

Revision Notes
Chapter - 8
Comparing Quantities

- **Ratio:** Comparing by division is called ratio. Quantities written in ratio have the same unit. Ratio has no unit. Equality of two ratios is called proportion.
- **Product of extremes = Product of means**
- **Percentage:** Percentage means for every hundred. The result of any division in which the divisor is 100 is a percentage. The divisor is denoted by a special symbol %, read as percent.

8.4 Profit-Loss, Discount and Tax

Profit and Loss

In previous class, we have learnt about computation of profit and loss. Let us review the facts and formulae studied earlier.

(i) **Profit:** When $SP > CP$, then there is a profit or gain.

$$\therefore \text{Profit} = SP - CP$$

(ii) **Loss:** When $CP > SP$, then there is a loss.

$$\therefore \text{Loss} = CP - SP$$

(iii) Profit% or loss% is always calculated on the cost price of the item.

(a) Profit% or gain%

$$= \left(\frac{\text{Profit or gain}}{CP} \times 100 \right) \%$$

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

(iv) When profit% is given, then

(a) $SP = \left(\frac{100 + \text{Profit}\%}{100} \right) \times CP$

(b) $CP = \frac{SP \times 100}{100 + \text{Profit}\%}$

(v) When loss% is given, then

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

(b) $CP = \frac{SP \times 100}{100 - \text{Loss}\%}$

(vi) **Overheads** are some additional expenses incurred on transportation, repair, labour charges etc., which are included in the cost price of the article.

(vii) If CP and SP are given for different numbers of articles, first find CP and SP of equal number of articles and then calculate profit and loss percentage.

Discount

(i) **Marked Price** : The labelled price or printed price of an article is called its marked price. In short, it is denoted by MP. Sometimes it is also known as list price.

(ii) **Discount** : Reduction offered by a shopkeeper on the marked price is called discount. Discount is always calculated on the marked price.

(a) $SP = MP - \text{Discount}$

(b) $\text{Discount} = MP - SP$

(c) $MP = SP + \text{Discount}$

(d) If discount% is given, then

• $\text{Discount} = \text{Discount}\% \text{ of } MP$

• $SP = \left(\frac{100 - \text{Discount}}{100} \right) \times MP$

• $MP = \left(\frac{100}{100 - \text{Discount}} \right) \times SP$

(e) $\text{Discount}\% = \frac{\text{Discount}}{MP} \times 100\%$

(iii) **Successive Discount** : If two or more discounts are allowed one after the other, then such discounts are known as successive discounts.

(a) If two successive discounts are given as $d_1\%$ and $d_2\%$, then,

$$SP = \left(\frac{100 - d_1}{100} \right) \left(\frac{100 - d_2}{100} \right) \times MP$$

(b) If three successive discounts $d_1\%$, $d_2\%$ and $d_3\%$ are given, then

$$SP = \left(\frac{100 - d_1}{100} \right) \left(\frac{100 - d_2}{100} \right) \left(\frac{100 - d_3}{100} \right) \times MP$$

(c) If two or more discounts are given, then

$$\text{single discount} = \frac{\text{Total discount}}{MP} \times 100\%$$

Tax

Sale Tax

(i) $\text{Sale tax}\% = \frac{\text{Sale tax}}{SP} \times 100$

(ii) $\text{Total amount of the bill} = SP + \text{Sale tax}$

An additional amount has been paid by a customer with the cost of an item is called Sale Tax. It is collected by the shopkeeper from the customer at the time of selling the goods and is deposited with the government.

Rates of sale tax are different for different commodities.

(iii) Sale tax = Tax% of sale amount

Value Added Tax (VAT)

These days, however, the selling price (known as MRP) include the tax known as VAT (Value Added Tax).

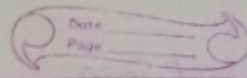
VAT is tax assessed on buyer on goods/objects sold.

- **Simple Interest:** If the principal remains the same for the entire loan period, then the interest paid is called simple interest. $SI = \frac{P \times R \times T}{100}$
- Compound interest is the interest calculated on the previous year's amount ($A = P + I$)
 - (i) Amount when interest is compounded annually = $P(1 + \frac{R}{100})^n$ P is principal, R is rate of interest, n is time period
 - (ii) Amount when interest is compounded half yearly
 = $P(1 + \frac{R}{100})^{2n}$ [$\frac{R}{2}$ is, half yearly rate and $2n =$ number of 'half - years']

21 sept 2020

Chapter - 8

Ex - 8.1



Q1. Find the ratio of the following:-

(a) Speed of a cycle 15 km per hour to the speed of scooter 30 km per hour.

Sol. Ratio of the speed of cycle to the speed of scooter $\Rightarrow \frac{15}{30} = \frac{1}{2} = 1:2$

(b) 50 paise to ₹ 5.

Sol. ₹ 1 = 100 paise

$$\frac{50 \text{ paise}}{\text{₹ 5}} = \frac{50 \text{ paise}}{5 \times 100 \text{ paise}} = \frac{50 \text{ paise}}{500 \text{ paise}} = \frac{1}{10} = 1:10$$

(b) 5 m to 10 km

Sol. 1 km = 1000 m

$$= \frac{5 \text{ m}}{10 \text{ km}} = \frac{5 \text{ m}}{10 \times 1000 \text{ m}} = \frac{5 \text{ m}}{10,000 \text{ m}} = \frac{1}{2000}$$

$$\frac{1}{2000} = 1:2000$$

Q2. Convert the following ratios to percentages:-

(a) 3:4

Sol. $= \frac{3}{4} \times 100 = 75\%$

(b) 2:3

Sol.

$\frac{2}{3} \times 100 = 66.66\%$

$\frac{33.33}{3}$

$3 \overline{) 100}$

$\underline{-9}$

10

Day 22 Sept 2020

Ex. 8.1

Q3. 72% of 25 students are good in mathematics. How many are not good in mathematics?

Sol. Total no. of students = 25.
No. of good students in mathematics $\Rightarrow \frac{25 \times 72}{100}$
4

$\Rightarrow 18$
No. of students not good in mathematics
 $\Rightarrow 25 - 18 \Rightarrow 7$

So percentage of students not good in mathematics $\Rightarrow \frac{7}{25} \times 100 \Rightarrow 28\%$

Or $(100\% - 72\%) \Rightarrow 28\%$

Q4. A football team won 10 matches out of the total number of matches they played. If their win percentage was 40, then how many matches did they play in all?

Sol. Let total no. of matches be x .
Acc. to question, 40% of total matches = 10

$$40\% \text{ of } x = 10$$

$$\frac{40}{100} \times x = 10$$

$$x = \frac{10 \times 100}{40} \Rightarrow 25$$

No. of matches = 25.

Q5. If Chameli had ₹ 600 left after spending 75% of her money, how much did she have in the beginning?

Sol. Let her money in the beginning be ₹ x .

$$\text{Amount spent by her} = x \times \frac{75}{100} = \frac{3x}{4}$$

$$\text{Amount left with her} \Rightarrow x - \frac{3x}{4}$$

$$\Rightarrow \frac{4x - 3x}{4} = \frac{x}{4}$$

$$\text{Acc. to question} = \frac{x}{4} = 600.$$

$$\Rightarrow x = 600 \times 4 = 2400.$$

total money in the beginning = 2400.

$$\text{Or} = x - 75\% \text{ of } x = 600$$

$$x - \frac{75}{100} \times x = 600$$

$$x - \frac{3x}{4} = 600$$

$$\frac{4x - 3x}{4} = 600$$

$$\frac{x}{4} = 600$$

$$x = 600 \times 4 = 2400.$$

Q6. If 60% people in a city like Cricket, 30% like football and the remaining like other game, then what percent of the people like other games? If the total number of people are 50 lakh, find the exact no. who like each type of game.

Sol. Number of people who like Cricket = 60%
No. of people who like football = 30%
No. of people who like other games
=) $(100\% - (60\% + 30\%)) = 10\%$

Now no. of people who like Cricket =)
$$50,00,000 \times \frac{60}{100} = 30,00,000$$

no. of people who like football =)
$$50,00,000 \times \frac{30}{100} = 15,00,000$$

no. of people who like other games =)
$$50,00,000 \times \frac{10}{100} = 5,00,000$$

Day 23 Sept 2020 Ex. 8.2

Q1. A man got 10% increase in his salary. If his new salary is £ 1,54,000, find his original salary.

Sol. Let the original salary be x .
Given, the new salary = £ 1,54,000
Original salary + Increment = New salary
Given, the increment is 10% of the original salary.

$$x + \left(\frac{x \times 10}{100} \right) = 1,54,000$$

$$x + \frac{x}{10} = 1,54,000$$

$$10x + x = 1,54,000$$

$$\frac{11x}{10} = 1,54,000$$

$$x = \frac{1,54,000 \times 10}{11} = 1,40,000$$

Original salary = £ 1,40,000

Q2. On Sunday 845 people went to the Zoo. On Monday only 169 people went. What is the percent decrease in the people visiting the Zoo on Monday?

Sol. Given, people went to the Zoo on Sunday = 845
people went to the Zoo on Monday = 169

Decrease in the no. of people = $845 - 169 = 676$

Percentage decrease $\Rightarrow \frac{\text{Decrease in the no. of people} \times 100}{\text{No. of people went to zoo on Sunday}}$

$$\Rightarrow \frac{676}{845} \times 100$$

$$\Rightarrow 80\%$$

Q3. A shopkeeper buys 80 article was for ₹ 2400, and sells them for a profit of 16%. find the selling price of one article.

Sol: Given, the shopkeeper buys 80 article for ₹ 2400,
Cost of 1 article $\rightarrow \frac{2400}{80} \Rightarrow ₹ 30$

$$\text{Profit \%} = 16$$

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

$$16(\%) = \frac{\text{Profit}}{30} \times 100$$

$$\frac{16}{100} = \frac{\text{Profit}}{30} \times 100$$

$$\text{Profit} = \frac{16 \times 30}{100}$$

$$\Rightarrow \frac{480}{100} = 4.8$$

$$\text{Selling price} \Rightarrow \text{C.P.} + \text{Profit}$$
$$30 + 4.8$$
$$= ₹ 34.80$$

Day 24 Sept 2020

Ex - 8.2

Q. The cost of an article was Rs 15,500, ₹450 were spent on its repairs. If it sold for a profit of 15%, find the selling price of the article.

Sol. Total cost of an article \Rightarrow Cost + overhead exp.
 $15,500 + 450 = 15,950$

$$\text{Profit \%} = 15$$

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

$$15 = \frac{\text{Profit}}{15,950} \times 100$$

$$\text{Profit} \Rightarrow \frac{15,950 \times 15}{100}$$

$$\Rightarrow 2,392.50$$

$$\text{Selling price} \Rightarrow \text{C.P.} + \text{Profit}$$
$$\Rightarrow 15,950 + 2,392.50$$
$$\Rightarrow \text{₹}18,342.50$$

Q5. A VCR and TV were bought for ₹8000 each. The shopkeeper made a loss of 4% on the VCR and a profit of 8% on the TV. Find the gain or loss % on the whole transaction.

Sol. C.P. of VCR = ₹8000

The shopkeeper made a loss of 4% on VCR. This means if C.P.

$$\text{C.P. is ₹8000}$$

$$\text{S.P.} = \left(8000 \times \frac{4}{100} \right) \Rightarrow \text{₹}320 \text{ loss}$$

$$\text{S.P.} \Rightarrow \text{₹}8000 - \text{₹}320 \Rightarrow \text{₹}7680.$$

$$S.P = \left(8000 \times \frac{96}{100} \right) = ₹7680$$

$$C.P \text{ of TV} = ₹8000$$

profit of 8% on T.V.

$$\text{profit} \Rightarrow 8000 \times \frac{8}{100} = ₹640$$

$$S.P \Rightarrow 8000 + 640 = ₹8640$$

or

$$S.P \Rightarrow 8000 \times \frac{108}{100} = ₹8640$$

$$\text{Total S.P} = ₹7680 + 8640 = ₹16320$$

$$\text{Total C.P} = ₹8000 + 8000 = ₹16000$$

$$\text{Profit} \Rightarrow 16320 - 16000 = ₹320$$

$$\text{Gain \%} \Rightarrow \frac{320}{16000} \times 100 = 2\%$$

the shopkeeper had a gain of 2% on the whole transaction.

Q6. During a sale, a shop offered a discount of 10% on the market price of all the items. What would a customer have to pay for a pair of jeans marked at ₹1450 and two shirts marked at ₹850 each?

Sol. Total market price \Rightarrow ₹1450 + 2 × ₹850

$$₹1450 + 1700$$
$$₹3150$$

Given, discount = 10%
 Discount = ₹ $3150 \times \frac{10}{100} \Rightarrow ₹ 315$

Dis. = Market price - Sale price
 $315 = 3150 - S.P$
 $S.P = 3150 - 315$
 $S.P = ₹ 2835$

The customer will have to pay ₹ 2835.

Q7. A milkman sold 2 of his buffaloes for ₹ 20,000 each. On one he made a gain of 5% and on the other a loss of 10%. Find his overall gain or loss.

Sol. S.P of each buffalo = ₹ 20,000
 The milkman made a gain of 5% while selling a one buffalo

Let C.P is ₹ 100, then S.P is ₹ 105.

C.P of one buffalo = $20,000 \times \frac{100}{105}$

$\Rightarrow ₹ 19,047.62$

And second buffalo was sold at a loss of 10%

Let C.P is ₹ 100, then S.P is ₹ 90

C.P of other buffalo $\Rightarrow 20,000 \times \frac{100}{90}$

$\Rightarrow ₹ 22,222.22$

Total C.P $\Rightarrow ₹ 19,047.62 + 22,222.22$

$\Rightarrow ₹ 41,269.84$

Total S.P $\Rightarrow ₹ 20,000 + 20,000 = 40,000$

A loss $\Rightarrow 41,269.84 - 40,000$
 $\Rightarrow ₹ 1,269.84$

$$\text{Loss \%} \Rightarrow \frac{1269.84}{41269.84} \times 100$$

$$\Rightarrow 3.076\%$$

$$\text{Loss} = 3\%$$

Q8. The Price of a TV is ₹ 13,000. The sales tax charged on it is at the rate of 12%. Find the amount that Vinod will have to pay if he buys it.

Sol. On ₹ 100 the tax to be paid = ₹ 12

So on ₹ 13,000 the tax to be paid will be

$$\Rightarrow 13,000 \times \frac{12}{100} \Rightarrow ₹ 1,560$$

Required amount = Cost + Sales Tax

$$\Rightarrow 13,000 + 1,560$$

$$\Rightarrow ₹ 14,560$$

Vinod will have to pay = ₹ 14,560 for the T.V

25 sept 2020

Ex - 8.2

Arun bought a pair of skates at a sales where the discount given was 20%. If the amount he pays is ₹1600. Find the market price.

Let the m.p of the skates be ₹100.

$$\text{Discount} = 20\% \text{ of } ₹100$$
$$\frac{100 \times 20}{100} = 20$$

$$\text{Sale price} = 100 - 20 = ₹80$$

If SP is ₹80 then MP = ₹100

If SP is ₹1 then MP = ₹ $\frac{100}{80}$

If S.P is ₹1600 then MP = ₹ $\frac{100 \times 1600}{80}$

$$\Rightarrow ₹2000$$

$$\text{M.P} \Rightarrow ₹2000$$

Q 10. I purchased a hair-dryer for ₹ 5400 including 8% VAT. Find the Price before VAT was added

Sol Let the original price be ₹ 100.
VAT = 8% $(\frac{100 \times 8}{100} = 8)$

$$\text{Sale price} = 100 + 8 = 108$$

If S.P is ₹ 108, then original price = ₹ 100

If S.P is ₹ 1, then original price = $\frac{100}{108}$

If S.P is ₹ 5400, the original price = $\frac{100}{108} \times 5400$

$$= ₹ 5000$$

the price of hair-dryer before the addition of VAT = ₹ 5000.

Q 11. An article was purchased for ₹ 1239 including GST of 18%. Find the price of the article before GST was added?

Sol Let the original price be ₹ 100.
GST = 18% $(\frac{100 \times 18}{100} = 18)$

$$\text{S.P} = 100 + 18 = 118$$

If S.P is ₹ 118, the O.P is = ₹ 100

If S.P is ₹ 1, the O.P is = $\frac{100}{118}$

If S.P is ₹ 1239, the O.P is = $\frac{100}{118} \times 1239$

⇒ ₹ 1050

the price of article before the addition of GST
⇒ ₹ 1050.

Ex - 8.3

Q. Cal. the amount and C.I on:-

₹ 10,800 for 3 years at $12\frac{1}{2}\%$ per annum
Compounded annually.

Principal (P) = ₹ 10,800

year / Time (n) = 3

Rate (R) = $12\frac{1}{2}\%$ = $\frac{25}{2}\%$ (annual)

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

$$\left[10800 \left(1 + \frac{25}{200} \right)^3 \right]$$

$$\Rightarrow \left[10,800 \left(\frac{200+25}{200} \right)^3 \right]$$

$$\left[10,800 \left(\frac{225}{200} \right)^3 \right]$$

$$10,800 \times (1.125)^3$$

$$10,800 \times 1.4238$$

$$\underline{15379.2} \quad 15379.04$$

$$C.I = A - P$$

$$15377.04 - 10,800$$

$$\Rightarrow \text{₹ } 4577.04,$$

(b) ₹18000 for $2\frac{1}{2}$ year at 10% per annum compounded annually.

Sol $P = 18000$, $R = 10\%$, $T = 2\frac{1}{2}$ Years

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

$$= 18000 \left(1 + \frac{10}{100}\right)^2$$

$$18000 \left(\frac{110}{100}\right)^2$$

$$18000 \times \frac{110}{100} \times \frac{110}{100} \Rightarrow \text{₹ } 21780$$

By taking ₹21780 as Principal, the S.I for the next $\frac{1}{2}$ year will be calculated.

$$S.I = \frac{21780 \times \frac{1}{2} \times 10}{100}$$

$$\Rightarrow \text{₹ } 1089$$

$$\text{Int for } 2 \text{ Year} = (21780 - 18000) = \text{₹ } 3780$$

$$\text{And Int for } \frac{1}{2} \text{ Year} = \text{₹ } 1089$$

$$\text{total C.I} = 3780 + 1089 = \text{₹ } 4869$$

$$\text{Amount} = P + C.I$$

$$\Rightarrow 18000 + 4869$$

$$\text{₹ } 22869$$

$$C.I = A - P$$

$$15377.04 - 10,800$$

$$\Rightarrow \text{₹ } 4577.04$$

(b) ₹18000 for $2\frac{1}{2}$ year at 10% per annum compounded annually.

Sol $P = 18000$, $R = 10\%$, $T = 2\frac{1}{2}$ Years

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

$$= 18000 \left(1 + \frac{10}{100}\right)^2$$

$$18000 \left(\frac{110}{100}\right)^2$$

$$18000 \times \frac{110}{100} \times \frac{110}{100} \Rightarrow \text{₹ } 21780$$

By taking ₹21780 as Principal, the S.I for the next $\frac{1}{2}$ year will be calculated.

$$S.I = \frac{21780 \times \frac{1}{2} \times 10}{100}$$

$$\Rightarrow \text{₹ } 1089$$

$$\text{Int for 2 Year} = (21780 - 18000) = \text{₹ } 3780$$

$$\text{And Int for } \frac{1}{2} \text{ Year} = \text{₹ } 1089$$

$$\text{total C.I} = 3780 + 1089 = \text{₹ } 4869$$

$$\text{Amount} = P + C.I$$

$$\Rightarrow 18000 + 4869$$

$$\text{₹ } 22869$$

Sept 2020

Ex-8.3

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PAGE NO.:

Q) ₹ 62,500 for $1\frac{1}{2}$ years at 8% per annum compounded half yearly.

P = 62,500, Rate = 8% per annum or 4% per half year.

No. of years = $1\frac{1}{2} \times 2 = \frac{3}{1}$ year.

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

$$\Rightarrow \left[62500 \left(1 + \frac{4}{100}\right)^3\right]$$

$$\Rightarrow \left[62500 \left(\frac{104}{100}\right)^3\right]$$

$$\Rightarrow \left[62500 \left(\frac{26}{25}\right)^3\right]$$

$$\Rightarrow 62500 \times (1.04)^3$$

$$62500 \times 1.124864$$

$$\text{Amount} \Rightarrow 70304$$

$$C.I. = A - P = ₹ 70304 - 62500 = ₹ 7804$$

Q) ₹ 8000 for 1 year at 9% per annum compound half yearly.

P = 8000, Rate = 9% per annum $\frac{9}{2} = 4.5\%$ per half year. No. of year = $1 \times 2 = 2$ years.

$$\text{Amount} = \left[P \left(1 + \frac{R}{100}\right)^n \right]$$

$$\Rightarrow \left[8000 \left(1 + \frac{9}{200}\right)^2 \right]$$

$$= \left[8000 \left(1 + \frac{9}{200} \right)^2 \right]$$

$$\left[8000 \left(\frac{200+9}{200} \right)^2 \right]$$

$$\left[8000 \left(\frac{209}{200} \right)^2 \right]$$

$$\left[8000 (1.045)^2 \right]$$

$$8000 \times 1.092025$$

$$\text{Amount} = ₹ 8736.20$$

$$\text{C.I.} = A - P = ₹ 8736.20 - 8000 \\ \Rightarrow ₹ 736.20$$

1) ₹ 10,000 for 2 years at 8% per annum compounded half yearly.

1) $P = ₹ 10,000$, Rate = 8% per annum or 4% per half year. No. of Year = $1 \times 2 = 2$ years.

$$\text{Amount} = \left[P \left(1 + \frac{R}{100} \right)^m \right]$$

$$\Rightarrow \left[10,000 \left(1 + \frac{4}{100} \right)^2 \right]$$

$$\left[10,000 \left(\frac{100+4}{100} \right)^2 \right]$$

$$\left[10,000 \left(\frac{104}{100} \right)^2 \right]$$

$$10,000 \times (1.04)^2$$

$$10,000 \times 1.0816$$

$$\begin{aligned} & \text{₹} 10,000 \times 1.0816 \\ \text{Amount ₹} & 10,816 \\ \text{C.I.} &= A - P \\ \text{C.I.} &= 10,816 - 10,000 \Rightarrow \text{₹} 816 \end{aligned}$$

Q2 Kamala borrowed ₹ 26,400 from a bank to buy a scooter at a rate of 15% p.a. compounded yearly. What amount will she pay at the end of 2 years and 4 months to clear the loan?

Sol $P = \text{₹} 26,400,$
 Rate = 15% per annum
 No. of year = $2 \frac{4}{12}$

$$\begin{aligned} \text{Amount} &= \left[P \left(1 + \frac{R}{100} \right)^n \right] \\ &= \left[26,400 \left(1 + \frac{15}{100} \right)^2 \right] \\ &= \left[26,400 \left(\frac{100+15}{100} \right)^2 \right] \\ &= \left[26,400 \left(\frac{115}{100} \right)^2 \right] \\ &= \left[26,400 \times (1.15)^2 \right] \\ &= 26,400 \times 1.3225 \end{aligned}$$

Amount = 34,914
 By taking ₹ 34,914 as principal, the S.I for the next $\frac{4}{12} = \frac{1}{3}$ years will be

$$\text{S.I} = \frac{34,914 \times \frac{1}{3} \times 15}{100} \Rightarrow \text{₹} 1,745.70$$

Int. for the first 2 year. A - P
 $\Rightarrow ₹ 34914 - 26400$
 $\Rightarrow ₹ 8514$

Int. for the next 1 year $\Rightarrow ₹ 1745.70$
 3

Total C. I = ₹ 8514 + 1745.70
 $\Rightarrow ₹ 10,259.70$

Amount = P + C. I
 $\Rightarrow 26400 + 10,259.70 \Rightarrow ₹ 36,659.70$

Q 3. Fabina borrow ₹ 12500 at 12% per annum for 3 years at S.I and Radha borrows the same amount for the same time period at 10% per annum, C.I. Who pays more Int. and by how much?

Sol Int. paid by Fabina = $P \times R \times T$
 100

S. I. $\Rightarrow \frac{12500 \times 12 \times 3}{100} = ₹ 4500$

Amount paid by Radha at the end of 3 years

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

$A = \left[12500 \left(1 + \frac{10}{100} \right)^3 \right]$

$\left[12500 \left(\frac{110}{100} \right)^3 \right]$

$\left[12500 \times (1.10)^3 \right]$

12500×1.331

$A = ₹ 16637.5$

C. I = $16637.5 - 12500 = ₹ 4137.5$

The Int. paid by Falsina ₹ 4500 and by Radha ₹ 4197.50
 Falsina pay more Int.
 $₹ 4500 - ₹ 4197.50 = ₹ 362.50$

I borrowed ₹ 12000 from Jamshed at 6% per annum S.I. for 2 years. Had I borrowed this sum at 6% per annum C.I., what extra amount would I have to pay?

$P = ₹ 12000$, $R = 6\%$ per annum, $T = 2$ years
 $S.I = \frac{P \times R \times T}{100} = \frac{12000 \times 6 \times 2}{100} \Rightarrow ₹ 1440$

C.I

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

$$\Rightarrow \left[12000 \left(1 + \frac{6}{100}\right)^2\right]$$

$$\left[12000 \left(\frac{106}{100}\right)^2\right]$$

$$\left[12000 \times (1.06)^2\right]$$

$$12000 \times 1.1236$$

Amount $\Rightarrow ₹ 13483.2$

$$C.I = A - P = 13483.2 - 12000 = ₹ 1483.2$$

the extra amount to be paid is

$$₹ 1483.2 - 1440 = ₹ 43.20$$

May-22 Sept 2020 Page-8.3

Q.5. Varadaram invested ₹ 60,000 at an Interest rate of 12% per annum compounded half yearly. What amount would he get :-

(i) after 6 months? (ii) after 1 year?

Sol. (i) $P = 60,000$, $R = 12\%$ per annum 6% for half.
Time = 6 months = $\frac{1}{2}$ year $\times 2 = 1$

$$A = P \times \left(1 + \frac{R}{100}\right)^T$$
$$60,000 \times \left(1 + \frac{6}{100}\right)^1$$
$$60,000 \times \frac{106}{100} = ₹ 63,600$$

(b) $P = 60,000$, $R = 12\%$ per annum 6% for half
Time = 1 year $\times 2 = 2$ Years

$$A = P \times \left(1 + \frac{R}{100}\right)^T$$
$$60,000 \times \frac{106}{100} \times \frac{106}{100} = 6 \times 106 \times 106$$
$$= ₹ 67,416$$

Q.6. Anif took a loan of ₹ 80,000 from a bank. If the rate of Int. is 10% per annum, find the difference in amounts he would be paying after $1\frac{1}{2}$ years if the Int. is :-

(i) Compounded annually (ii) Compounded half yearly.

Sol. $P = 80,000$
 $R = 10\%$
 $T = 1\frac{1}{2}$ year

$$(i) A = P \times \left(1 + \frac{R}{100}\right)^T$$
$$\Rightarrow 80,000 \times \left(1 + \frac{10}{100}\right)^{1\frac{1}{2}}$$
$$80,000 \times \left(1 + \frac{10}{100}\right)^1 \left(1 + \frac{5}{100}\right)^1$$
$$80,000 \times \frac{110}{100} \times \frac{105}{100} = 8 \times 110 \times 105$$
$$\Rightarrow ₹ 92,400$$

(ii) $P = 80,000$
 $T = 1\frac{1}{2} = \frac{3}{2} \times 2 = 3$
 $R = 10 \div 2 = 5\%$ for half Year.

$$A = P \times \left(1 + \frac{R}{100}\right)^T$$
$$80,000 \times \left(1 + \frac{5}{100}\right)^3$$
$$80,000 \times \frac{105}{100} \times \frac{105}{100} \times \frac{105}{100}$$
$$\Rightarrow ₹ 92,610$$

Q7. Maria invested ₹ 8000 in business. She would be paid Int. at 5% per annum C. a. Find:-

- (i) The amount credited against her name at the end of the 2nd year.
(ii) The Int. for the third year.

Sol. (i) ^{1st} $P = 8000$, $R = 5\%$, $T = 1$

$$\Rightarrow \text{S. I.} = \frac{P \times R \times T}{100}$$

$$\Rightarrow \frac{8000 \times 5 \times 1}{100} \Rightarrow ₹ 400$$

$$\text{2nd} = P = 8000 + 400 = 8400$$

$$I \Rightarrow \frac{P \times T \times R}{100} = \frac{8400 \times 1 \times 5}{100}$$

$$\Rightarrow ₹ 420$$

$$\text{3rd year} = P = 8400 + 420 = ₹ 8820$$

$$\text{Int.} = \frac{P \times T \times R}{100} = \frac{8820 \times 1 \times 5}{100}$$

$$\frac{₹ 882 \times 5}{2} = ₹ 441$$

Q8. Find the amount and the C. I. on ₹ 10,000 for $1\frac{1}{2}$ years at 10% per annum, compounded half yearly.

Would this interest be more than the int. he would get if it was compounded annually?

Sol

$$P = 10,000, R = 10\% \text{ per annum } 5\% \text{ per half Year.}$$

$$T = 1\frac{1}{2} \times 2 = 3 \text{ years}$$

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

$$\Rightarrow 10,000 \times \left(1 + \frac{5}{100}\right)^3$$

$$10,000 \times \frac{105}{100} \times \frac{105}{100} \times \frac{105}{100}$$

$$\text{Amount} \Rightarrow \text{₹ } 11576.25$$

$$\text{C. Int.} \Rightarrow A - P$$

$$\Rightarrow 11576.25 - 10,000$$

$$\Rightarrow \text{₹ } 1576.25$$

$$(iii) 10,000 \times \left(1 + \frac{10}{100}\right)^{1\frac{1}{2}}$$

$$10,000 \times \left(\frac{110}{100}\right)^1 \times \left(\frac{105}{100}\right)^{\frac{1}{2}}$$

$$10,000 \times \frac{110}{100} \times \frac{105}{100}$$

$$\text{Amount} \Rightarrow \text{₹ } 11550$$

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

$$\Rightarrow 11550 - 10,000$$

$$\Rightarrow \text{₹ } 1550.$$

Q9. Find the amount which Ram will get on ₹ 4096. if he gave it for 18 months at $12\frac{1}{2}\%$ per annum, interest being compounded half yearly.

Sol. $P = 4096$

$$T = 18 \text{ month} \times 2 = \frac{36}{12} = 3 \text{ years}$$

$$R = 12\frac{1}{2}\% = \frac{25}{2} \times \frac{1}{2} = \frac{25\%}{4} = 6.25\%$$

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

$$\Rightarrow 4096 \times \left(1 + \frac{25}{400}\right)^3$$

$$\Rightarrow 4096 \times \frac{425}{400} \times \frac{425}{400} \times \frac{425}{400}$$

$$\Rightarrow \text{₹ } 4913.$$

Q10. The population of a place increased to 54000 in 2003 at a rate of 5% per annum.

- (i) Find the population in 2001.
(ii) What would be its population in 2005?

Sol. (i) population = 2003 = $P_1 = 54000$
 $R = 5\%$

find = 2001 = $P_0 = ?$
 $n = 2$

$$P_1 = P_0 \left(1 + \frac{R}{100}\right)^n$$

Q10. The population of a place in

$$\frac{54000}{2000} = P_0 \left(\frac{1 + 5}{100} \right)^2$$

$$54000 = P_0 \left(\frac{105}{100} \right)^2$$

$$54000 = P_0 \times \frac{105}{100} \times \frac{105}{100}$$

$$P_0 = 54000 \times \frac{20}{21} \times \frac{20}{21}$$

$$P_0 = \frac{54000 \times 400}{441}$$

$$P_0 = 48980 \text{ Approx.}$$

question 10 part (ii)

(ii) 2003 population in 2003 = 54000 P_0
population in 2005 = ? $\rightarrow P_1$

$R = 5\%$ increase

$T = n = 2$

$$P_1 = P_0 \left(1 + \frac{R}{100} \right)^n$$

$$P_1 = 54000 \left(1 + \frac{5}{100} \right)^2$$

$$P_1 = 54000 \times \frac{105}{100} \times \frac{105}{100}$$

$$P_1 \Rightarrow 54 \times 105 \times 105$$

$$P_1 \Rightarrow 59535$$

Q11. In a laboratory, the count of bacteria in a certain experiment was increasing at the rate of 2.5% per hour find the bacteria at the end of 2 hours if the count was initially 5,06,000

Sol.

$$P_0 = 5,06,000$$
$$R = 2.5\%$$
$$T = n = 2$$
$$P_1 = ?$$
$$P_1 = P_0 \left(1 + \frac{R}{100} \right)^n$$

$$P_1 = 5,06,000 \left(1 + \frac{2.5}{100}\right)^2$$

$$P_1 = 5,06,000 \times \frac{102.5}{100} \times \frac{102.5}{100}$$

$$\Rightarrow 5,31,616.16 \text{ Approx.}$$

Q12. A scooter was bought at ₹ 42000. Its value depreciated at the rate of 8% per annum. find its value after one year.

Sol.

$$P_0 = 42000$$
$$r = 8\% \text{ Dep.}$$
$$n = 1$$
$$P_1 = ?$$

$$P_1 = P_0 \left(\frac{100 - R}{100} \right)^n$$

$$P_1 = 42000 \left(\frac{100 - 8}{100} \right)^1$$

$$P_1 \Rightarrow 42000 \times \frac{92}{100} \Rightarrow ₹ 38640$$