

Marks : 40	SYJC March' 19 Subject : MATHS – II Ratio, Proportion & Partnership / Commission, Brokerage & Discount	Duration : 1.5 Hours Solution
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Q.1. Attempt any Two : (2 marks each)**(04)**

1. We assume that Alex spent ₹ x during June 2010 on food items.

∴ We have 20 : x = 12 : 900

$$\therefore \frac{20}{x} = \frac{12}{900}$$

$$\therefore \frac{x}{20} = \frac{900}{12}$$

$$\therefore x = \frac{900}{12} \times 20$$

$$\therefore x = 1,500$$

Thus, Alex's expenditure on food items during June 2010 must be ₹ 1,500.

2. Let total strength of the class be x students, Now, 70% are boys.

∴ Boys are $\frac{70x}{100} = \frac{7x}{10}$ and 30% are girls.

∴ Girls are $\frac{30x}{100} = \frac{3x}{10}$

Now 16 boys and 8 girls are added.

∴ Boys are $\frac{7x}{10} + 16$ and girls are $\frac{3x}{10} + 8$

Their ratio is 11 : 5. Thus, we get

$$\frac{\frac{7x}{10} + 16}{\frac{3x}{10} + 8} = \frac{11}{5}$$

$$\therefore 5 \left[\frac{7x}{10} + 16 \right] = 11 \left[\frac{3x}{10} + 8 \right]$$

$$\therefore \frac{35x}{10} + 80 = \frac{33x}{10} + 88$$

$$\therefore \frac{35x}{10} - \frac{33x}{10} = 88 - 80$$

$$\therefore x = 8$$

$$\therefore x = 8 \times \frac{10}{2}$$

$$\therefore x = 40$$

$$\therefore \text{Number of boys} = \frac{7}{10} \times 40 = 28$$

$$\therefore \text{Number of girls} = \frac{3}{10} \times 40 = 12$$

∴ Originally, there were 28 boys and 12 girls.

3. Let the income of Oliver be ₹ x.

$$\text{Number, the expenditure on conveyance} = x \times \frac{15}{100}$$

But it is ₹ 1,800

$$\therefore 1,800 = \frac{15x}{100}$$

$$\therefore x = \frac{1800 \times 100}{15}$$

$$\therefore x = ₹ 12,000$$

Expenditure on food is 30% of total income ₹ 12,000.

$$\begin{aligned} \therefore \text{expenditure on food} &= 12,000 \times \frac{30}{100} \\ &= ₹ 3,600 \end{aligned}$$

Hence, Oliver spends ₹ 3600 in food.

Alternative Method:

Ration of expenditure on food and conveyance is

$$30\% : 15\% \Rightarrow 30 : 15 \Rightarrow 2 : 1.$$

Let ₹ x be spent on food.

\therefore ratio of amount spent on food and conveyance is x : 1,800

$$\therefore 2 : 1 = x : 1,800$$

$$\therefore \frac{2}{1} = \frac{x}{1800}$$

$$\therefore x = 2 \times 1,800$$

$$\therefore x = ₹ 3,600.$$

4. Since capital invested are same for all the 3 partners, hence profits will be distributed in proportion of the time period for which capitals are invested. Since periods are 12 months, 9 months and 5 months respectively.

\therefore Profit will be divided in the ratio 12: 9 : 5.

$$\text{Also } 12 + 9 + 5 = 26$$

Share of Ameena in the profit

$$\frac{12}{26} = x \quad 23,400 = ₹ 10,800.$$

Share of Yasmin in the profit

$$\frac{9}{26} = x \quad 23,400 = ₹ 8,100.$$

Share of Shabana in the profit

$$\frac{5}{26} = x \quad 23,400 = ₹ 4,500.$$

\therefore Ameena's profit, Yasmin's profit and Shabana's profit are ₹ 10,800, ₹ 8,100 and ₹ 4,500 respectively.

Q.2. Attempt any Four : (3 marks each)

(12)

1. Gopal invested ₹ 30,000 for 12 months.

Adam invested ₹ 40,000 for 6 months.

Salim invested ₹ 50,000 for 3 months.

Since capitals and periods both are different. Profit is distributed in the ratio of the product of the capital and respective period.

∴ Profit is distributed in the proportion of
 $30,000 \times 12 : 40,000 \times 6 : 50,000 \times 3$

i.e. in the proportion of

$$3 \times 12 : 4 \times 6 : 5 \times 3$$

i.e. in the proportion of

$$12 : 8 : 5$$

Also, $12 + 8 + 5 = 25$

∴ Gopal's share in the profit

$$= \frac{12}{25} \times 17,500 = ₹ 8,400$$

∴ Adam's share in the profit

$$\frac{8}{25} \times 17,500 = ₹ 5,600$$

∴ Salim's share in the profit

$$= \frac{5}{25} \times 17,500 = ₹ 3,500.$$

2. Let period of A's capital be x months.

Since ratio of their capital is 5 : 6.

∴ Let A's capital be 5y and B's capital be 6y

∴ A invested 5y for x months.

B invested 6y for 20 months.

Profit is distributed in the ratio

$$5y \times x : 6y \times 20$$

But given ratio of the profit is 5 : 4

$$\therefore \frac{5y \times x}{6y \times 20} = \frac{5}{4}$$

$$\therefore \frac{5x}{6 \times 20} = \frac{5}{4}$$

$$\therefore 5^x = \frac{5 \times 6 \times 20}{4}$$

$$\therefore x = \frac{5 \times 6 \times 20}{4 \times 5}$$

$$\therefore x = 30$$

∴ A invested the capital for 30 months.

3. Amit invested ₹ 20,000. After 3 months he withdrew ₹ 5,000.

∴ he invested $(20,000 - 5,000) = 15,000$ for rest 9 months.

Rohit invested ₹ 20,000. After 3 months he added ₹ 5,000.

∴ he invested $(20,000 + 5,000) = 25,000$ for rest 9 months.

Since, the period of investments of both is 9 months, the profit of ₹ 12,800 is dividend between them in the proportion to their investments, i.e., in the proportion to $(20,000 \times 3) + (15,000 \times 9) : (20,000 \times 3) + (25,000 \times 9)$

$$\Rightarrow (60,000 + 1,35,000) : (60,000 + 2,25,000)$$

$$\Rightarrow 1,95,000 : 2,85,000$$

$$\Rightarrow 39 : 57$$

Now, total share = $39 + 57 = 96$

$$\therefore \text{Amit's share in the profit} = \frac{39}{96} \times 12,800 = ₹ 5,200$$

$$\therefore \text{Rohit's share in the profit} = \frac{57}{96} \times 12,800 = ₹ 7,600$$

Hence, the shares in profit of Amit and Rohit are ₹ 5,200 and ₹ 7,600 respectively.

Alternative Method: According to given data we prepare the following table:

Partner	Capital Invested	Period of Investment	Equivalent Capital
Amit	20,000	3	60,000 + 1,35,000
	15,000	9	= 1,95,000
Rohit	20,000	3	60,000 + 2,25,000
	25,000	9	= 2,85,000
Total	-	-	4,80,000

\therefore Amit's share in profit

$$= \frac{195000}{480000} \times 12,800 = \frac{39}{96} \times 12,800 = ₹ 5,200$$

Rohit's share in profit

$$= \frac{285000}{480000} \times 12,800 = \frac{57}{96} \times 12,800 = ₹ 7,600.$$

4. The ratio of capitals invested by Mr. Natarajan and Mr. Gopalan is 4 : 5.
Mr. Gopalan invested capital for 16 months.

Let the period of investment by Mr. Natarajan be x months.

Let Mr. Natarajan's capital be ₹ 4 and Mr. Gopalan's capital be ₹ 5.

Thus, Mr. Natarajan invested ₹ 4 for x months
and Mr. Gopalan invested ₹ 5 for 16 months.

\therefore profit is distributed in the ratio 4x : 80

But the given ratio of profit is 5 : 4

$$\therefore \frac{4x}{80} = \frac{5}{4}$$

$$\therefore 4x = \frac{5 \times 80}{4}$$

$$\therefore 4x = 100$$

$$\therefore x = 25$$

Hence, Mr. Natarajan invested the capital for 25 months.

5. The capitals of three partners A, B and C are in the ratio 4 : 3 : 3.

Net amount realised of the assets of the company

$$= (\text{Sale value of asset}) - (\text{Payment of liabilities}) - (\text{Realisation expenses})$$

$$= 400000 - 60000 - 4000 = ₹ 336000$$

This amount is distributed in the proportion to their capitals i.e., 4 : 3 : 3.

Also total share = 4 + 3 + 3 = 10

$$\text{A's share in the final settlement} = \frac{4}{10} \times 336000 = ₹ 134400$$

$$\text{B's share in the final settlement} = \frac{3}{10} \times 336000 = ₹ 100800$$

$$C's \text{ share in the final settlement} = \frac{3}{10} \times 336000 = ₹ 100800$$

Hence, as final settlement after dissolution each partner A, B, C gets ₹ 134400, ₹ 100800 and ₹ 100800 respectively.

Q.3. Attempt any One : (4 marks each) :**(04)**

1. Mr. Ahuja invested ₹ 75,000 for 5 months and ₹ 80,000 for 7 months.

Mr. Sinha invested ₹ 50,000 for 5 months and ₹ 40,000 for 7 months.

∴ Profit is distributed in the ratio

$$(75,000 \times 5 + 80,000 \times 7) : (50,000 \times 5 + 40,000 \times 7)$$

i.e. in the ratio

$$(75 \times 5 + 80 \times 7) : (50 \times 5 + 40 \times 7)$$

i.e. in the ratio $(75 + 16 \times 7) : (50 + 8 \times 7)$

i.e. in the ratio $(75 + 112) : (50 + 56)$

i.e. in the ratio 187: 106

Also, $187 + 106 = 293$

$$\therefore \text{Ahuja's share in the profit} = \frac{187}{293} \times 11720$$

$$= ₹ 7,480$$

$$\therefore \text{Sinha's share in the profit} = \frac{106}{293} \times 11720$$

$$= ₹ 4,240.$$

Ahuja's share in profit is ₹ 7,480 and that of Mr. Sinha's is ₹ 4,240.

2. Since capitals invested by P and Q are in the ratio 4: 3.

∴ Let P's capital initially be ₹ 4x for 9 months and Q's capital initially be ₹ 3x for 9 months.

$$\text{Now } 25\% \text{ of } 4x = \frac{4x \times 25}{100} = ₹ x$$

P withdrew ₹ x from his earlier capital (i.e. 4x) for next 3 months.

Q added ₹ x in his earlier capital (i.e. 3x) for next 3 months.

∴ for next 3 months

P's capital is ₹ $(4x - x) = 3x$ and

Q's capital is ₹ $(3x + x) = ₹ 4x$

∴ Profit is distributed in the ratio

$$(4x \times 9 + 3x \times 3) : (3x \times 9 + 4x \times 3)$$

i.e. in the ratio $(36x + 9x) : (27x + 12x)$

i.e. in the ratio 45x: 39x

i.e. in the ratio 15 : 13 (dividing by 3x)

Also $15 + 13 = 28$.

Now given that P's profit is ₹ 15,450.

∴ P's share in the profit

$$= \frac{15}{28} \times (\text{Total Profit})$$

$$\therefore 15,450 = \frac{15}{28} \times (\text{Total Profit})$$

∴ Total profit = ₹ 28,840

$$\text{Now Q's share in profit} = \frac{13}{28} \times 28,840$$

$$= \frac{13}{28} \times 28,840$$

$$= ₹ 13,390$$

∴ Total profit is = ₹ 28,840
Q's share in the profit ₹ 13,390.

3. Amar spend 90% of his salary.
∴ Amar saves 10% of his salary.
Similarly, Akbar and Anthony spend 80% and 70% of their salaries.
∴ Akbar saves 20% of his salary and Anthony saves 30% of his salary.
But, their savings are in the ratio 3 : 4 : 7.
∴ 10% of Amar's salary : 20% of Akbar's salary : 30% of Anthony's salary
= 3 : 4 : 7
∴ 10% of Amar's salary : 20% of Akbar's salary = 3 : 4

$$\frac{10}{100} = \frac{3}{4}$$

$$\therefore \frac{100}{20} = \frac{3}{4}$$

$$\therefore \frac{\text{Amar's salary}}{2 \text{ Akbar's salary}} = \frac{3}{4}$$

$$\therefore \frac{\text{Amar's salary}}{\text{Akbar's salary}} = \frac{6}{4} = \frac{18}{12} \quad \dots(1)$$

Similarly, $\frac{20\% \text{ of Amar's salary}}{30\% \text{ of Anthony's salary}} = \frac{4}{7}$

$$\therefore \frac{2(\text{Akbar's salary})}{3(\text{Anthony's salary})} = \frac{4}{7}$$

$$\therefore \frac{\text{Akbar's salary}}{\text{Anthony's salary}} = \frac{4 \times 3}{7 \times 2} = \frac{6}{7} = \frac{12}{14}$$

From (1) and (2), we get
Amar's salary : Akbar's salary : Anthony's salary
= 18 : 12 : 14
= 9 : 6 : 7

But, their total monthly salaries together is 66,000

$$\therefore \text{Amar's salary} = \frac{9}{22} \times 66,000 = 27,000 \text{ ₹}$$

$$\text{Akbar's salary} = \frac{6}{22} \times 66,000 = 18,000 \text{ ₹}$$

$$\text{Anthony's salary} = \frac{7}{22} \times 66,000 = 21,000 \text{ ₹}$$

Hence, salaries of Amar, Akbar and Anthony are ₹27,000, ₹18,000 and ₹21,000 respectively.

Q.4. Solve any Two : (2 Marks each)

(04)

1. Here, P = 5000, n = 4 months = $\frac{1}{3}$ year, r = 12.5%

$$\text{Now, sum due} = P \left(1 + \frac{nr}{100} \right)$$

$$= 5000 \times \left(1 + \frac{\frac{1}{3} \times 12.5}{100} \right)$$

$$= 5000 \times \left(1 + \frac{125}{3000} \right)$$

$$= 5000 \times \left(1 + \frac{1}{24} \right)$$

$$= 5000 \times \frac{25}{24} = \frac{125000}{24}$$

$$= 5208.33 = 5208.30$$

Hence, the sum due is ₹ 5,208.30.

2. Agent's commission at 7% on ₹ 20800

$$= 20800 \times \frac{7}{100} = ₹ 1456$$

Rate of del credere = 1.5%

Amount of del credere at 1.5% on ₹ 20800

$$= 20800 \times \frac{15}{10} \times \frac{1}{100} = \frac{3120}{10}$$

$$= ₹ 312$$

∴ agent's total commission

$$= ₹ (1456 + 312)$$

$$= ₹ 1768$$

Earning of the merchant

$$= ₹ (20800 - 1768)$$

$$= ₹ 19,032.$$

3. **Salesman's income :**

Total sales = ₹ 35,000

4% commission on the sales up to ₹ 10,000

∴ commission on the sales of ₹ 10,000

$$= 10,000 \times \frac{4}{100} = ₹ 400$$

5% commission on the remaining sales of ₹ (35,000 - 10,000 =) 25,000

∴ commission on the sales of ₹ 25,000

$$= 25,000 \times \frac{5}{100} = ₹ 1,250$$

∴ salesman's total income

$$= ₹ (400 + 1,250)$$

$$= ₹ 1,650$$

4. Given : True discount = ₹ 600, $r = 16\%$

$$n = 9 \text{ months} = \frac{9}{12} = \frac{3}{4} \text{ year}$$

$$\text{Now, True discount} = \frac{PW \times n \times r}{100}$$

$$\therefore 600 = \frac{PW \times \frac{3}{4} \times 16}{100}$$

$$\therefore 600 \times 100 = PW \times 12$$

$$\therefore PW = \frac{600 \times 100}{12}$$

$$\therefore PW = ₹ 5,000$$

Hence, present worth of the bill is ₹ 5,000.

$$\begin{aligned} \text{Sum due} &= PW + TD \\ &= 5,000 + 600 \\ &= ₹ 5,600 \end{aligned}$$

Hence, the sum due of the bill is ₹ 5,600.

Q.5. Solve any Four : (3 Marks each)**(12)**

1. Let the sales made by Sudha in a certain month be ₹ x over ₹ 10,000.

Sudha gets commission at 8%.

She gets salary of ₹ 1,500 and she receives ₹ 4,500 in a certain month.

$$\therefore \text{Sudha's commission} = ₹ 4,500 - 1,500 = ₹ 3,000$$

$$\therefore 3,000 = x \times \frac{8}{100}$$

$$\therefore x = \frac{3,000 \times 100}{8}$$

$$\therefore x = ₹ 37,500$$

Hence, the sales made by Sudha in that month = ₹ (10,000 + 37,500 =) 47,500.

2. Let the cost of one book is = ₹ x

$$\therefore \text{the cost of 20 books} = ₹ 20x$$

Now, cost of 20 books is same as the cost of 21 books.

\therefore Interest on ₹ 20x for 6 months at the rate r% will be same as the cost of one book.

$$\therefore x = 20x \times \frac{1}{2} \times \frac{r}{100}$$

$$\therefore 1 = \frac{10r}{100}$$

$$\therefore 100 = 10r$$

$$\therefore r = \frac{100}{10} = 10$$

Hence, the rate of interest is 10% per annum.

3. Present worth = ₹ 5,500,

Sum due = ₹ 5,830,

$$\text{Period } n = 9 \text{ months} = \frac{9}{12} = \frac{3}{4} \text{ year}$$

Now, Sum due = Present worth $\left(1 + \frac{n \times r}{100}\right)$

$$\therefore 5,830 = 5500 \left(1 + \frac{3r}{4 \times 100}\right)$$

$$\therefore \frac{5,830}{5,500} = 1 + \frac{3r}{400}$$

$$\therefore \frac{5,830}{5,500} - 1 = \frac{3r}{400}$$

$$\therefore \frac{5,830 - 5,500}{5,500} = \frac{3r}{400}$$

$$\therefore \frac{330}{5,500} = \frac{3r}{400}$$

$$\therefore 0.06 \times 400 = 3r$$

$$\therefore 24 = 3r$$

$$\therefore r = \frac{24}{3} = 8$$

Hence, the rate of interest is 8% p.a.

4. Given : Face Value (FV) of the bill = ₹ 4,015, $r = 8\%$.

Date of drawing = 19th Jan. 2006

Period of the bill = 9 months

Nominal due date = 19th Sept. 2006

Legal due date = 22nd Sept. 2006

Date of discount = 28th Feb. 2006

\therefore number of days from the date of discounting to the legal date is as follows :

Mar.	Apr.	May	June	July	Aug.	Sept.	Total
31	30	31	30	31	31	22	206

$$\therefore \text{Period } n = \frac{206}{365}$$

BD = Interest on FV ₹ 4,015 for 206 days at 8%

$$\begin{aligned} \therefore \text{BD} &= \frac{\text{FV} \times n \times r}{100} \\ &= 4015 \times \frac{206}{365} \times \frac{8}{100} \\ &= \frac{11 \times 206 \times 8}{100} = \frac{18128}{100} \end{aligned}$$

$$\therefore \text{BD} = 181.28$$

Hence, banker's discount is ₹ 181.28.

Cash Value of the bill :

$$\begin{aligned} \text{CV} &= \text{FV} - \text{BD} \\ &= 4015 - 181.28 \end{aligned}$$

$$\therefore \text{CV} = 3833.72$$

Hence, cash value is ₹ 3,833.72.

5. Let the fixed monthly salary of the salesman = ₹ x and the rate of commission = $r\%$.

Now, the receipt on the first month's sale of ₹ 64000 is ₹ 10650.

$$\therefore 10650 = x + 64000 \times \frac{r}{100}$$

$$\therefore 10650 = x + 640r \quad \dots\dots\dots (1)$$

The receipt on the second month's sales of ₹ 72000 is ₹ 11450.

$$\therefore 11450 = x + 72000 \times \frac{r}{100}$$

$$\therefore 11450 = x + 720r \quad \dots\dots\dots (2)$$

Subtracting (1) from (2), we get
 $800 = 80r$

$$\therefore r = \frac{800}{80}$$

$$\therefore r = 10\%$$

Putting $r = 10$ in (1), we get

$$10650 = x + 640 \times 10$$

$$\therefore 10650 - 6400 = x$$

$$\therefore x = 4250$$

Hence, the fixed monthly salary of the salesman is ₹ 4,250 and the rate of commission is 10%.

Q.6. Solve any One : (4 Marks each)

(04)

1. Given : Cash Value (CV) = ₹ 5,496, $r = 14\%$.

Let the Face Value (FV) or SD of the bill = ₹ x .

Date of bill = 28th Feb. 2007

Period of the bill = 8 months

Nominal due date = 28th Oct. 2007

Legal due date = 31st Oct. 2007

Date of discount = 26th March 2007

\therefore number of days from the date of discounting to the legal date is as follows :

Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
5	30	31	30	31	31	30	31	219

$$\therefore \text{Period } n = \frac{219}{365} \text{ year}$$

$$\begin{aligned} \text{Now, BD} &= \text{FV} - \text{CV} \\ &= x - 5496 \end{aligned}$$

$$\begin{aligned} \text{Also BD} &= \frac{\text{FV} \times n \times r}{100} \\ &= x \times \frac{219}{365} \times \frac{14}{100} = \frac{3066x}{36500} \end{aligned}$$

$$\therefore x - 5496 = \frac{3066x}{36500}$$

$$\therefore 36500(x - 5496) = 3066x$$

$$\therefore 36500x - (36500 \times 5496) = 3066x$$

$$\therefore 36500x - 3066x = 36500 \times 5496$$

$$\therefore x = \frac{36500 \times 5496}{33434}$$

$$\therefore x = \frac{500 \times 5496}{458}$$

$$\therefore x = 500 \times 12$$

$$\therefore x = 6000$$

Hence, the face value of the bill is ₹ 6,000.

2. Let the list price of 50 books be ₹ x.

∴ trade discount at 15% on ₹ x

$$= x \times \frac{15}{100} = ₹ \frac{3x}{20}$$

∴ invoice price = List price – Trade discount

$$= x - \frac{3x}{20} = \frac{20x - 3x}{20} = \frac{17x}{20}$$

But, invoice price of 50 books is ₹ 1,530.

$$\therefore 1530 = \frac{17x}{20}$$

$$\therefore 1530 \times 20 = 17x$$

$$\therefore x = \frac{30600}{17}$$

$$\therefore x = 1800$$

∴ list price of 50 books is ₹ 1,800.

∴ list price of one book is $\frac{1800}{50} = ₹ 36$

3. Let the catalogue price of a radio = ₹ x.

Discount at 25% on ₹ x = $x \times \frac{25}{100} = ₹ \frac{x}{4}$.

∴ selling price of the radio

$$= ₹ \left[x - \frac{x}{4} \right] = ₹ \frac{3x}{4}$$

If the cost price is = ₹ 100, making 20% profit the selling price is = ₹ 120.

When the selling price is ₹ 120, the cost price is ₹ 100 then when the selling price is

$$₹ \frac{3x}{4} \text{ the cost price is } = \frac{100 \times \frac{3x}{4}}{120} = ₹ \frac{75x}{120}$$

He gains profit or ₹ 160 per radio.

Now, Profit = Selling price – Cost price

$$\therefore 160 = \frac{3x}{4} - \frac{75x}{120}$$

$$\therefore 160 = \frac{90x - 75x}{120}$$

$$\therefore 160 \times 120 = 15x$$

$$\therefore x = \frac{160 \times 120}{15}$$

$$\therefore x = ₹ 1280$$

Hence, the catalogue price of the radio is ₹ 1,280.

