

Name : \_\_\_\_\_

Grade : VIII

Subject : Mathematics

Chapter : 8. Comparing Quantities

**Objective Type Questions**

**1 Marks.**

**I. Multiple choice questions**

1. If 90% of  $x$  is 315 km, then the value of  $x$  is:  
a. 325 km                      b. 350 km                      c. 350 m                      d. 325 m
2. If 60% of  $x$  of 1200, then the value of ' $x$ ' is:  
a. 1000                      b. 2000                      c. 3000                      d. 4000
3. If marked price of an article is 1,200 and the discount is 12%, then the selling price of the article is  
a. 1,056                      b. 1,344                      c. 1,212                      d. 1,188
4. If  $a\%$  is the discount percent on a market price  $x$ , then discount is  
a.  $\frac{x}{a} \times 100$                       b.  $\frac{a}{x} \times 100$                       c.  $x \frac{a}{100}$                       d.  $\frac{100}{x \times a}$
5. The market price of an article is 80 and it is sold at 76, then the discount rate is:  
a. 5%                      b. 95%                      c. 10%                      d. appx. 11%
6. A man got 10% increase in his salary. If his new salary is 154000, find his original salary?  
a. 160000                      b. 150000                      c. 140000                      d. 130000
7. For calculation of interest compounded half yearly, keeping the principal same, which one of the following is true.  
a. Double the given annual rate and half the given number of years.  
b. Double the given annual rate as well as the given number of years.  
c. Half the given annual rate as well as the given number of years.  
d. Half the given annual rate and double the given number of years.
8. Shyama purchases a scooter costing 36,450 and the rate of sales tax is 9%, then the total amount paid by her is:  
a. 36,490.50                      b. 39,730.50                      c. 36,454.50                      d. 33,169.50

9. The ratio 4:5 is equivalent to:  
 a. 80%                      b. 60%                      c. 40%                      d. 20%
10. Latika bought a teapot for 120 and a set of cups for 400. She sold teapot a profit of 5% and cups at a loss of 5%. The amount received by her is:  
 a. 494                      b. 546                      c. 506                      d. 534
11. Simple interest on 1000 for 2 years at the rate of 5% per annum is:  
 a. 100                      b. 120                      c. 140                      d. 80
12. A sum of money placed at compound interest doubles itself in 4 years. It will amount to eight times in:  
 a. 8 years                      b. 10 years                      c. 12 years                      d. 16 years
13. The fraction  $\frac{2}{5}$  converted to percentage is:  
 a. 20%                      b. 30%                      c. 40%                      d. 50%
14. To gain 25% after allowing a discount of 10%, the shopkeeper must mark the price of the article which costs him 360 as:  
 a. 500                      b. 450                      c. 460                      d. 486
15. A jacket was sold for 1,120 after allowing a discount of 20%. The market price of the jacket is  
 a. 1440                      b. 1400                      c. 960                      d. 866.66
16. A TV set was bought for 26,250 including 5% VAT. The original price of the TV set is  
 a. 27,562.50                      b. 25,000                      c. 24,937.50                      d. 26,245
17. A sum is taken for two years at 16% p.a. If interest is compounded after every three months, the number of times for which interest is charged in 2 years is:  
 a. 8                      b. 4                      c. 6                      d. 9
18. The original price of a washing machine which was bought for 13,500 inclusive of 8% VAT is:  
 a. 12,420                      b. 14,580                      c. 12,500                      d. 13,492
19. Suppose a certain sum doubles in 2 years at  $r\%$  rate of simple interest per annum or at  $R\%$  rate of interest per annum compounded annually. We have  
 a.  $r < R$                       b.  $R < r$                       c.  $R = r$                       d. can't be decided
20. The compound interest on 50,000 at 4% per annum for 2 years compounded annually is:  
 a. 4,000                      b. 4,080                      c. 4,280                      d. 4,050

1. (c)	2. (b)	3. (b)	4. (c)	5. (a)	6. (c)	7. (d)	8. (b)	9. (a)	10. (c)
11. (a)	12. (c)	13. (c)	14. (a)	15. (b)	16. (b)	17. (a)	18. (c)	19. (b)	20. (b)

## II. Multiple choice questions

1. A shirt with marked price Rs.800 was sold at Rs.680. The rate of discount allowed on the shirt is  
 a. 10%                      b. 15%                      c. 20%                      d. 25%
2. If  $\frac{7}{3}\%$  of a number is 42, then the number is  
 a. 9,800                      b. 8                      c. 1,800                      d. 180
3. To gain 25% after allowing a discount of 10%, the shopkeeper must mark the price of the article which costs him Rs. 360 as  
 a. Rs.500                      b. Rs.450                      c. Rs.460                      d. Rs.486
4. Shyama purchases a scooter costing Rs.36,450 and the rate of sales tax is 9%, then the total amount paid by he is  
 a. Rs.36,490.50                      b. Rs.39,730.50                      c. Rs.36,454.50                      d. Rs.33,169.50
5. The original price of washing machine which was bought for Rs.13,500 inclusive of 8% VAT is  
 a. Rs. 12,420                      b. 14,580                      c. Rs.12,500                      d. Rs.13,492
6. Rachika bought a car for Rs.2,50,000. Next year its price decreased by 10% and further next year it decreased by 12%. In the two years overall decrease per cent in the price of the car is  
 a. 3.2%                      b. 22%                      c. 20.8%                      d. 8%
7. Rs.1,600 lent at a compound interest of 5% per annum, compounded half yearly for one year will amount to  
 a. Rs.1,640                      b. Rs.1,680                      c. Rs.1,681                      d. Rs.1,764
8. Suppose for the principal P, rate R% and time T, the simple interest is S and compound interest is C. Consider the possibilities.  
 i.  $C > S$                       b.  $C = S$                       iii.  $C < S$   
 Then  
 a. Only (i) is correct                      b. either (i) or (ii) is correct  
 b. Either (ii) or (iii) is correct                      d. only (iii) is correct
9. The compound interest on Rs.50,000 at 4% per annum for 2 years compounded annually is  
 a. Rs.4,000                      b. Rs.4,080                      c. Rs.4,280                      d. Rs.4,050
10. If the cost price of 10 shirts is equal to the selling price of 8 shirts, then which of the following is true for the transaction?  
 a. Profit of 25%                      b. Loss of 25%                      c. Profit of 20%                      d. Loss of 20%

1. b	2. c	3. a	4. b	5. c	6. c	7. c	8. a	9. b	10. a
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### I. Fill in the Blanks

- The market price of an article when it is sold for 880 after a discount of 12% is \_\_\_\_\_.
- 15% increase in price of an article, which
- The discount on an item for sale is calculated on the \_\_\_\_\_.
- Gain or less is always calculated on the \_\_\_\_\_ price.
- $A = P \left(1 + \frac{\text{.....}}{100}\right)^n$ .

1.1000	2. 243	3. market price	4. cost price	5. R
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### I. True/False

- 6% of 8 is 48.
- Discount is a reduction given on cost price of an article.
- C.P. = M.P. - Discount.
- In case of gain,  $S.P. = \frac{(100 + \text{gain}\%) C.P.}{100}$
- In case of loss,  $C.P. = \frac{100 \times S.P.}{100 + \text{Loss}\%}$

1. False	2. False	3. False	4. True	5. False
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### I. Very Short Answer Type Questions.

- Find the S.P., if M.P. = 5450 discount = 5%

Sol.

Discount = 5% of Rs 5450

$$= \frac{5}{100} \times 5450 = 272.50$$

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

$$= 5450 - 272.50$$

$$= \text{Rs } 5,177.50$$

- Find the M.P. id S.P. = Rs 495 and discount = 1%

Sol. Let M.P be Rs  $x$

Discount = 1% of Rs  $x$

$$= \frac{1}{100} \times x = \frac{x}{100}$$

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

$$x = 495 + \frac{x}{100}$$

$$x = \frac{49500 + x}{100}$$

$$100x = 49500 + x$$

$$99x = 49500$$

$$x = \frac{49500}{99} = 500$$

$$M.P = \text{Rs } 500$$

3. Find discount in percent, when M.P = Rs 625 and S.p = Rs 562.50.

Sol.

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

$$= 625 - 562.50 = 62.50$$

$$\begin{aligned} \text{Discount\%} &= \frac{\text{Discount} \times 100}{M.P} \\ &= \frac{62.50 \times 100}{625} = 10\% \end{aligned}$$

4. The price of an item was Rs 45,000 last year. It has increased by 20% this year.

What is the price now?

Sol. 20% (the last year's price) = 20% of Rs 45,000

$$= \frac{20}{100} \times 45,000$$

$$= \text{Rs } 20 \times 450$$

$$= \text{Rs } 9,000$$

This year's price = (Last year's price) + (Increase in price)

$$= \text{Rs } 45,000 + \text{Rs } 9,000$$

$$= \text{Rs } 54,000$$

5. The cost of pair of shoes is Rs 900. The sale tax charged was 5%, find the bill amount.

Sol. Sale price of the pair of shoes = Rs 900

$$\text{Sales tax} = 5\% \times \text{Rs } 900$$

$$= \frac{5}{100} \times (900) = \text{Rs } 45$$

$$\text{Bill amount} = \text{Sale price} + \text{Sales tax}$$

$$= \text{Rs } 900 + \text{Rs } 45$$

$$= 945.$$

6. A watch worth Rs 5400 is offered for sale at Rs 4500. What percent discount is offered during the sale.

Sol.

$$\text{M.P of watch} = \text{Rs } 5400$$

$$\text{S.P of watch} = \text{Rs } 4500$$

$$\begin{aligned}\text{Discount\%} &= \frac{\text{M.P} - \text{S.P}}{\text{M.P}} \\ &= \frac{5400 - 4500}{5400} \\ &= \text{Rs } 900\end{aligned}$$

$$\begin{aligned}\text{Discount} &= \frac{\text{Discount} \times 100}{\text{M.P}} \\ &= \frac{900 \times 100}{5400} = \frac{50}{3} = 16\frac{2}{3}\%\end{aligned}$$

7. Prachi bought medicines from a medical store as prescribed by her doctor for Rs 36.40 including 4% VAT. Find the price before VAT was added.

Sol. Let the original price of medicine be Rs 100

$$\text{Price including VAT} = \text{Rs } 104$$

When price including VAT is Rs 104,

$$\text{Original price} = \text{Rs } 104$$

When price including VAT is RS 36.40,

$$\begin{aligned}\text{Original price} &= \frac{100}{104} \times 36.40 \\ &= 35\end{aligned}$$

Then, the price before VAT was added = 35.

## II. Very Short Answer Type Questions.

1. Find the S.P. if M.P. = Rs. 5,450 and discount = 5%

$$\text{Sol. Discount} = 5\% \text{ of Rs. } 5,450 = \frac{5}{100} \times 5,450 = \text{Rs. } 272.50$$

$$\text{SP} = \text{MP} - \text{Discount} = \text{Rs. } 5,450 - \text{Rs. } 272.50 = \text{Rs. } 5,177.50$$

2. If 90% of  $x$  is 315 km, find the value of  $x$ .

Sol. We have,

$$90\% \text{ of } x = 315$$

$$\Rightarrow \frac{90}{100} x = 315 \quad \Rightarrow 90x = 3150$$

$$\Rightarrow x = \frac{31500}{90} = 350 \text{ km}$$

3. What is the value of 40% of [100 - 20% of 300]

Sol. We have to find

$$\begin{aligned} & 40\% \text{ of } [100 - 20\% \text{ of } 300] \\ &= \frac{40}{100} \left[ 100 - \frac{20}{100} \times 300 \right] \\ &= \frac{40}{100} [100 - 60] = \frac{40}{100} \times 40 = 16 \end{aligned}$$

4. Convert the ratio 2 : 3 to per cent.

Sol. We have,

$$2 : 3 = \frac{2}{3} = \left( \frac{2}{3} \times 100 \right) \% = \frac{200}{3} \%$$

5. Convert the given per cent as decimal  $12\frac{3}{5}\%$

Sol. We have,

$$12\frac{3}{5}\% = \frac{63}{5}\% = \frac{\frac{63}{5}}{100} = \frac{63}{5} \times \frac{1}{100} = \frac{63}{500} = 0.126$$

### I. Short Answer Type Questions.

1. In the year 2001, the number of malaria patients admitted in the hospital of a state was 4,375. Every year this number decreases by 8%. Find the number of patients in 2003.

Sol. Rate of decrement(R) = 8%

$$P = 4375, n = 2$$

$$\begin{aligned} \text{Number of patient is 2003} &= P \left( 1 - \frac{R}{100} \right)^n \\ &= 4375 \left( 1 - \frac{8}{100} \right)^2 \\ &= 4375 \left( \frac{92}{100} \right)^2 \\ &= 4375 \left( \frac{23}{25} \right)^2 \\ &= \frac{4375 \times 23 \times 23}{25 \times 25} \\ &= 3703. \end{aligned}$$

Hence, number of patients in 2003 are 3703.

2. If marked price of a chair is Rs 900 and it is sold at Rs 855, then find the discount rate.

Sol. Marked price = 900

and selling price = 855



$$\begin{aligned}\text{Discount} &= \text{Marked price} - \text{Selling price} \\ &= 900 - 855 = 45\end{aligned}$$

Let the discount rate be  $x\%$

Then,  $x\%$  of marked price = 45

$$\begin{aligned}\frac{x}{100} \times 900 &= 45 \\ x &= \frac{45 \times 100}{900} \\ x &= 5\%\end{aligned}$$

3. In a public school, 71% of the student population are boys. If there are 120 girls, then find the total enrollment of the school.

Sol. Given, 70% of the student population are boys so rest 30% of the students are girls

30% of the students population = 120

1% of the students population =  $\frac{120}{30}$

100% of the student population =  $\frac{120}{30} \times 100 = 400$

So, total enrollment is 400.

4. Lemons were bought at 48n per dozen and sold at the rate of 40 per 10. Find the gain or loss percent.

Sol. Cost price 12 lemons = 48

Cost price of 1 lemons =  $\frac{48}{12} = 4$

Selling price of 10 lemons = 40

Selling price of 1 lemons =  $\frac{40}{10} = 4$

Since, S.P. = C.P., So there is no profit and no loss.

Hence, gain = 10%

5. Ramita bought a second hand two-wheeler for 15,000 and spent 500 on its repair. She sold it for 18,600. Find her loss or profit percent.

Sol. Total Cost Price of the two-wheeler (C.P)

= 15000 + overhead expenses

= 15000 + 500

= 15500

Selling Price (S.P) = 18600

S.P > C.P = She got profit

Profit = 18600 - 15500 = 3100



$$\text{Now, Profit percent} = \frac{3100}{15500} \times 100\% = 20\%$$

Thus, she earned a profit of 20%.

6. The cost of a calculator is 750. The sales tax is charged 5%. Find the bill amount.

Sol. The price of the calculator = 750

Sales tax = 5% of 750

$$= \frac{5}{100} \times 750$$

$$= \frac{75}{2}$$

$$= 37.50$$

Bill amount = Sales Price + Sales Tax

$$= 750 + 37.50$$

$$= 787.50$$

7. Ayesha announced a festival discount 25% on all the items in her mobile phone shop. Ramandeep bought a mobile phone shop. Ramandeep bought a mobile phone for himself. He got a discount of 1,960. What was the marked price of the mobile phone?

Sol. Discount amount = 1960

And discount rate = 25%

When discount 25, then the market price = 100

On discount 1, then the marked price

$$= \frac{100}{25}$$

On discount 1960, then the marked price

$$= \frac{100}{25} \times 1960$$

$$= 7840$$

Hence, marked price of the mobile phone is 7840.

8. In a factory, women are 35% of all the workers, the rest of the workers are men. The number of men exceeds that of women by 252. Find the total number of workers in the factory.

Sol. Given, women are 35% of all workers.

So, rest 65% of the workers are men

Let total number of workers be  $x$

We know that the number of men exceeds that of women by 252

$$65\% \text{ of } x - 35\% \text{ of } x = 252$$

$$\frac{65}{100} \times x - \frac{35}{100} \times x = 252$$

$$\frac{13}{20}x - \frac{7}{20}x = 252$$

$$\frac{6x}{20} = 252$$

$$\Rightarrow x = \frac{252 \times 20}{6}$$

$$x = 840$$

Hence, total no of workers are 840.

## II. Short Answer Type Questions.

1. Find the amount of Rs.1,000 in one year at 4% per annum, when the interest is compounded half-yearly.

**Sol.**  $R = \frac{4}{2}\%$  per half year = 2% per half year

$$n = 1 \text{ year} = 1 \times 2 = 2 \text{ half years}$$

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

$$= 1,000 \left(1 + \frac{2}{100}\right)^2 = 1,000 \left(\frac{51}{50}\right)^2$$

$$= 1,000 \times \frac{51}{50} \times \frac{51}{50} = \text{Rs. } 1,040.40$$

2. Seema invested Rs.6,400 for 3 years at the rate of 10% per annum compounded annually, Sunil invested the same amount at the same rate for the same time but on simple interest. Who gets more interest and by how much?

**Sol.** For Seema

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

$$= 6,400 \left(1 + \frac{10}{100}\right)^3 = 6,400 \left(\frac{11}{10}\right)^3$$

$$= 6,400 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} = \frac{\text{Rs. } 42,592}{5} = \text{Rs. } 8,518.40$$

$$= \text{Rs. } 8,518.40 - \text{Rs. } 6,400 = \text{Rs. } 2,118.40$$

For Sunil

$$\text{SI} = \frac{6,400 \times 10 \times 3}{100} = \text{Rs. } 1,920$$

$$\text{Difference of interest} = \text{Rs. } 2,118.40 - \text{Rs. } 1,920 = \text{Rs. } 198.40$$

Seema gets more interest by Rs.198.40.

**3. In what time will Rs.800 yield an amount of Rs.882 at 5% per annum interest compounded annually?**

**Sol.** Given amount = Rs.882, P = Rs.800, R = 5% per annum, n = ?

We know that  $A = P \left(1 + \frac{R}{100}\right)^n$

$$\text{So, } 882 = 800 \left(1 + \frac{5}{100}\right)^n$$

$$\Rightarrow \frac{882}{800} = \left(1 + \frac{5}{100}\right)^n \Rightarrow \frac{882}{800} = \left(\frac{21}{20}\right)^n$$

$$\Rightarrow \frac{441}{400} = \left(\frac{21}{20}\right)^n \Rightarrow \frac{(21)^2}{(20)^2} = \left(\frac{21}{20}\right)^n$$

$$\Rightarrow \frac{(21)^2}{(20)^2} = \left(\frac{21}{20}\right)^n$$

On comparing the exponents, we get

$$n = 2 \text{ years}$$

Which is the required answer.

**4. A farmer bought a piece of land for Rs.10,00,000. He spent Rs.1,50,000 in order to plough the land. He built a fence around it for Rs.50,000. Then he sold the land making a profit of 10%. Find the selling price of the land.**

**Sol.** Cost price of the land = Rs.10,00,000.

Total overhead expenses = Rs.1,50,000 + Rs.50,000 = Rs.2,00,000.

So, final cost = Rs.10,00,000 + Rs.2,00,000 = Rs.12,00,000

Since he made a profit of 10%

$$\text{So, SP of land} = \frac{(100 + \text{Profit}\%) \times \text{CP}}{100} = \frac{(100 + 10) \times 1200000}{100} = \text{Rs. } 13,20,000$$

**5. Reshma buys a laptop for Rs.26,000. She installed important softwares in it and thus spent Rs.2,600 on it. She then sold it for Rs.34,000. Find her gain%.**

**Sol.** CP of laptop with software = Rs.(26,000 + 2,600) = Rs.28,600

SP of laptop = Rs.34,000

$$\therefore \text{Gain} = \text{Rs.}(34,000 - 28,600) = \text{Rs.}5,400$$

$$\therefore \text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100 = \frac{5400}{28600} \times 100 = 18.88\%$$

**6. Mr. Sharma purchased a washing machine for Rs.23,500 with a GST 15% on it. The transportation costed him Rs.1500. Find how much Mr. Sharma paid in total.**

**Sol.** Cost of washing machine = Rs.23,500

Cost of transportation = Rs.1,500

GST = 15%

$$\text{Amount payable as GST} = \frac{15}{100} \times 23,500$$

$$= \text{Rs. } 3,525$$

Total amount paid by Mr. Sharma is Rs.23,500 + Rs.1,500 + Rs.3,525

$$= \text{Rs. } 28,525$$

### I. Long Answer Type Questions.

1. A number is increased by 20% and then it is decreased by 20%. Find the net increase or decrease per cent.

**Sol.** Let the number be 100

$$\text{Increase in the number} = 20\% \text{ of } 100 = 20$$

$$\text{So, increased number} = 100 + 20 = 120$$

$$\text{Decrease in the number} = 20\% \text{ of } 120$$

$$= \frac{20}{100} \times 120 = 24$$

$$\text{So, new number} = 120 - 24 = 96$$

$$\text{Net decrease} = 100 - 96 = 4$$

$$\text{Hence, net decrease per cent} = \frac{4}{100} \times 100 = 4\%$$

2. Vishakha offers a discount of 20% on all the items at her shop and still makes a profit of 12%. What is the cost price of an article marked at 280?

**Sol.** Marked Price = 280

$$\text{Discount} = 20\% \text{ of } 280$$

$$= \frac{20}{100} \times 280 = 56$$

$$\text{So, selling price} = (280 - 56)$$

$$= 224$$

$$\text{Let the cost price be } 100$$

$$\text{Profit} = 12\% \text{ of } 100$$

$$= 12$$

$$\text{So selling price} = (100 + 12) = 112$$

$$\text{If the selling price is } 112, \text{ cost price} = 100$$

$$\text{If the selling price is } 224, \text{ cost price} = \frac{100 \times 224}{112} = 200$$

3. Find the compound interest on 48,000 for one year at 8% per annum when compounded half yearly.

Sol. Price (P) = 48,000

Rate (R) = 8% p.a

Time (n) = 1 year

Interest is compounded half yearly

$$\begin{aligned} A &= P \left( 1 + \frac{R}{200} \right)^{2n} \\ &= 48000 \left( 1 + \frac{8}{200} \right)^2 \\ &= 4800 \times \frac{26}{25} \times \frac{26}{25} \\ &= 76.8 \times 26 \times 26 \\ &= 51,916.80 \end{aligned}$$

Therefore, Compound Interest = A - P

$$= (51,916.80 - 48,000)$$

$$= 3,916.80$$

4. Calculate the amount and compound interest on 10,800 for 3 year at  $12\frac{1}{2}\%$  per annum compounded annually.

Sol. Here,  $p = 10800$ ,  $T = 3$  years,  $R = 12\frac{1}{2}\%$

$$\text{p.a.} = \frac{25}{2}\% \text{ p.a.}$$

We have,

$$\begin{aligned} A &= P \left( 1 + \frac{R}{100} \right)^n \\ &= 10800 \left( 1 + \frac{25}{2 \times 100} \right)^3 \end{aligned}$$

[Interest compounded annually,  $n = 3$ ]

$$\begin{aligned} &= 10800 \left( \frac{225}{200} \right)^3 \\ &= 10800 \times \frac{225}{200} \times \frac{225}{200} \times \frac{225}{200} \\ &= \frac{675 \times 9 \times 9 \times 9}{4 \times 8} \\ &= \frac{492075}{32} \end{aligned}$$

Amount = 15377.34

$$= 15377.34$$

Now, Compound Interest = 15377.34 - 10800

$$= 4577.34$$

5. Find the difference between compound interest and simple interest on 45000 at 12% per annum for 5 years.

**Sol.** Given,  $P = 45000, R = 12\%, T = 5 \text{ year}$

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{4500 \times 12 \times 5}{100} \\ = 27000$$

$$\text{and } A = P \left(1 + \frac{R}{100}\right)^n = 45000 \left(1 + \frac{12}{100}\right)^5$$

$$[n = T]$$

$$= 45000 \left(\frac{112}{100}\right)^5 \\ = 79305.37$$

$$\text{C.I.} = A - P = 79305.37 - 45000 \\ = 34305.37$$

$$\text{Difference between compound interest and simple interest} \\ = 34305.37 - 27000 \\ = 7305.37$$

## II. Long Answer Type Questions.

1. Find the compound interest by calculating simple interest when principal is Rs.3,000, rate is 5% per year (annum) and time is 2 years.

**Sol.** Principal for the first year = Rs.3,000

$$\text{Interest for the first year} = \frac{\text{Rs.3,000} \times 1 \times 5}{100} = \text{Rs. 150}$$

$$\text{Amount at the end of first year} = \text{Rs.3,000} + \text{Rs.150} = \text{Rs.3,150}$$

$$\text{Principal for the second year} = \text{Rs.3,150}$$

$$\text{Interest for the first year} = \frac{\text{Rs.3,150} \times 5 \times 1}{100} = \text{Rs. 157.50}$$

$$\text{Amount at the end of second year} = \text{Rs.3,150} + \text{Rs.157.50} = \text{Rs.3,307.50}$$

$$\therefore \text{Compound interest} = \text{Rs.3,307.50} - \text{Rs.3,000} = \text{Rs.307.50}$$

2. Find the difference between the compound interest and simple interest on a sum of Rs.50,000 at 10% per annum for 2 years.

**Sol.**  $A = P \left(1 + \frac{R}{100}\right)^n$

$$= 50,000 \left(1 + \frac{10}{100}\right)^2 = 50,000 \left(\frac{11}{10}\right)^2$$

$$= 50,000 \times \frac{11}{10} \times \frac{11}{10} = \text{Rs. 60,500}$$

$$CI = A - P$$

$$= \text{Rs. } 60,500 - \text{Rs. } 50,000 = \text{Rs. } 10,500$$

$$SI = \frac{P}{100} = \frac{50000 \times 10 \times 2}{100} = \text{Rs. } 10,000$$

$$\text{Difference} = \text{Rs. } 10,500 - \text{Rs. } 10,000 = \text{Rs. } 500$$

3. Find the amount that Dravid would receive if he invests Rs.8,192 for 18 months at  $12\frac{1}{2}\%$  per annum, the interest being compounded half-yearly.

**Sol.**  $R = \frac{25}{2}\%$  per annum  
 $= \frac{25}{2 \times 2}\%$  per half year  $= \frac{25}{4}\%$  per half year  
 $n = 18 \text{ month} = \frac{18}{12} \text{ years} = \frac{18}{12} \times 2 = 3 \text{ half years.}$   
 $A = P \left(1 + \frac{R}{100}\right)^n$   
 $= 8,192 \left(1 + \frac{25}{4 \times 100}\right)^3 = 8,192 \left(\frac{17}{16}\right)^3$   
 $= 8,192 \times \frac{17}{16} \times \frac{17}{16} \times \frac{17}{16} = \text{Rs. } 9,826$

4. The difference between SI and CI of a certain sum of money is Rs.48 at 20% per annum for 2 years. Find the principal...

**Sol.** Let the certain sum be Rs.P.  
 $SI = \frac{P \times R \times T}{100} = \frac{P \times 20 \times 2}{100} = \frac{2P}{5}$   
 $CI = P \left[ \left(1 + \frac{R}{100}\right)^n - 1 \right]$   
 $= P \left[ \left(1 + \frac{20}{100}\right)^2 - 1 \right] = P \left[ \frac{36}{25} - 1 \right] = \frac{11P}{25}$   
As,  $CI - SI = 48$   
 $\Rightarrow \frac{11P}{25} - \frac{2P}{5} = 48 \Rightarrow \frac{11P - 10P}{25} = 48$   
 $P = 48 \times 25 = \text{Rs. } 1,200$

5. A grocer purchased 40 dozen eggs for Rs.300. Out of these, 30 eggs were broken and could not be sold. At what rate per dozen should he sell the remaining eggs to make a profit of 10%?

**Sol.** Since, 30 eggs are broken so  $40 \times 12 - 30 = 450$  eggs are to be sold.  
Cost price of eggs = Rs.300  
Profit % = 10%,  $\therefore$  Profit = 10% of Rs.300  
 $\Rightarrow \text{Profit} = \text{Rs. } \left(300 \times \frac{10}{100}\right) = \text{Rs. } 30$   
Now, Selling price = Cost price + Profit  
 $\therefore$  Selling price of remaining eggs = Rs (300 + 30) = Rs.330  
 $\Rightarrow$  Selling price of 450 eggs = Rs.330



$$\therefore \text{Selling price of 1 egg} = \text{Rs } \frac{330}{450}$$

$$\therefore \text{Selling price of 12 egg} = \text{Rs } \frac{330}{450} \times 12 = \text{Rs. 8.80}$$

Hence, selling price per dozen eggs = Rs.8 and 80 paise.

### I. High Order Thinking Skills [HOTS] Questions

1. Find the amount of 8000 for three years compounded annually at 10% per annum. Also, find the compound interest.

Sol. Since,  $P = 8000$

$$R = 10\% \text{ p.a}$$

$$\text{and } n = 3 \text{ years}$$

Using the formula,

$$\begin{aligned} A &= \left(1 + \frac{R}{100}\right)^n \\ &= 8000 \times \left(1 + \frac{10}{100}\right)^3 \\ &= 8000 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10} \\ &= 10648 \end{aligned}$$

Thus, Amount after 3 years = 10648

And

$$\begin{aligned} \text{C.I} &= A - P \\ &= (10648 - 8000) \\ &= 2648 \end{aligned}$$

2. A colour T.V. is available for 26880 inclusive of VAT. If the original cost of the T.V. is 24,000, find the rate of VAT.

Sol. Let the rate of VAT =  $x\%$

$$\text{Then } 24000 + x\% \text{ of } 24000 = 26880$$

$$\text{or } \frac{x}{100} \times 24000 = 26880 - 24000$$

$$\text{or } 240x = 2880$$

$$\text{or } x = \frac{2880}{240} = 12$$

Therefore,

$$\text{Rate of VAT} = 12\%$$

## II. High Order Thinking Skills [HOTS] Questions

1. In a factory, women are 35 of all the workers, the rest of the worker being men. The number of men exceeds that of women by 252. Find the total number of workers in the factory.

**Sol.** Let total number of workers be  $x$

$$\text{Women} = 35\% \text{ of } x = \frac{35}{100}x$$

$$\text{Men} = (100 - 35)\% \text{ of } x = 65\% \text{ of } x = \frac{65}{100}x$$

According to question,

$$\frac{65}{100}x = \frac{35x}{100} + 252 \Rightarrow \frac{65x - 35x}{100} = 252$$

$$\Rightarrow 30x = 252 \times 100 \Rightarrow x = 840$$

Thus, total number of workers = 840

2. A shopkeeper purchased two scooter for Rs. 37,500 each He sold these scooters, gaining 10% on one and losing 5% on the other. Find his gain or loss per cent in the whole transaction.

**Sol.** CP of first scooter = Rs. 37,500

$$\text{Profit \%} = 10\%, \quad \therefore \text{Profit} = 10\% \text{ of Rs. } 37,500$$

$$\Rightarrow \text{Profit} = \text{Rs} \left( 37500 \times \frac{10}{100} \right) = \text{Rs. } 3,750$$

Now, SP of first scooter = Cost price + Profit

$$= \text{Rs} (37,500 + 3,750) = \text{Rs. } 41,250.$$

Again, CP of second scooter = Rs. 37,500

$$\text{Loss \%} = 5\%$$

$$\therefore \text{Loss} = 5\% \text{ of Rs. } 37,500$$

$$\Rightarrow \text{Loss} = \text{Rs} \left( 37500 \times \frac{5}{100} \right) = \text{Rs. } 1,875$$

Now, SP of second scooter = Cost price - Loss

$$\therefore \text{SP of second scooter} = \text{Rs} (37,500 - 1,875) = \text{Rs. } 35,625$$

$$\text{Now total CP} = \text{Rs} (37,500 + 37,500) = \text{Rs. } 75,000$$

$$\text{Total SP} = \text{Rs. } (41,250 + 35,625) = \text{Rs. } 76,875$$

Since, SP > CP there is gain i.e.

$$\text{Overall Gain} = \text{Rs} (76,875 - 75,000) = \text{Rs. } 1,875$$

$$\text{Overall Gain \%} = \frac{1875}{75000} \times 100 = 2.5\%$$

3. A shop keeper bought two projectors for Rs.50,000. He sold one at a profit of 5% and other at a loss of 5%. If the selling price of each projector is same, determine the CP of each projector.

**Sol.** Let the CP of first projector be  $x$ .

$$\text{Profit \%} = 5\%$$

$$\therefore \text{Profit} = 5\% \text{ of Rs } x \Rightarrow \text{Profit} = \text{Rs} \left( x \times \frac{5}{100} \right) = \frac{5x}{100} = \text{Rs. } \frac{x}{20}$$

$$\therefore \text{SP of first projector} = \text{Cost price} + \text{Profit} = \text{Rs} \left( x + \frac{x}{20} \right) = \text{Rs} \frac{21x}{20}$$

$$\text{Again, CP of second projector} = \text{Rs} (50,000 - x)$$

$$\text{Loss \%} = 5\%$$

$$\therefore \text{Loss} = 5\% \text{ of } (50,000 - x) \Rightarrow \text{Loss} = \text{Rs} \left\{ (50,000 - x) \times \frac{5}{100} \right\} = \text{Rs} \frac{50000 - x}{20}$$

$$\begin{aligned} \therefore \text{SP of second projector} &= \text{CP} - \text{Loss} = \text{Rs} \left\{ (50,000 - x) - \frac{50000 - x}{20} \right\} \\ &= \text{Rs. } (50000 - x) \left\{ 1 - \frac{1}{20} \right\} = \text{Rs. } (50,000 - x) \left\{ \frac{20-1}{20} \right\} \\ &= \text{Rs} \frac{19(50,000 - x)}{20} \end{aligned}$$

According to question,

$$\begin{aligned} \text{Rs } \frac{21x}{20} &= \text{Rs. } \frac{19(50,000 - x)}{20} \Rightarrow 21x = 19(50,000 - x) \\ \Rightarrow 21x &= 19 \times 50,000 - 19x \Rightarrow 21x + 19x = 19 \times 50,000 \\ \Rightarrow 40x &= 19 \times 50,000 \Rightarrow x = \frac{19 \times 50,000}{40} \Rightarrow x = 23,750 \end{aligned}$$

Hence, CP of first projector = Rs.23,750

CP of second projector = Rs (50,000 - 23,750) = Rs.26,250

4. The price of pulse has increased by 20%. By what per cent must Ms. Singh reduce her consumption so that her expenditure on pulse does not increase.

**Sol.** Let the original expenditure was Rs.  $x$  and original price of pulse be Rs.  $y$ .

$$\therefore \text{Original consumption} = \frac{x}{y} \text{ unit}$$

$$\text{New price of pulse} = \text{Rs} (y + 20\% \text{ of } y)$$

$$= \text{Rs} \left( y + y \times \frac{20}{100} \right) = \text{Rs} \left( y + \frac{y}{5} \right) = \text{Rs} \frac{6y}{5}$$

To maintain expenditure,

$$\text{New consumption} = \frac{x}{\frac{6y}{5}} \text{ unit} = \frac{5x}{6y} \text{ unit}$$

$$\text{Reduction in consumption} = \left( \frac{x}{y} - \frac{5x}{6y} \right) \text{ unit}$$

$$= \left( \frac{6x - 5x}{6y} \right) \text{ unit} = \frac{x}{6y} \text{ unit}$$

$$\text{Reduction \%} = \frac{\text{Reduction in consumption}}{\text{Original consumption}} \times 100$$

$$= \frac{\frac{x}{6y}}{\frac{x}{y}} \times 100 = \frac{100}{6} \% = \frac{50}{3} \%$$

### I. Value Based Questions

1. Ram's income is 60% more than that of Shyam. By what percent is Shyam's income less than Ram's?

**Sol.** Let Shyam's income = 100

Then, Ram's income = 160

If Ram's income is 160,

Then Shyam's income = 100

If Ram's income 100,

Then Shyam's income =  $\left(\frac{100}{160} \times 100\right) = 62.50$

Shyam's income is less than Ram's income by  $(100 - 62.50) = 37.5\%$

2. (a) Find the compound interest on 31250 at 8% per annum for  $2\frac{3}{4}$  years.  
 (b) Mohit bought a CD for 750 and sold it for Rs. 875. Show that his gain percent is  $16\frac{2}{3}\%$ .

**Sol.** (a) Since,  $P = 31250, n = 2\frac{3}{4}$  years,  $R = 8\%$  p.a.

$$\begin{aligned} \text{Then, } A &= 31250 \left(1 + \frac{8}{100}\right)^2 \times \left(1 + \frac{\frac{3}{4} \times 8}{100}\right) \\ &= 31250 \times \left(\frac{27}{25}\right)^2 \times \left(\frac{53}{50}\right) \\ &= 31250 \times \frac{27}{25} \times \frac{27}{25} \times \frac{53}{50} = 38637 \end{aligned}$$

$$\text{Hence, C.I.} = 38637 - 31250 = 7387$$

(b) Since,

$$C.P. = 750 \text{ and } S.P. = 875$$

$$S.P. < C.P.$$

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

$$= \frac{125}{750} \times 100$$

$$\frac{50}{3} \% = 16\frac{2}{3} \%$$

3. (a) Find the amount of 50000 after 2 years compounded annually. The rate of interest being 8% p.a. during the first year and 9% p.a. during the second year. Also, find the compound interest.

(b) If (a) decreased value  $= P \left(1 - \frac{R}{100}\right)^n$  and (b) depreciated value  $= P \left(1 + \frac{R}{100}\right)^n$  then select right answer.

Sol. (a) Here  $P = 50000, R_1 = 8\% \text{ p.a}$  and  $R_2 = 9\% \text{ p.a}$

$$\begin{aligned}\text{Since, } A &= P \left(1 + \frac{R_1}{100}\right) \left(1 + \frac{R_2}{100}\right) \\ &= 50000 \times \left(1 + \frac{8}{100}\right) \left(1 + \frac{9}{100}\right) \\ &= 50000 \times \frac{27}{25} \times \frac{109}{100}\end{aligned}$$

$$\text{Amount} = 58860$$

$$\text{Therefore C.I} = A - P$$

$$= 58860 - 50000$$

$$= 8860$$

(b) (a) is right answer.

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