad \left(1 - \frac{1}{10}\right)^n = \frac{51,030}{70,000}$$

$$\therefore \quad \left(\frac{9}{10}\right)^n = \frac{729}{1000} = \left(\frac{9}{10}\right)^3$$

∴ n = 3
∴ Manish sold his motorcycle after 3 years.

Question 5.
Mr. Chetan purchased furniture for his home at ₹ 5,12,000/-. Considering the rate of depreciation as 12.5%, what will be the value of furniture after 3 years.
Solution:
Given, purchase price of furniture = V = ₹ 5,12,000/-
Rate of depreciation = r = 12.5%

Number of years = n = 3 years
∴ Value of furniture after 3 years = $V(1-\frac{r}{100})^n$
= 5,12,000 $(1-\frac{12.5}{100})^3$
= 5,12,000 $(1-18)^3$
= 5,12,000 $(78)^3$
= 5,12,000 × 343512
= 3,43,000
∴ The value of furniture will be ₹ 3,43,000/-

Question 6.
Grace Fashion Boutique purchased a sewing machine at ₹ 25,000/-. After 3 years machine was sold at depreciated value of ₹ 18,225/-. Find the rate of depreciation.
Solution:
Given, purchase price of sewing machine = V = ₹ 25,000/-
Selling price of machine = D.V. = ₹ 18,225/-
Number of years = n = 3 years

$$\text{By using, D.V.} = V\left(1-\frac{r}{100}\right)^n$$

$$18,225 = 25,000\left(1-\frac{r}{100}\right)^3$$

$$\left(1-\frac{r}{100}\right)^3 = \frac{18,225}{25,000} = \frac{729}{1000} = \left(\frac{9}{10}\right)^3$$

$$\frac{100-r}{100} = \frac{9}{10}$$

∴ 100 – r = 90
∴ r = 10%
∴ Rate of depreciation is 10% per annum.

Question 7.
Mr. Pritesh reduced the value of his assets by 5% each year, which were purchased for ₹ 50,00,000/-. Find the value of assets after 2 years.
Solution:
Given, initial value of assets = V = ₹ 50,00,000/-
Rate of depreciation per annum = r = 5%
Number of years = n = 2 years

∴ Value of assets aftertwo years = $V(1-\frac{r}{100})^n$

$$= 50,00,000\left(1-\frac{5}{100}\right)^2$$

$$= 50,00,000\left(\frac{19}{20}\right)^2$$

$$= \frac{50,00,000 \times 361}{400}$$

= 12,500 × 361
= 45,12,500
∴ The value of assets after two years is ₹ 45,12,500/-.

Question 8.
A manufacturing company is allowed to charge 10% depreciation on its stock. The initial value of the stock was ₹ 60,000/-. After how many years value of the stock will be ₹ 39366?
Solution:
Given, rate of depreciation = r = 10%
Initial value of stock = V = ₹ 60,000
Depreciated value of stock = D.V. = ₹ 39,366/-
By using,

$$D.V. = V\left(1-\frac{r}{100}\right)^n$$

$$39,366 = 60,000\left(1-\frac{10}{100}\right)^n$$

$$\left(1-\frac{1}{10}\right)^n = \frac{39,366}{60,000}$$

$$\left(\frac{9}{10}\right)^n = \frac{6,561}{10,000} = \left(\frac{9}{10}\right)^4$$

∴ n = 4
∴ The value of the stock will be ₹ 39,366/- after 4 years.

Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.5

Question 1.
Three partners shared the profit in a business in the ratio 5 : 6 : 7. They had partnered for 12 months, 10 months, and 8 months respectively. What was the ratio of their investments?
Solution:
Let the ratio of investments of the three partners be p : q : r.
They partnered for 12 months, 10 months, and 8 months respectively.
∴ The profit shared by the partners will be in proportion to the product of capital invested and their respective time periods.
∴ 12 × p : 10 × q : 8 × r = 5 : 6 : 7

$$\text{Now, } \frac{12p}{10q}=\frac{5}{6}$$

$$\therefore \quad \frac{p}{q}=\frac{50}{72} \quad \text{.....(i)}$$

$$\text{and } \frac{10q}{8r}=\frac{6}{7}$$

$$\therefore \quad \frac{q}{r}=\frac{48}{70}=\frac{24}{35}\times\frac{3}{3}$$

$$\therefore \quad \frac{q}{r}=\frac{72}{105} \quad \text{.....(ii)}$$

From (i) & (ii), we have
p : q : r = 50 : 72 : 105
∴ The ratio of their investments was 50 : 72 : 105.

Question 2.
Kamala, Vimala and Pramila enter into a partnership. They invest ₹ 40,000, ₹ 80,000 and ₹ 1,20,000 respectively. At the end of the first year, Vimala withdraws ₹ 40,000, while at the end of the second year, Pramila withdraws ₹ 80,000. In what ratio will the profit be shared at the end of 3 years?
Solution:

Given that, Kamala, Vimala, and Pramila invest ₹ 40,000, ₹ 80,000, and ₹ 1,20,000 respectively.
The ratio of profits is to be calculated at the end of 3 years.
Vimala withdraws ₹ 40,000 at the end of the first year.
∴ Vimala invested ₹ 80,000 for one year and 40,000 for 2 years.
Pramila withdraws ₹ 80,000 at the end of the second year.
∴ Pramila invested ₹ 1,20,000 for two years and 40,000 for one year.
Kamala invested ₹ 40,000 for all the 3 years.
∴ The ratio of profits to be shared at the end of 3 years will be
= 40,000 × 3 : 80,000 × 1 + 40,000 × 2 : 1,20,000 × 2 + 40,000 × 1
= 1,20,000 : 1,60,000 : 2,80,000
= 12 : 16 : 28
= 3 : 4 : 7

Alternate Method:
Given that, Kamala, Vimala and Pramila invest ₹ 40,000, ₹ 80,000 & ₹ 1,20,000 respectively.
Given, information can be tabulated as:

	Kamala	Vimala	Pramila
Year 1	40,000	80,000	1,20,000
Year 2	40,000	40,000	1,20,000
Year 3	40,000	40,000	40,000
Total	1,20,000	1,60,000	2,80,000

∴ The profits to be shared at the end of 3 years will be
= 1,20,000 : 1,60,000 : 2,80,000
= 12 : 16 : 28
= 3 : 4 : 7

Question 3.
Sanjeev started a business investing ₹ 25,000 in 1999. In 2000, he invested an additional amount of ₹ 10,000 and Rajeev joined him with an amount of ₹ 35,000. In 2001, Sanjeev invested another additional amount of ₹ 10,000 and Pawan joined them with an amount of ₹ 35,000. What will be Rajeev's share in the profit of ₹ 1,50,000 earned at the end of 3rd year from the start of the business in 1999?
Solution:

The given information can be tabulated as:

Year ↓	Investment in ₹		
	Sanjeev	Rajeev	Pawan
1999	25,000/-	0	0
2000	(25,000+ 10,000) 35,000/-	35,000/-	0
2001	(35,000 + 10,000) 45,000/-	35,000/-	35,000/-
Toal	1,05,000/-	70,000/-	35,000/-

∴ The ratio of profits to be shared at the end of 3 years will be 1,05,000 : 70,000 : 35,000
i.e. in the proportion 3 : 2 : 1
Given, profit earned ₹ 1,50,000/-
∴ Rajeev's share in the profit = 26 × 1,50,000 = ₹ 50,000/-

Question 4.
Teena, Leena, and Meena invest in a partnership in the ratio: 7/2, 4/3, 6/5. After 4 months, Teena increases her share by 50%. If the total profit at the end of one year is ₹ 21,600, then what is Leena's share in the profit?
Solution:
Investment of Teena, Leena and Meena are in the ratio $72:43:65$
After 4 months, Teena's share increases by 50%.
i.e. $72+(72\times50100)=72+74$
i.e. 214
The profit will be shared in the proportion of product of capitals and respective time periods in months.
i.e. $72\times4+214\times8:43\times12:65\times12$
i.e. 56 : 16 : 725
i.e. 7 : 2 : 95
i.e. in the proportion 35 : 10 : 9 .....[Multiplying throughout by 5]
Given that profit at the end of one year = ₹ 21,600/-
∴ Leena's share in the profit = 1054 × 21,600
= 5 × 800
= 4000
∴ Leena's share in the profit is ₹ 4000/-.

Question 5.
Dilip and Pradeep invested amounts in the ratio 2 : 1, whereas the ratio between amounts invested by Dilip and Sudip was 3 : 2. If ₹ 1,49,500 was their profit, how much amount did Sudip receive?
Solution:
Let the amounts invested by Dilip, Pradeep and Sudip be ₹ 'd', ₹ 'p' and ₹ 's' respectively.
Given that, d : p = 2 : 1
∴ d : p = 6 : 3 .....(i)
and d : s = 3 : 2
∴ d : s = 6 : 4 .....(ii)
From (i) and (ii),
d : p : s = 6 : 3 : 4
∴ The ratio of profits to be shared among Dilip, Pradeep and Sudip will be 6 : 3 : 4.
Given, profit earned = ₹ 1,49,500/-
∴ Sudip's share in the profit = 413 × 1,49,500
= 4 × 11,500
= ₹ 46,000/-

Question 6.
The ratio of investments of two partners Jatin and Lalit is 11 : 12 and the ratio of their profits is 2 : 3. If Jatin invested the money for 8 months, find for how much time Lalit invested his money.
Solution:
Let 'x' be the time in months for which Lalit invested his money
Jatin and Lalit invested their money in the ratio 11 : 12.
Jatin invested his money for 8 months and the ratio of their profits is 2 : 3.
∴ 11 × 8 : 12 × x = 2 : 3
∴ $8812x=23$
∴ x = $88×32×12$
∴ x = 11
∴ Lalit invested his money for 11 months.

Question 7.
Three friends had dinner at a restaurant. When the bill was received, Alpana

paid $\frac{2}{3}$ as much as Beena paid and Beena paid $\frac{1}{2}$ as much as Catherin paid. What fraction of the bill did Beena pay?
Solution:
Let 'T' be the total bill amount at the restaurant and 'a', 'b', and 'c' be the share of Alpana, Beena, and Catherin respectively.
Given, that Alpana paid $\frac{2}{3}$ as much as Beena paid
$\therefore a = \frac{2}{3} b$ .....(i)
Also, Beena paid $\frac{1}{2}$ as much as Catherin paid.
$\therefore b = \frac{1}{2} c$
$\therefore c = 2b$ .....(ii)
$\therefore$ Three friends paid the total bill amount.
$\therefore a + b + c = T$ .....(iii)
Using (i) and (ii) in (iii), we get

$$\frac{2}{3}b+b+2b=T$$

$$\therefore \quad b\left(\frac{2}{3}+1+2\right)=T$$

$$\therefore \quad b\left(\frac{2+3+6}{3}\right)=T$$

$$\therefore \quad \frac{11b}{3}=T$$

$$\therefore \quad b=\frac{3}{11}T$$

Thus, Beena paid $\left(\frac{3}{11}\right)^{\text{th}}$ fraction of the total bill amount.

Question 8.
Roy starts a business with ₹ 10,000, Shikha joins him after 2 months with 20% more investment than Roy, after 2 months Tariq joins him with 40% less than Shikha. If the profit earned by them at the end of the year is equal to twice the difference between the investment of Roy and ten times the investment of Tariq. Find the profit of Roy?
Solution:
Given that, Roy starts the business with ₹ 10,000.
Shikha joins him after 2 months with 20% more investment than Roy.
$\therefore$ Shikha's investment = 10,000 + $\left(10{,}000 \times \frac{20}{100}\right)$ = ₹ 12,000
Tariq joins after two more months with an investment 40% less than Shikha.
$\therefore$ Tariq's investment = 12,000 – $\left(12{,}000 \times \frac{40}{100}\right)$ = ₹ 7,200
Now, the profit will be shared in the proportion of product of capitals and

respective periods in months.
i.e. 10,000 × 12 : 12,000 × 10 : 7,200 × 8
i.e. in the proportion, 25 : 25 : 12 .....(i) [Dividing throughout by 4,800]
Given that, profit at the end of the year = twice of the difference between investment of Roy and ten times the investment of Tariq.
∴ Profit = 2 [(10 × 7,200) – 10,000]
= 2[72,000 – 10,000]
= 2 × 62,000
= ₹ 1,24,000
∴ Roy's share of profit = $\frac{25}{62}$ × 1,24,000 .....[From (i)]
= ₹ 50,000/-

Question 9.
If 4(P's Capital) = 6(Q's Capital) = 10 (R's Capital), then out of the total profit of ₹ 5,580, what is R's share?
Solution:
Let 'p', 'q' and 'r' be P, Q and R's Capital for the business respectively.
∴ 4p = 6q = 10r
L.C.M of 4, 6, 10 = 60
∴ We take 4p = 6q = 10r = 60x
∴ p = 15x, q = 10x, r = 6x
∴ p : q : r = 15 : 10 : 6
Given that total profit = ₹ 5580
R's share in the profit = $\frac{6}{31}$ × 5580 = ₹ 1080/-

Question 10.
A and B start a business, with A investing the total capital of ₹ 50,000, on the condition that B pays interest at the rate of 10% per annum on his half of the capital. A is a working partner and receives ₹ 1,500 per month from the total profit and any profit remaining is equally shared by both of them. At the end of the year, it was found that the income of A is twice that of B. Find the total profit for the year?
Solution:
Let 'x' and 'y' be the profits earned by A and B respectively and let 'z' be the total profit for the year.
A is the working partner and receives ₹ 1500 per month from the total

profit.
i.e. 12 × 1500 = ₹ 18,000 at the end of the year.
The remaining profit is shared between A and B equally.
∴ $y = \frac{z-18000}{2}$ .....(i)
Thus, profit earned by A at the end of that year is given by
$x = 18000 + \left(\frac{z-18000}{2}\right)$
∴ $x = \frac{z+18000}{2}$ .....(ii)
A invests the entire capital on the condition that B pays A interest at the rate of 10% per annum on his half of the capital.
∴ At the end of the first year,
A will receive $\frac{10}{100}$ × 25,000 i.e. ₹ 2500/- over and above his share of profit.
∴ A's income = Profit of A + 2500 = x + 2500
Given that,
income of A = twice the income of B
∴ x + 2500 = 2y .....(iii)
Using (i) and (ii) in (iii), we get
$\frac{z+18000}{2} + 2500 = 2\left(\frac{z-18000}{2}\right)$
z + 18000 + 5000 = 2(z – 18000)
z + 23000 = 2z – 36000
∴ z = 59,000
∴ The total profit for the year = ₹ 59,000/-

Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.6

Question 1.
M/s Janaseva sweet mart sold sweets of ₹ 3,86,000. What CGST and SGST he will pay if the rate of GST is 5%?
Solution:
Given that M/s Janaseva sweet mart sold sweets of ₹ 3,86,000
∴ Bill amount = ₹ 3,86,000
GST payable at the rate 5%
∴ CGST and SGST applicable is 2.5% each
∴ CGST on the bill = 2.5100 × 3,86,000 = ₹ 9650
and SGST on the bill = 2.5100 × 3,86,000 = ₹ 9650

Question 2.
Janhavi Gas Agency purchased some gas cylinders for ₹ 5,00,000 and sold them to the customers for ₹ 5,90,000. Find the amount of GST payable and the amount of ITC. 5% GST is applicable.
Solution:
Given that, Janhavi Gas Agency purchased some gas cylinders for ₹ 5,00,000 and GST applicable is 5%.
∴ Input tax (ITC) = 5% of 5,00,000
= 5100 × 5,00,000
= ₹ 25,000
Janhavi Gas Agency sold the gas cylinders for ₹ 5,90,000
∴ Output tax for Janhavi Gas Agency = 5% of 5,90,000
= 5100 × 5,90,000
= ₹ 29,500
GST payable = Output tax – Input tax (ITC)
= 29,500 – 25,000
= ₹ 4500
∴ GST payable for Janhavi Gas Agency is ₹ 4,500 and ITC is ₹ 25,000.

Question 3.
A company dealing in mobile phones purchased mobile phones worth ₹ 5,00,000 and sold the same to customers at ₹ 6,00,000. Find the amount of ITC and amount of GST if the rate of GST is 12%.
Solution:
Given that the rate of GST applicable is 12%.
The company purchased mobile phones worth ₹ 5,00,000.
∴ Input tax (ITC) = 12% of 5,00,000
= $\frac{12}{100}$ × 5,00,000
= ₹ 60,000
The company dealing in mobile phones sold the same to customers at ₹ 6,00,000.
∴ Output tax of the company = 12% of 6,00,000
= $\frac{12}{100}$ × 6,00,000
= ₹ 72,000
GST payable for the company = Output tax – Input tax (ITC)
= 72,000 – 60,000
= ₹ 12,000
∴ The ITC for the company is ₹ 60,000 and GST payable is ₹ 12,000.

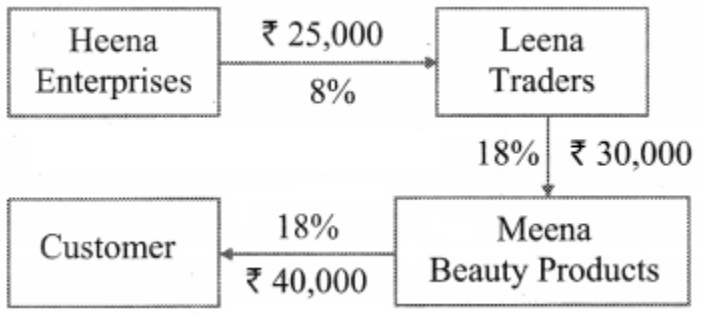
Question 4.
Prepare business to customers (B2C) tax invoice using given information. Write the name of supplier, address, state, Date, Invoice Number, GSTIN etc. as per your choice
Supplier: _____
Address: _____
State: _____
Date: _____
Invoice No: _____
GSTIN: _____
Particular: Rate of Sarees – ₹ 2750
Rate of GST 5% HSN 5407 – 2 pcs
Rate of Kurta – ₹ 750
Rate of GST 12% HSN 5408
Solution:
Supplier: M/s Swaglife Fashions
Address: 143, Shivaji Rasta, Mumbai 400001
Mobile No. 9263692111

Email: abc@gmail.com
State: Maharashtra
Date: 31/08/19
Invoice No: GST/110
GSTIN: 27ABCDE1234HIZS

Sr no.	HSN Code	Name of product	Rate	Quantity	Taxable amount	CGST		SGST		Total
						Rate	Tax	Rate	Tax	
1	5407	Sarees	₹ 2750	2 Pcs	₹ 5500	6%	₹ 330	6%	₹ 330	₹ 6160
2	5408	Kurta	₹ 750	1 Pcs	₹ 750	6%	₹ 45	6%	₹ 45	₹ 840
				Total			₹ 375		₹ 375	₹ 7000

∴ Rate of 1 saree = ₹ 2750
∴ Rate of 2 sarees = 2 x 2750 = ₹ 5500
∴ GST on sarees = 12% of 5500
= 12100×5500
= ₹ 660
∴ CGST = SGST = ₹ 330
∴ Rate of 1 Kurta = ₹ 750
∴ GST on Kurta = 12% of 750
= 12100×750
= ₹ 90
∴ CGST = SGST = ₹ 45

Question 5.
Heena Enterprise sold cosmetics worth ₹ 25,000 to Leena traders, a retailer. Leena Traders sold it further to Meena Beauty Products for ₹ 30,000. Meena Beauty Product sold it further to the customers for ₹ 40,000. The rate of GST is 18%. Find
(i) GST Payable by each party
(ii) CGST and SGST
Solution:
The trading chain,



∴ Output tax for Heena Enterprises = 18% of 25,000
= $\frac{18}{100}$ × 25,000
= ₹ 4,500
∴ GST payable by Heena Enterprises
Now output tax for Leena traders = 18% of 30,000
= $\frac{18}{100}$ × 30,000
= ₹ 5,400
∴ GST payable by Leena traders = Output tax – Input tax
= 5,400 – 4,500
= ₹ 900
∴ Output tax for Meena beauty products = 18% of 40,000
= $\frac{18}{100}$ × 40,000
= ₹ 7,200
∴ GST payable by Meena beauty products = Output tax – Input tax
= 7,200 – 5,400
= ₹ 1,800

(ii) Now, CGST = SGST = $\frac{GST}{2}$ = 9%
∴ Statement of GST payable at each stage can be tabulated as:

Party	GST payable	CGST payable	SGST payable
Heena Enterprises	₹ 4,500	₹ 2,250	₹ 2,250
Leena traders	₹ 900	₹ 450	₹ 450
Meena beauty products	₹ 1,800	₹ 900	₹ 900

Question 6.
'Chitra furnishings' purchased tapestry (curtain cloth) for ₹ 28,00,000 and sold for ₹ 44,80,000. Rate of GST is 5%. Find
(i) Input Tax

(ii) Output Tax
(iii) ITC
(iv) CGST and SGST
Solution:
Given, that 'Chitra furnishings' purchased tapestry (curtain cloth) for ₹ 28,00,000 and rate of GST is 5%
(i) Input tax = 5% of 28,00,000
$= \frac{5}{100} \times 28,00,000$
= ₹ 1,40,000
The tapestry was sold at ₹ 44,80,000

(ii) Output tax = 5% of 44,80,000
$= \frac{5}{100} \times 44,80,000$
= ₹ 2,24,000

(iii) Now ITC = Input tax = ₹ 1,40,000
GST payable = Output tax – ITC
= 2,24,000 – 1,40,000
= ₹ 84,000

(iv) CGST = SGST = $\frac{\text{GST Payable}}{2}$
$= \frac{84,000}{2}$
= ₹ 42,000
∴ CGST = SGST = ₹ 42,000

Question 7.
Two friends 'Aditi' and 'Vaishali' went to a restaurant. They ordered 2 Masala Dosa costing ₹ 90 each 2 coffee costing ₹ 60 each and 1 sandwich costing ₹ 80. GST is charged at 5%. Find the Total amount of the bill including GST.
Solution:
Aditi and Vaishali ordered for 2 Masala Dosas, 2 Coffees and 1 Sandwich
∴ Total price of their order = 2 × 90 + 2 × 60 + 80 = ₹ 380
GST is charged at 5%
∴ GST on the total order = 5% × 380
$= \frac{5}{100} \times 380$

= ₹ 19
∴ Total bill amount including GST = 380 + 19 = ₹ 399

Maharashtra State Board 11th Commerce Maths Solutions Chapter 9 Commercial Mathematics Ex 9.7

Question 1.
Shantanu has a choice to invest in ₹ 10 shares of two firms at ₹ 13 or at ₹ 16. If the first firm pays a 5% dividend and the second firm pays a 6% dividend per annum, find:
(i) Which firm is paying better?
(ii) If Shantanu invests equally in both the firms and the difference between the return from them is ₹ 30. Find how much, in all, does he invest.
Solution:
(i) For firm 1:
Face value of the share (F.V.) = ₹ 10
Market value of the share (M.V.) = ₹ 13

Dividend = 5%

∴ Annual income from the share = 5100×10 = ₹ 0.5

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{0.5}{13} \times 100$$

$$= \frac{50}{13} \quad \ldots. \text{(i)}$$

$$\approx 3.85\ \%$$

For firm 2:

Face value of the share (F.V.) = ₹ 10

Market value of the share (M.V.) = ₹ 16

Dividend = 5%

∴ Annual income from the share = 6100×10 = ₹ 0.6

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{0.6}{16} \times 100$$

$$= \frac{60}{16} \quad \ldots. \text{(ii)}$$

$$= 3.75\%$$

Since, the profit percentage from firm 1 > profit percentage from firm 2, the first firm is paying better.

(ii) Let 'X' be the amount Shantanu invests in each of the firms.

Given that difference between the return from them is ₹ 30, we have

$$\frac{\frac{50}{13}}{100} \times X - \frac{\frac{60}{16}}{100} \times X = 30 \quad \ldots[\text{From (i) and (ii)}]$$

$$\therefore \quad X\left(\frac{50}{13} - \frac{60}{16}\right) = 30 \times 100$$

$$\therefore \quad X\left(\frac{50 \times 16 - 60 \times 13}{13 \times 16}\right) = 3000$$

$$\therefore \quad X\left(\frac{800 - 780}{13 \times 16}\right) = 3000$$

$$\therefore \quad X = \frac{3000 \times 13 \times 16}{20}$$

$$\therefore \quad X = 31{,}200$$

In all, Shantanu invests = 2X
= 2 × 31,200
= ₹ 62,400/-

Question 2.
A dividend of 9% was declared on ₹ 100 shares selling at a certain price in the stock market. If the rate of return is 7.5% calculate
(i) The market price of each share, and
(ii) The amount to be invested to obtain an annual dividend of ₹ 630.
Solution:
(i) Given that,
Face value of the share (F.V) = ₹ 100
Dividend = 9%
Rate of return = 7.5%
Annual income from the share = 9100 × 100 = ₹ 9

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market price}} \times 100$$

$$\therefore \quad 7.5 = \frac{9}{\text{Market price}} \times 100$$

$$\therefore \quad \text{Market price} = \frac{900}{7.5}$$

$$= ₹\ 120$$

∴ The market price of the share is ₹ 120.

(ii) Let 'X' be the amount to be invested to obtain an annual dividend of ₹ 630.
∴ 7.5% of X is ₹ 630
∴ 7.5100 × X = 630
∴ X = $630×1007.5$
∴ X = 8400
∴ ₹ 8400 need to be invested to obtain an annual dividend of ₹ 630.

Question 3.
Nilesh has the option of investing his money in 8% ₹ 10 shares at a premium of ₹ 3.50 or 7% ₹ 100 shares at a premium of 20%. Which of the two investments will be more profitable for him?
Solution:

For share 1:
Face value of the share (F.V.) = ₹ 10
Premium = ₹ 3.5
∴ Market value of the share (M.V.) = 10 + 3.5 = ₹ 13.5
Dividend = 8 %
∴ Annual income from the share = 8100 × 10 = ₹ 0.8

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$
$$= \frac{0.8}{13.5} \times 100$$

$= 800135$
= 5.93%

For share 2:
Face value of the share (F.V.) = ₹ 100
Premium = 20%
∴ Market value of the share (M.V.) = 100 + (20100 × 100) = ₹ 120
Dividend = 7%
Annual income from the share = 7100 × 100 = ₹ 7

$$\text{Profit percentage} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$
$$= \frac{7}{120} \times 100$$
$$\approx 5.833\%$$

Since, profit percentage from share 1 > profit percentage from share 2, investing in the first kind of shares will be more profitable for Nilesh.

Question 4.
Sudhakar invests ₹ 1344 in buying shares of face value ₹ 24 selling at a 12% premium. The dividend on the shares is 15% per annum. Calculate
(i) The number of shares Sudhakar buys, and
(ii) The dividend he receives annually.
Solution:
Given that,
Face value of the share (F.V.) = ₹ 24
Premium = 12%

∴ Market value of the share (M.V.) = 24 + $(\frac{12}{100} \times 24)$ = ₹ 26.88
(i) Sudhakar invests ₹ 1344 in the shares
∴ Number of shares purchased by Sudhakar = $\frac{1344}{26.88}$ = 50
∴ Sudhakar buys 50 shares.
(ii) Dividend on the share = 15%
Annual income on one share = $\frac{15}{100} \times 24$ = ₹ 3.6
∴ The total dividend he receives annually = 50 × 3.6 = ₹ 180
∴ Sudhakar receives ₹ 180 as his annual dividend.

Question 5.
Sameer invests ₹ 5625 in a company paying 7% per annum when the share of ₹ 10 stands for ₹ 12.50. Find Sameer's income from this investment. If he sells 60% of these shares of ₹ 10 each, find his gain or loss in this transaction.
Solution:
Given:
Face value of the share (F.V.) = ₹ 10
Market value of the share (M.V.) = ₹ 12.5
Amount invested in shares = ₹ 5625
∴ Number of shares purchased by Sameer = $\frac{5625}{12.5}$ = 450
Dividend = 7%
Annual income from one share = $\frac{7}{100} \times 10$ = ₹ 0.7
∴ Sameer's income from this investment = number of shares × annual income from one share
= 450 × 0.7
= ₹ 315
Sameer sells 60 % of these shares = $\frac{60}{100} \times 450$ = 270 shares
Sameer purchased these shares at ₹ 12.5 per share.
∴ Purchase price for these shares = 270 × 12.5 = ₹ 3375
If he sells these shares at ₹ 10 per share, he would receive 270 × 10 = ₹ 2700
∴ In this transaction, Sameer would incur a loss of 3375 – 2700 = ₹ 675

Question 6.
Geeta buys ₹ 100 shares of a company that pays a 15% dividend. She buys the shares at a price from the market that gives her a 10% return on her

investment. At what price did she buy each share?
Solution:
Given that,
Face value of the share (F.V.) = ₹ 100
Dividend = 15%
∴ Annual income from the share = $\frac{15}{100}$ × 100 = ₹ 15
Rate of return on investment = 10%

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market price}} \times 100$$

$$\therefore \quad 10 = \frac{15}{\text{Market price}} \times 100$$

$$\therefore \quad \text{Market price} = \frac{1500}{10} = ₹\ 150$$

∴ Geeta bought each share from the market at ₹ 150.

Question 7.
Tejas invests in 9% ₹ 100 shares at ₹ 145 but Shail invests in 7% ₹ 100 shares at ₹ 116. Whose investment is better?
Solution:
Investment of Tejas:
Given that, the Face value of the share (F.V.) = ₹ 100
The market value of the share (M.V.) = ₹ 145
Dividend = 9%
Annual income from the share = $\frac{9}{100}$ × 100 = ₹ 9

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$

$$= \frac{9}{145} \times 100$$

$$= \frac{900}{145}$$

$$\approx 6.2\ \%$$

Investment of Shail:
Face value of the share (F.V.) = ₹ 100
Market value of the share (M.V.) = ₹ 116
Dividend = 7%
Annual income from the share = $\frac{7}{100}$ × 100 = ₹ 7

$$\text{Rate of return} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$
$$= \frac{7}{116} \times 100$$
$$\approx 6.03\ \%$$

Since the rate of return for Tejas's investment is greater than that for Shail's, Tejas's investment is better.

Question 8.
A 6% share yields 8%. Find the market value of a ₹ 100 share.
Solution:
Given that,
Face value of the share = ₹ 100
Dividend = 6%
Yield = 8%
Annual income on the share = 6100 × 100 = ₹ 6

$$\text{Yield} = \frac{\text{Annual income}}{\text{Market value}} \times 100$$
$$\therefore \quad 8 = \frac{6}{\text{Market value}} \times 100$$
$$\therefore \quad \text{Market value} = \frac{600}{8}$$
$$= ₹\ 75$$

∴ The market value of the share = ₹ 75

Question 9.
Ashwini bought ₹ 40 shares at a premium of 40%. Find the income, if Ashwini invests ₹ 14,000 in these shares and receives a dividend at the rate of 8% on the nominal value of the shares.
Solution:
Given,
Face value of the shares (F.V.) = ₹ 40
Premium = 40%
Market value of the shares (M.V.) = 40 + (40 × 40100)
= 40 + 16
= ₹ 56
Ashwini invests ₹ 14000 in these shares
∴ Number of shares bought by Ashwini = $\text{AmountInvested}\text{Marketvalueofoneshare}$
= 1400056

= 250
Dividend = 8%
∴ Annual income on one share = 8100 × 40 = ₹ 3.2
∴ Income of Ashwini on 250 shares = 250 × 3.2 = ₹ 800
∴ Ashwini earns ₹ 800 on her investment.

Question 10.
Mr. Rutvik invests ₹ 30,000 in buying shares of a company that pays a 12% dividend annually on ₹ 100 shares selling at a premium of ₹ 50. Find
(i) The number of shares bought Mr. Rutvik and
(ii) His annual income from the shares.
Solution:
Given that,
Face value of a share (F.V.) = ₹ 100
Premium = ₹ 50
∴ Market value of a share (M.V.) = 100 + 50 = ₹ 150
Dividend =12%
Mr. Rutvik invests ₹ 30,000 in the shares.
(i) Number of shares bought by Mr. Rutvik = $\text{AmountinvestedMarketvalue}$
= 30000150
= 200

(ii) Dividend on the share = 12%
∴ Annual income from one share = 12100 × 100 = ₹ 12
∴ His annual income from shares = number of shares × income from one share
= 200 × 12
= ₹ 2400

Question 11.
Rasika bought ₹ 40 shares at a discount of 40%. Find the income, if she invests ₹ 12,000 in these shares and receives a dividend at the rate of 11% on the nominal value of the shares.
Solution:
Given,
Face value of the shares (F.V.) = ₹ 40

Discount = 40%
∴ Market value of the shares (M.V.) = 40 – (40 × 40100)
= 40 – 16
= ₹ 24
Rasika invests ₹ 12,000 in these shares.
∴ Number of shares bought by Rasika = $AmountinvestedMarketvalueofoneshare$
= 1200024
= 500
Dividend = 11%
∴ Annual income on one share = 11100 × 40 = ₹ 4.4
∴ Rasika's income on 200 such shares = 500 × 4.4 = ₹ 2200
∴ Rasika earns ₹ 2200 from her investment.

Question 12.
Nisha invests ₹ 15,840 in buying shares of nominal value ₹ 24 selling at a premium of 10%. The company pays a 15% dividend annually. Find
(i) The dividend she receives annually, and
(ii) The rate of return from her investment.
Solution:
Given that,
Face value of the share (F.V.) = ₹ 24
Premium = 10%
∴ Market value of the share (M.V.) = 24 + (24 × 10100)
= 24 + 2.4
= ₹ 26.4
Dividend = 15%
∴ Annual income on the share = 15100 × 24 = ₹ 3.6
Nisha invests ₹ 15,840 in these shares.
∴ Number of shares bought by Nisha

$$= \frac{\text{Amount invested}}{\text{Market value of one share}}$$

$$= \frac{15840}{26.4}$$

$$= 600$$

(i) Annual dividend received by Nisha = Number of shares × annual income from one share
= 600 × 3.6
= ₹ 2160

(ii) Rate of return from the investment

$$= \frac{\text{Annual dividend}}{\text{Amount invested}} \times 100$$

$$= \frac{2160}{15840} \times 100$$

$$= 13.64\ \%$$

Question 13.
Ashutosh buys 80, ₹ 100 shares at a discount of 20% and receives a return of 12% on his money. Calculate
(i) The amount invested by Ashutosh.
(ii) The rate of dividend paid by the company.
Solution:
Given
Face value of the shares (F.V.) = ₹ 100
Discount = 20%
∴ Market value of the shares (M.V.) = 100 – (100 × $\frac{20}{100}$) = ₹ 80
(i) Amount invested by Ashutosh = number of shares × market value of the shares
= 80 × 80
= ₹ 6400

(ii) Ashutosh receives a return of 12% on his money.
∴ Ashutosh's income from shares = $\frac{12}{100}$ × 6400 = ₹ 768
∴ Ashutosh's annual income from one share = $\frac{768}{80}$ = ₹ 9.6
Annual income from one share = $\frac{\text{Dividend}}{100} \times$ Face value
∴ 9 6 = $\frac{\text{Dividend}}{100} \times 100$
∴ Rate of dividend = 9.6%

Question 14.
Vaishnavi bought 1000, ₹ 100 shares from the stock market carrying 8% dividend quoted at ₹ 130. A few days later the market value of the shares went up by 10%. Vaishnavi sold all her shares. What was her total income from this transaction?
Solution:
Given that,
Face value of the shares (F.V.) = ₹ 100

The market value of the shares (M.V.) = ₹ 130
Dividend = 8%
Income from the each share = 8100 × 100 = ₹ 8
Number of shares bought by Vaishnavi = 1000
∴ Vaishnavi's income from dividend = 1000 × 8 = ₹ 8000
The price of the shares went up by 10%
New market value of the shares = 130 + (130 × 10100) = ₹ 143
Vaishnavi sold the shares at ₹ 143 which she bought at ₹ 130 each.
∴ Vaishnavi's profit on one share =143 – 130 = ₹ 13
∴ Vaishnavi's profit after selling all her shares =1000 × 13 = ₹ 13,000
Vaishnavi's total income from this transaction = Income from dividend + income from sale of shares
= 8,000 + 13,000
= ₹ 21,000
∴ Vaishnavi's total income from this transaction was ₹ 21,000.

Question 15.
Mr. Dinesh invests ₹ 20,800 in 6% ₹ 100 shares at ₹ 104, and ₹ 14,300 in 10.5% ₹ 100 shares at ₹ 143. What will be his annual income from the shares?
Solution:
For 1st kind of shares,
Face value of shares (F.V.) = ₹ 100
Dividend = 6%
∴ Annual income from one share = 6100 × 100 = ₹ 6
Market value of the share (M.V.) = ₹ 104
Total amount invested = ₹ 20,800

$$\therefore \quad \text{Number of shares} = \frac{\text{Amount invested}}{\text{Market value}}$$
$$= \frac{20,800}{104}$$
$$= 200$$

∴ Total income from 1st kind of shares = 200 × 6 = ₹ 1200
For 2nd kind of shares,
Face value of shares (F.V.) = ₹ 100
Dividend = 10.5%
∴ Annual income from one share = 10.5100 × 100 = ₹ 10.5

Market value of the share (M.V.) = ₹ 143
Total amount invested = ₹ 14300

$$\therefore \quad \text{Number of shares} = \frac{\text{Amount invested}}{\text{Market value}}$$

$$= \frac{14300}{143}$$

$$= 100$$

∴ Total income from 2nd kind of shares = 100 × 10.5 = ₹ 1050
∴ Total annual income of Dinesh from both these shares = 1200 + 1050 = ₹ 2250

Question 16.
A company declares a semi-annual dividend of 5%. Daniel has 400 shares of the company. If Daniel's annual income from the shares is ₹ 1,000, find the face value of each share.
Solution:
Given that,
Semi-annual dividend = 5%
∴ Annual dividend = 10%
Number of shares with Daniel = 400
Daniel's annual income from the shares = ₹ 1000
∴ Annual income from one share = 1000400 = ₹ 2.5
But annual income from one share = $\text{Annualdividend } 100 \times \text{Face value}$
∴ 2.5 = 10100 × Face value of the share
∴ Face value of the share = ₹ 25

Question 17.
Bhargav buys 400, ₹ 20 shares at a premium of ₹ 4 each and receives a dividend of 12%. Find
(i) The amount invested by Bhargav.
(ii) His total income from the shares.
(iii) Percentage return on his money.
Solution:
Given that,
Face value of the shares (F.V.) = ₹ 20
Premium = ₹ 4
∴ Market value of the shares (M.V.) = ₹ 24

Dividend = 12%
∴ Annual income from the share = $\frac{12}{100}$ × 20 = ₹ 2.4
Bhargav buys 400 shares
(i) The amount invested by Bhargav = number of shares × market value
= 400 × 24
= ₹ 9600

(ii) Bhargav's income from the shares = number of shares × annual income from one share
= 400 × 2.4
= ₹ 960

(iii) Percentage return on Bhargav's money

$$= \frac{\text{Total annual income}}{\text{Total amount invested}} \times 100$$

$$= \frac{960}{9600} \times 100$$

$$= 10\%$$

∴ Bhargav gets 10% as the rate of return on his money.

Question 18.
Anil buys 350 ₹ 100 shares of a company at a premium of 20% from the market. The company pays 12% dividend annually. Find
(i) the investment made by Anil,
(ii) his annual income from the shares, and
(iii) the rate of return from the shares.
Solution:
Given that,
Face value of shares (F.V.) = ₹ 100
Premium = 20%
∴ Market value of shares (M.V.) = 100 + ($\frac{20}{100}$ × 100) = ₹ 120
Dividend = 12%
∴ Annual income from one share = $\frac{12}{100}$ × 100 = ₹ 12
Anil buys 350 shares.
(i) Amount invested by Anil = number of shares × market value
= 350 × 120
= ₹ 42,000

(ii) Anil's annual income from the shares = number of shares × annual income from one share
= 350 × 12
= ₹ 4200

(iii) Rate of return from shares

$$= \frac{\text{Total annual income}}{\text{Total annual invested}} \times 100$$

$$= \frac{4200}{42000} \times 100$$

$$= 10\%$$

∴ The rate of return from Anil's shares is 10%.