14 Partnership

IMPORTANT FACTS

I. Partnership: When two or more than two persons run a business jointly, they are called partners and the deal is known as partnership.

II. Ratio of Division of Gains:

***(i)* Simple Partnership:** *A simple partnership is the one in which the capitals of all the partners are invested for the same time.*

In this partnership, the gain or loss is distributed among the partners in the ratio of their investments.

Suppose A and B invest ₹ x and ₹ y respectively for a year in a business, then at the end of the year:

(A's share of profit) : (B's share of profit) = $x : y$.

***(ii)* Compound Partnership:** *A compound partnership is the one in which the capitals of the partners are invested for different time periods.*

In this partnership, the equivalent capitals are calculated for a unit of time by taking (capital × number of units of time). Now, gain or loss is divided in the ratio of these capitals.

Suppose A invests ₹ x for p months and B invests ₹ y for q months, then

(A's share of profit) : (B's share of profit) = $xp : yq$.

III. Working and Sleeping Partners: *A partner who manages the business is known as a working partner and the one who simply invests the money is a sleeping partner.*

SOLVED EXAMPLES

Ex. 1. ***A, B and C started a business by investing ₹ 120000, ₹ 135000 and ₹ 150000 respectively. Find the share of each, out of an annual profit of ₹ 56700.***

Sol. Ratio of shares of A, B and C = Ratio of their investments

$$= 120000 : 135000 : 150000 = 8 : 9 : 10.$$

$\therefore$ A's share $= ₹\left(56700 \times \frac{8}{27}\right) = ₹\ 16800$; B's share $= ₹\left(56700 \times \frac{9}{27}\right) = ₹\ 18900$;

C's share $= ₹\left(56700 \times \frac{10}{27}\right) = ₹\ 21000.$

Ex. 2. ***Alfred started a business investing ₹ 45000. After 3 months, Peter joined him with a capital of ₹ 60000. After another 6 months, Ronald joined them with a capital of ₹ 90000. At the end of the year, they made a profit of ₹ 16500. Find the share of each.***

Sol. Clearly, Alfred invested his capital for 12 months, Peter for 9 months and Ronald for 3 months.

So, ratio of their capitals = (45000 × 12) : (60000 × 9) : (90000 × 3)

$$= 540000 : 540000 : 270000 = 2 : 2 : 1.$$

$\therefore$ Alfred's share $= ₹\left(16500 \times \frac{2}{5}\right) = ₹\ 6600$; Peter's share $= ₹\left(16500 \times \frac{2}{5}\right) = ₹\ 6600$;

Ronald's share $= ₹\left(16500 \times \frac{1}{5}\right) = ₹\ 3300.$

Ex. 3. ***A, B and C start a business each investing ₹ 20000. After 5 months A withdrew ₹ 5000, B withdrew ₹ 4000 and C invests ₹ 6000 more. At the end of the year, a total profit of ₹ 69900 was recorded. Find the share of each.*** **(SNAP, 2005)**

Sol. Ratio of the capitals of A, B and C

$= 20000 \times 5 + 15000 \times 7 : 20000 \times 5 + 16000 \times 7 : 20000 \times 5 + 26000 \times 7$

$= 205000 : 212000 : 282000 = 205 : 212 : 282.$

$\therefore$ A's share $= ₹\left(69900 \times \frac{205}{699}\right) = ₹\ 20500$; B's share $= ₹\left(69900 \times \frac{212}{699}\right) = ₹\ 21200$;

C's share $= ₹\left(69900 \times \frac{282}{699}\right) = ₹\ 28200.$

Ex. 4. ***A, B and C enter into partnership. A invests 3 times as much as B invests and B invests two-thirds of what C invests. At the end of the year, the profit earned is ₹ 6600. What is the share of B?***

Sol. Let C's capital = ₹ x. Then, B's capital = ₹ $\frac{2}{3}x$. A's capital $= ₹\left(3 \times \frac{2}{3}x\right) = ₹\ 2x.$

$\therefore$ Ratio of their capitals $= 2x : \frac{2}{3}x : x = 6 : 2 : 3.$

Hence, B's share $= ₹\left(6600 \times \frac{2}{11}\right) = ₹\ 1200.$

Ex. 5. ***A, B and C enter into a partnership with capitals in the ratio*** $\frac{7}{2} : \frac{4}{3} : \frac{6}{5}$. ***After 4 months A increases his share of capital by 50%. If at the end of the year the total profit earned is ₹ 2430, find the share of each in the profit.***

Sol. Ratio of capitals $= \frac{7}{2} : \frac{4}{3} : \frac{6}{5} = \left(\frac{7}{2} \times 30\right) : \left(\frac{4}{3} \times 30\right) : \left(\frac{6}{5} \times 30\right) = 105 : 40 : 36.$

Let the initial capitals of A, B and C be ₹ 105 x, ₹ 40 x and ₹ 36 x respectively.

Then, ratio of profits $= [105x \times 4 + (150\% \text{ of } 105x) \times 8] : (40x \times 12) : (36x \times 12)$

$= 1680 : 480 : 432 = 35 : 10 : 9.$

$\therefore$ A's share $= ₹\left(2430 \times \frac{35}{54}\right) = ₹\ 1575$; B's share $= ₹\left(2430 \times \frac{10}{54}\right) = ₹\ 450$;

C's share $= ₹\left(2430 \times \frac{9}{54}\right) = ₹\ 405.$

Ex. 6. ***A, B and C enter into partnership with capitals of ₹ 25000, ₹ 30000 and ₹ 15000 respectively. A is the working partner and he gets 30% of the profit for managing the business. The balance profit is distributed in proportion to the capital investment. At the year-end, A gets ₹ 200 more than B and C together. Find the total profit and the share of each.***

Sol. Let the total profit be ₹ x.

Amount obtained by A for managing $= ₹\left(\frac{30x}{100}\right) = ₹\left(\frac{3x}{10}\right).$

Balance profit $= ₹\left(x - \frac{3x}{10}\right) = ₹\left(\frac{7x}{10}\right).$

Ratio of capitals $= 25000 : 30000 : 15000 = 5 : 6 : 3.$

$\therefore$ A's share $= ₹\left[\left(\frac{7x}{10} \times \frac{5}{14}\right) + \frac{3x}{10}\right] = ₹\left(\frac{11x}{20}\right)$; B's share $= ₹\left(\frac{7x}{10} \times \frac{6}{14}\right) = ₹\left(\frac{3x}{10}\right)$;

C's share $= ₹\left(\frac{7x}{10} \times \frac{3}{14}\right) = ₹\left(\frac{3x}{20}\right).$

$\therefore \quad \frac{3x}{10}+\frac{3x}{20}+200=\frac{11x}{20} \Rightarrow x=2000.$

So, total profit = ₹ 2000.

$\therefore$ A's share = ₹ $\left(\frac{11\times2000}{20}\right)$ = ₹ 1100; B's share = ₹ $\left(\frac{3\times2000}{10}\right)$ = ₹ 600;

C's share = ₹ $\left(\frac{3\times2000}{20}\right)$ = ₹ 300.

Ex. 7. ***Four milkmen rented a pasture. A grazed 24 cows for 3 months; B 10 cows for 5 months; C 35 cows for 4 months and D 21 cows for 3 months. If A's share of rent is ₹ 720, find the total rent of the field.***

Sol. Ratio of shares of A, B, C, D = (24 × 3) : (10 × 5) : (35 × 4) : (21 × 3)
= 72 : 50 : 140 : 63.

Let total rent be ₹ x. Then, A's share = ₹ $\frac{72x}{325}$.

$\therefore \quad \frac{72x}{325}=720 \Leftrightarrow x=\frac{720\times325}{72}=3250.$

Hence, total rent of the field is ₹ 3250.

Ex. 8. ***Two persons A and B take a field on rent. A put on it 21 horses for 3 months and 15 cows for 2 months; B puts 15 cows for 6 months and 40 sheep for $7\frac{1}{2}$ months. If, in one day, 3 horses eat as much as 5 cows eat and 6 cows as much as 10 sheep, what part of the rent should A pay?***

Sol. 6 cows ≡ 10 sheep $\Rightarrow$ 1 cow ≡ $\frac{5}{3}$ sheep.

3 horses ≡ 5 cows $\Rightarrow$ 1 horse ≡ $\frac{5}{3}$ cows ≡ $\left(\frac{5}{3}\times\frac{5}{3}\right)$ sheep ≡ $\frac{25}{9}$ sheep.

$\therefore$ Ratio of shares of A and B

$=\left[\left(21\times\frac{25}{9}\times3\right)+\left(15\times\frac{5}{3}\times2\right)\right]:\left[\left(15\times\frac{5}{3}\times6\right)+\left(40\times\frac{15}{2}\right)\right]$ = 225 : 450 = 1 : 2.

Hence, part of the rent paid by A = $\frac{1}{3}$.

Ex. 9. ***A, B and C took a house on rent for one year for ₹ 13824. They remained together for 4 months and then C left the house. After 5 more months, B also left the house. How much rent should each pay?***

(S.S.C., 2006)

Sol. Monthly rent = ₹ $\left(\frac{13824}{12}\right)$ = ₹ 1152.

Rent for first 4 months = ₹ (1152 × 4) = ₹ 4608.
It is to be divided equally among A, B and C.

$\therefore$ Share of each = ₹ $\left(\frac{4608}{3}\right)$ = ₹ 1536.

Rent for next 5 months = ₹ (1152 × 5) = ₹ 5760.
It is to be divided equally between A and B.

$\therefore$ Share of each = ₹ $\left(\frac{5760}{2}\right)$ = ₹ 2880.

Rent for last 3 months = ₹ (1152 × 3) = ₹ 3456.
It is to be paid by A only.

$\therefore$ Total rent paid by A = ₹ (1536 + 2880 + 3456) = ₹ 7872.
Total rent paid by B = ₹ (1536 + 2880) = ₹ 4416.
Total rent paid by C = ₹ 1536.

Ex. 10. ***A invested ₹ 76000 in a business. After few months, B joined him with ₹ 57000. At the end of the year, the total profit was divided between them in the ratio 2 : 1. After how many months did B join?***

Sol. Suppose B joined after x months.

Then, B's money was invested for $(12 - x)$ months.

$\therefore \quad \frac{76000 \times 12}{57000 \times (12 - x)} = \frac{2}{1} \Leftrightarrow 912000 = 114000\ (12 - x)$

$\Leftrightarrow 114\ (12 - x) = 912$

$\Leftrightarrow (12 - x) = 8 \quad \Leftrightarrow \quad x = 4.$

Hence, B joined after 4 months.

Ex. 11. ***The ratio of investments of two partners A and B is 11 : 12 and the ratio of their profits is 2 : 3. If A invested the money for 8 months, then for how much time B invested his money?*** **(S.S.C., 2008)**

Sol. Suppose A invested ₹ $11x$ for 8 months and B invested ₹ $12x$ for y months.

Then, $\frac{11x \times 8}{12x \times y} = \frac{2}{3} \quad \Rightarrow \quad 24y = 264 \Rightarrow y = 11.$

Hence, B invested the money for 11 months.

Ex. 12. ***A, B and C are partners in a business. A, whose money has been used for 4 months, claims $\frac{1}{8}$ of the profit. B, whose money has been used for 6 months, claims $\frac{1}{3}$ of the profit. C had invested ₹ 1560 for 8 months. How much money did A and B contribute?***

Sol. Let the total profit be ₹ x.

Then, A's share = ₹ $\frac{x}{8}$; B's share = ₹ $\frac{x}{3}$;

C's share = ₹ $\left[x - \left(\frac{x}{8} + \frac{x}{3}\right)\right]$ = ₹ $\left(x - \frac{11x}{24}\right)$ = ₹ $\left(\frac{13x}{24}\right)$.

$\therefore \quad$ Ratio of shares of A, B and C = $\frac{x}{8} : \frac{x}{3} : \frac{13x}{24} = 3 : 8 : 13.$

Suppose A invested ₹ y for 4 months and B invested ₹ z for 6 months.

Then, $\frac{y \times 4}{1560 \times 8} = \frac{3}{13} \Rightarrow 52y = 37440 \Rightarrow y = 720.$

And, $\frac{z \times 6}{1560 \times 8} = \frac{8}{13} \Rightarrow 78\ z = 99840 \Rightarrow z = 1280.$

Hence, A's contribution = ₹ 720 ; B's contribution = ₹ 1280.

Ex. 13. ***A, B and C enter into a partnership by investing in the ratio of 3 : 2 : 4. After one year, B invests another ₹ 270000 and C, at the end of 2 years, also invests ₹ 270000. At the end of three years, profits are shared in the ratio of 3 : 4 : 5. Find the initial investment of each.***

Sol. Let the initial investments of A, B and C be ₹ $3x$, ₹ $2x$ and ₹ $4x$ respectively.

Then, $(3x \times 36) : [(2x \times 12) + (2x + 270000) \times 24] : [(4x \times 24) + (4x + 270000) \times 12] = 3 : 4 : 5$

$\Leftrightarrow 108x : (72x + 6480000) : (144x + 3240000) = 3 : 4 : 5$

$\therefore \quad \frac{108x}{72x + 6480000} = \frac{3}{4} \Leftrightarrow 432x = 216x + 19440000 \Leftrightarrow 216x = 19440000 \Leftrightarrow x = 90000.$

Hence, A's initial investment = $3x$ = ₹ 270000;

B's initial investment = $2x$ = ₹ 180000;

C's initial investment = $4x$ = ₹ 360000.

Ex. 14. ***A, B and C enter into a partnership. Their capital contribution is in the ratio 21 : 18 : 14. At the end of the business term they share profits in the ratio 15 : 8 : 9. Find the ratio of time for which they invest their capitals.***

Sol. Suppose A, B and C invest ₹ $21x$ for p months, ₹ $18x$ for q months and ₹ $14x$ for r months.

Then, $21x \times p : 18x \times q : 14x \times r = 15 : 8 : 9 \Rightarrow 21p : 18q : 14r = 15 : 8 : 9$.

Now, $\frac{21p}{18q} = \frac{15}{8} \Rightarrow p = \left(\frac{15}{8} \times \frac{18}{21}\right)q = \frac{45}{28}q$. And, $\frac{18q}{14r} = \frac{8}{9} \Rightarrow q = \left(\frac{8}{9} \times \frac{14}{18}\right)r = \frac{56}{81}r$.

$\therefore \quad p = \frac{45}{28}q = \left(\frac{45}{28} \times \frac{56}{81}\right)r = \frac{10}{9}r.$

So, required ratio $= p : q : r = \frac{10}{9}r : \frac{56}{81}r : r = \frac{10}{9} : \frac{56}{81} : 1 = 90 : 56 : 81.$

EXERCISE
(OBJECTIVE TYPE QUESTIONS)

Directions: *Mark* (3) *against the correct answer*:

1. Rahul, Arun and Sumit started a business. Rahul invested $\frac{1}{2}$ part, Arun $\frac{1}{3}$ part and rest of the capital was invested by Sumit. The ratio of their profits will be **(P.C.S., 2006)**

(*a*) 2 : 3 : 1 (*b*) 3 : 2 : 1
(*c*) 2 : 3 : 6 (*d*) 3 : 2 : 5

2. P and Q started a business investing ₹ 85000 and ₹ 15000 respectively. In what ratio the profit earned after 2 years be divided between P and Q respectively?

(*a*) 3 : 4 (*b*) 3 : 5
(*c*) 15 : 23 (*d*) 17 : 23
(*e*) None of these

3. Anand and Deepak started a business investing ₹ 22500 and ₹ 35000 respectively. Out of a total profit of ₹ 13800, Deepak's share is

(*a*) ₹ 5400 (*b*) ₹ 7200
(*c*) ₹ 8400 (*d*) ₹ 9600

4. Samaira, Mahira and Kiara rented a set of DVDs at a rent of ₹ 578. If they used it for 8 hours, 12 hours and 14 hours respectively, what is Kiara's share of rent to be paid? **(Bank P.O., 2008)**

(*a*) ₹ 192 (*b*) ₹ 204
(*c*) ₹ 215 (*d*) ₹ 238
(*e*) None of these

5. P, Q and R invested ₹ 45000, ₹ 70000 and ₹ 90000 respectively to start a business. At the end of 2 years, they earned a profit of ₹ 164000. What will be Q's share in the profit? **(Bank P.O., 2009)**

(*a*) ₹ 36000 (*b*) ₹ 56000
(*c*) ₹ 64000 (*d*) ₹ 72000
(*e*) None of these

6. Prakash, Sachin and Anil started a business jointly investing ₹ 11 lakh, ₹ 16.5 lakh and ₹ 8.25 lakh respectively. The profit earned by them in the business at the end of 3 years was ₹ 19.5 lakh. What will be 50% of Anil's share in the profit? **(Bank P.O., 2009)**

(*a*) ₹ 2.25 lakh (*b*) ₹ 2.5 lakh
(*c*) ₹ 3.75 lakh (*d*) ₹ 4.5 lakh
(*e*) None of these

7. Two friends invested ₹ 1500 and ₹ 2500 in a business. They earned a profit of ₹ 800. One-half of the profit was divided equally between them and the other half was divided in proportion to their capitals. How much did each of them receive? **(Campus Recruitment, 2009)**

(*a*) ₹ 350 and ₹ 450 (*b*) ₹ 360 and ₹ 440
(*c*) ₹ 370 and ₹ 430 (*d*) ₹ 375 and ₹ 425

8. Three persons stared a placement business with a capital of ₹ 3000. B invests ₹ 600 less than A and C invests ₹ 300 less than B. What is B's share in a profit of ₹ 886? **(Campus Recruitment, 2010)**

(*a*) ₹ 443 (*b*) ₹ 354.40
(*c*) ₹ 265.80 (*d*) ₹ 177.20

9. Reena and Shaloo are partners in a business. Reena invests ₹ 35000 for 8 months and Shaloo invests ₹ 42000 for 10 months. Out of a profit of ₹ 31570, Reena's share is :

(*a*) ₹ 9471 (*b*) ₹ 12,628
(*c*) ₹ 18,040 (*d*) ₹ 18942

10. Shankar started a business with an investment of ₹ 120,000. After three months, Aniket joined him with an investment of ₹ 190,000. They earned a profit of ₹ 17,50,000 after one year. What is Aniket's share in the profit? **(Bank P.O., 2008)**

(*a*) ₹ 800000 (*b*) ₹ 850000
(*c*) ₹ 900000 (*d*) ₹ 950000
(*e*) None of these

11. Arun started a business investing ₹ 38000. After 5 months Bakul joined him with a capital of ₹ 55000. At the end of the year the total profit was ₹ 22000. What is the approximate difference between the shares of profits of Arun and Bakul? **(Bank P.O., 2007)**

(*a*) ₹ 1007 (*b*) ₹ 1192
(*c*) ₹ 1568 (*d*) ₹ 1857
(*e*) ₹ 1928

12. Gautam started a business with a sum of ₹ 60000. Jatin joined him 8 months later with a sum of ₹ 35000. At what respective ratio will the two share the profit after two years? **(Bank P.O., 2008)**

(*a*) 2 : 1 (*b*) 3 : 1
(*c*) 18 : 7 (*d*) 37 : 14
(*e*) None of these

13. Simran started a software business by investing ₹ 50000. After six months, Nanda joined her with a capital of ₹ 80000. After 3 years, they earned a profit of ₹ 24500. What was Simran's share in the profit? **(Bank P.O., 2004)**

(*a*) ₹ 9423 (*b*) ₹ 10,250
(*c*) ₹ 12500 (*d*) ₹ 14000
(*e*) None of these

14. Dilip, Ram and Avtar started a shop by investing ₹ 2700, ₹ 8100 and ₹ 7200 respectively. At the end of one year, the profit earned was distributed. If Ram's share was ₹ 3600, what was their total profit? **(R.R.B., 2006)**

(*a*) ₹ 8000 (*b*) ₹ 10800
(*c*) ₹ 11600 (*d*) Data inadequate

15. A and B started a business in partnership investing ₹ 20000 and ₹ 15000 respectively. After six months, C joined them with ₹ 20000. What will be B's share in the total profit of ₹ 25000 earned at the end of 2 years from the starting of the business?

(*a*) ₹ 7500 (*b*) ₹ 9000
(*c*) ₹ 9500 (*d*) ₹ 10000
(*e*) None of these

16. Aman started a business investing ₹ 70000. Rakhi joined him after six months with an amount of ₹ 105000 and Sagar joined them with ₹ 1.4 lakhs after another six months. The amount of profit earned should be distributed in what ratio among Aman, Rakhi and Sagar respectively, 3 years after Aman started the business?

(*a*) 7 : 6 : 10 (*b*) 12 : 15 : 16
(*c*) 42 : 45 : 56 (*d*) Cannot be determined
(*e*) None of these

17. Sonia started a business investing ₹ 60000. After 6 months Vivek joined him with an amount of ₹ 140000. After 1 year Kirti also joined them with ₹ 120000. After 2 years the business yielded a total profit of ₹ 450000. What is the share of Vivek in the profit? **(Bank P.O., 2005)**

(*a*) ₹ 140000 (*b*) ₹ 198500
(*c*) ₹ 210000 (*d*) ₹ 215000
(*e*) None of these

18. Arun, Kamal and Vinay invested ₹ 8000, ₹ 4000 and ₹ 8000 respectively in a business. Arun left after six months. If after eight months, there was a gain of ₹ 4005, then what will be the share of Kamal?

(*a*) ₹ 890 (*b*) ₹ 1335
(*c*) ₹ 1602 (*d*) ₹ 1780

19. P and Q started a business in the ratio of 2 : 3. After 1 year P left the business but Q continues. After 2 years he had the profit of ₹ 26000. What is the profit of Q? **(Bank Recruitment, 2007)**

(*a*) ₹ 10400 (*b*) ₹ 13000
(*c*) ₹ 15600 (*d*) ₹ 18500
(*e*) None of these

20. A, B and C enter into a partnership. A invests some money at the beginning, B invests double the amount after six months and C invests thrice the amount after eight months. If the annual profit be ₹ 27000; C's share (in ₹) is **(G.B.O., 2007)**

(*a*) ₹ 8625 (*b*) ₹ 9000
(*c*) ₹ 10800 (*d*) ₹ 11250

21. A, B and C enter into a partner ship. They invest ₹ 40000, ₹ 80000 and ₹ 120000 respectively. At the end of the first year, B withdraws ₹ 40,000, while at the end of the second year, C withdraws ₹ 80000. In what ratio will the profit be shared at the end of 3 years?

(*a*) 2 : 3 : 5 (*b*) 3 : 4 : 7
(*c*) 4 : 5 : 9 (*d*) None of these

22. A, B and C enter into a partnership. A initially invests ₹ 25 lakhs and adds another ₹ 10 lakhs after one year. B initially invests ₹ 35 lakhs and withdraws ₹ 10 lakhs after 2 years and C invests ₹ 30 lakhs. In what ratio should the profits be divided at the end of 3 years?

(*a*) 10 : 10 : 9 (*b*) 20 : 20 : 19
(*c*) 20 : 19 : 18 (*d*) None of these

23. Subhash starts a business by investing ₹ 25000. 6 months later Aditya joins him by investing ₹ 15000. After another 6 months Aditya invests an additional amount of ₹ 15000. At the end of 3 years they earn a profit of ₹ 247000. What is Aditya's share in the profit? **(Bank P.O., 2006)**

(*a*) ₹ 105000 (*b*) ₹ 111500
(*c*) ₹ 123000 (*d*) ₹ 130000
(*e*) None of these

24. Shekhar started a business investing ₹ 25000 in 2009. In 2010, he invested an additional amount of ₹ 10000 and Rajeev joined him with an amount of ₹ 35000. In 2011, Shekhar invested another additional amount of ₹ 10000 and Jatin joined them with an amount of ₹ 35000. What will be Rajeev's share in the profit of ₹ 150000 earned at the end of 3 years from the start of the business in 2009?

(*a*) ₹ 45000 (*b*) ₹ 50000
(*c*) ₹ 70000 (*d*) ₹ 75000
(*e*) None of these

25. A and B entered into a partnership investing ₹ 16000 and ₹ 12000 respectively. After 3 months, A withdrew ₹ 5000 while B invested ₹ 5000 more. After 3 more months, C joins the business with a capital of ₹ 21000. The share of B exceeds that of C, out of a total profit of ₹ 26,400 after one year by

(*a*) ₹ 2400 (*b*) ₹ 3000

(*c*) ₹ 3600 (*d*) ₹ 4800

26. A and B start a business with investments of ₹ 5000 and ₹ 4500 respectively. After 4 months, A takes out half of his capital. After two more months, B takes out one-third of his capital while C joins them with a capital of ₹ 7000. At the end of a year, they earn a profit of ₹ 5080. Find the share of each member in the profit. **(Bank P.O., 2003)**

(*a*) A – ₹ 1400, B – ₹ 1900, C – ₹ 1780

(*b*) A – ₹ 1600, B – ₹ 1800, C – ₹ 1680

(*c*) A – ₹ 1800, B – ₹ 1500, C – ₹ 1780

(*d*) A – ₹ 1680, B – ₹ 1600, C – ₹ 1800

(*e*) None of these

27. A, B, C subscribe ₹ 50000 for a business. A subscribes ₹ 4000 more than B and B ₹ 5000 more than C. Out of a total profit of ₹ 35000, A receives: **(M.A.T., 2005)**

(*a*) ₹ 8400 (*b*) ₹ 11900

(*c*) ₹ 13600 (*d*) ₹ 14700

28. A, B and C are three partners. They altogether invested ₹ 14000 in business. At the end of the year, A got ₹ 337.50, B ₹ 1125 and C ₹ 637.50 as profit. The difference between the investments of B and A was **(M.A.T., 2010)**

(*a*) ₹ 2200 (*b*) ₹ 3200

(*c*) ₹ 4200 (*d*) ₹ 5250

29. A, B and C started a business investing amounts in the ratio of 5 : 6 : 8 respectively. After one year, C withdrew 50% of the amount and A invested an additional amount of 60% of the original amount invested by him. In what ratio, the profit earned at the end of 2 years should be distributed among A, B and C respectively? **(Bank P.O., 2004)**

(*a*) 2 : 3 : 3

(*b*) 4 : 3 : 2

(*c*) 13 : 12 : 12

(*d*) Cannot be determined

(*e*) None of these

30. John, Mona and Gordon, three US based business partners, jointly invested in a business project to supply nuclear fuel to India. As per their share in the investment, Gordon will receive $\frac{2}{3}$ of the profits whereas John and Mona divide the remainder equally. It is estimated that the income of John will increase by $ 60 million when the rate of profit rises from 4% to 7%. What is Mona's capital? **(M.B.A., 2009)**

(*a*) $ 2000 million (*b*) $ 3000 million

(*c*) $ 5000 million (*d*) $ 8000 million

31. Anu is a working partner and Bimla is a sleeping partner in a business. Anu puts in ₹ 5000 and Bimla puts in ₹ 6000. Anu receives 12.5% of the profit for managing the business and the rest is divided in proportion to their capitals. What does each get out of a profit of ₹ 880? **(M.A.T., 2010)**

(*a*) ₹ 400, ₹ 480 (*b*) ₹ 450, ₹ 430

(*c*) ₹ 460, ₹ 420 (*d*) ₹ 470, ₹ 410

32. Two partners invested ₹ 125000 and ₹ 85000 respectively in a business. They distribute 60% of the profit equally and decide to distribute the remaining 40% as the interest on their capitals. If one partner received ₹ 3000 more than the other, the total profit is

(*a*) ₹ 42250 (*b*) ₹ 39375

(*c*) ₹ 38840 (*d*) ₹ 36575

33. Three partners A, B, C start a business. Twice A's capital is equal to thrice B's capital and B's capital is four times C's capital. Out of a total profit of ₹ 16500 at the end of the year, B's share is :

(*a*) ₹ 4000 (*b*) ₹ 6000

(*c*) ₹ 7500 (*d*) ₹ 6600

34. If 4 (A's capital) = 6 (B's capital) = 10 (C's capital), then out of a profit of ₹ 4650, C will receive

(*a*) ₹ 465 (*b*) ₹ 900

(*c*) ₹ 1550 (*d*) ₹ 2250

35. Ninad, Vikas and Manav enter into a partnership. Ninad invests some amount at the beginning. Vikas invests double the amount after 6 months and Manav invests thrice the amount invested by Ninad after 8 months. They earn a profit of ₹ 45000 at the end of the year. What is Manav's share in the profit? **(S.B.I.P.O., 2008)**

(*a*) ₹ 9000 (*b*) ₹ 12000

(*c*) ₹ 15000 (*d*) ₹ 25000

(*e*) None of these

36. Four milkmen rented a pasture. A grazed 15 cows for 4 months, B grazed 12 cows for 2 months, C grazed 18 cows for 6 months and D grazed 16 cows for 5 months. If A's share of rent is ₹ 1020, what is C's share of rent? **(Bank P.O., 2008)**

(*a*) ₹ 816

(*b*) ₹ 1360

(*c*) ₹ 1836

(*d*) Cannot be determined

(*e*) None of these

37. A, B and C enter into a partnership by making investments in the ratio 3 : 5 : 7. After a year, C invests another ₹ 337600 while A withdraws ₹ 45600. The ratio of investments then changes to 24 : 59 : 16.7. How much did A invest initially?

(*a*) ₹ 45600 (*b*) ₹ 96000

(*c*) ₹ 141600 (*d*) None of these

38. A, B and C are partners in a business. Their shares are in the proportion of $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}$. A withdraws half of his capital after 15 months and after another 15 months, a profit of ₹ 4340 is divided. The share of C is **(M.B.A., 2004)**

(*a*) ₹ 1240 (*b*) ₹ 1245

(*c*) ₹ 1360 (*d*) ₹ 1550

39. A, B, C started a business with their investments in the ratio 1 : 3 : 5. After 4 months, A invested the same amount as before and B as well as C withdrew half of their investments. The ratio of their profits at the end of the year is : **(L.I.C.A.A.O., 2007)**

(*a*) 4 : 3 : 5 (*b*) 5 : 6 : 10

(*c*) 6 : 5 : 10 (*d*) 10 : 5 : 6

40. A and B entered into partnership with capitals in the ratio 4 : 5. After 3 months, A withdrew $\frac{1}{4}$ of his capital and B withdrew $\frac{1}{5}$ of his capital. The gain at the end of 10 months was ₹ 760. A's share in this profit is :

(*a*) ₹ 330 (*b*) ₹ 360

(*c*) ₹ 380 (*d*) ₹ 430

41. In a partnership, A invests $\frac{1}{6}$ of the capital for $\frac{1}{6}$ of the time, B invests $\frac{1}{3}$ of the capital for $\frac{1}{3}$ of the time and C, the rest of the capital for the whole time. Out of a profit of ₹ 4600, B's share is **(M.B.A., 2004)**

(*a*) ₹ 650 (*b*) ₹ 800

(*c*) ₹ 960 (*d*) ₹ 1000

42. A, B and C jointly thought of engaging themselves in a business venture. It was agreed that A would invest ₹ 6500 for 6 months, B, ₹ 8400 for 5 months and C, ₹ 10,000 for 3 months. A wants to be the working member for which he was to receive 5% of the profits. The profit earned was ₹ 7400. Calculate the share of B in the profit.

(*a*) ₹ 1900 (*b*) ₹ 2660

(*c*) ₹ 2800 (*d*) ₹ 2840

43. Manick received ₹ 6000 as his share out of the total profit of ₹ 9000 which he and Raunaq earned at the end of one year. If Manick invested ₹ 20000 for 6 months, whereas Raunaq invested his amount for the whole year, what was the amount invested by Raunaq?

(*a*) ₹ 4000 (*b*) ₹ 5000

(*c*) ₹ 6000 (*d*) ₹ 10,000

44. A, B and C entered into a partnership. A invested ₹ 2560 and B invested ₹ 2000. At the end of the year, they gained ₹ 1105, out of which A got ₹ 320. C's capital was **(S.S.C., 2006)**

(*a*) ₹ 2840 (*b*) ₹ 4028

(*c*) ₹ 4280 (*d*) ₹ 4820

45. A, B and C enter into a partnership. A contributes one-third of the capital while B contributes as much as A and C together contribute. If the profit at the end of the year amounts to ₹ 900, what would C receive? **(P.C.S., 2008)**

(*a*) ₹ 100 (*b*) ₹ 150

(*c*) ₹ 200 (*d*) ₹ 300

46. A and B started a business jointly. A's investment was thrice the investment of B and the period of his investment was two times the period of investment of B. If B received ₹ 4000 as profit, then their total profit is:

(*a*) ₹ 16000 (*b*) ₹ 20000

(*c*) ₹ 24000 (*d*) ₹ 28000

47. A started a business with ₹ 21000 and is joined afterwards by B with ₹ 36000. After how many months did B join if the profits at the end of the year are divided equally?

(*a*) 3 (*b*) 4

(*c*) 5 (*d*) 6

48. A began a business with ₹ 85000. He was joined afterwards by B with ₹ 42500. For how much period does B join, if the profits at the end of the year are divided in the ratio of 3 : 1? **(N.I.F.T., 2003)**

(*a*) 4 months (*b*) 5 months

(*c*) 6 months (*d*) 8 months

49. A starts business with ₹ 3500 and after 5 months, B joins with A as his partner. After a year, the profit is divided in the ratio 2 : 3. What is B's contribution in the capital?

(*a*) ₹ 7500 (*b*) ₹ 8000

(*c*) ₹ 8500 (*d*) ₹ 9000

50. A and B enter into a partnership with ₹ 50000 and ₹ 60000 respectively. C joins them after x months, contributing ₹ 70000 and B leaves x months before the end of the year. If they share the profit in the ratio of 20 : 18 : 21, then the value of x is **(M.A.T., 2008)**

(*a*) 3 (*b*) 6

(*c*) 8 (*d*) 9

51. In a business A invests ₹ 600 more than B. The capital of B remained invested for $7\frac{1}{2}$ months, while the capital of A remained invested for 2 more months. If the total profit be ₹ 620 and B gets ₹ 140 less than what A gets, then A's capital is

(*a*) ₹ 2400 (*b*) ₹ 2800
(*c*) ₹ 3000 (*d*) ₹ 3200

52. A and B start a business jointly. A invests ₹ 16000 for 8 months and B remains in the business for 4 months. Out of the total profit, B claims $\frac{2}{7}$ of the profit. How much money was contributed by B?

(*a*) ₹ 10500 (*b*) ₹ 11900
(*c*) ₹ 12800 (*d*) ₹ 13600

53. Two friends P and Q started a business investing in the ratio of 5 : 6. R joined them after six months investing an amount equal to that of Q's. At the end of the year, 20% profit was earned which was equal to ₹ 98,000. What was the amount invested by R?

(*a*) ₹ 105000 (*b*) ₹ 175000
(*c*) ₹ 210000 (*d*) Data inadequate
(*e*) None of these

54. Three partners shared the profit in a business in the ratio 5 : 7 : 8. They had partnered for 14 months, 8 months and 7 months respectively. What was the ratio of their investments?

(*a*) 5 : 7 : 8 (*b*) 28 : 49 : 64
(*c*) 38 : 28 : 21 (*d*) None of these

55. A, B and C invested their capitals in the ratio 3 : 4 : 6. However their shares of profit are equal. The durations of their investments must be in the ratio

(*a*) 4 : 3 : 2 (*b*) 6 : 4 : 3
(*c*) 3 : 4 : 6 (*d*) 1 : 1 : 1

56. A and B invest in a business in the ratio 3 : 2. If 5% of the total profit goes to charity and A's share is ₹ 855, the total profit is

(*a*) ₹ 1425 (*b*) ₹ 1500
(*c*) ₹ 1537.50 (*d*) ₹ 1576

57. Swati and Rajni enter into a partnership with their capitals in the ratio 5 : 6. At the end of 7 months Swati withdraws her capital. If they receive the profit in the ratio of 5 : 9, find how long was Rajni's capital used. **(I.I.F.T., 2005, R.R.B., 2008)**

(*a*) 10 months (*b*) 12 months
(*c*) 14 months (*d*) None of these

58. *X* and *Y* are partners in a business. *X* contributed $\frac{1}{3}$ of the capital for 9 months and *Y* received $\frac{2}{5}$ of the profits. For how long was Y's money used in the business? **(M.A.T., 2010)**

(*a*) 2 months (*b*) 3 months
(*c*) 4 months (*d*) 5 months

59. A and B started a business with initial investments in the respective ratio of 18 : 7. After four months from the start of the business, A invest ₹ 2000 more and B invested ₹ 7000 more. At the end of one year, if the profit was distributed among them in the ratio of 2 : 1 respective, what was the total initial investment with which A and B started the business? **[IBPS—RRB Officers Gr.'B' Exam, 2015]**

(*a*) ₹ 50000 (*b*) ₹ 25000
(*c*) ₹ 150000 (*d*) ₹ 75000

60. Anil, Kamal and Vini Invested ₹ 8000, ₹ 4000 and ₹ 8000 respectively in a business. Anil left after six months. If after eight months, there was a gain of ₹ 4005, then what will be the share of Kamal? **[RBI Gr. 'B' (Phase I) Exam, 2015]**

(*a*) ₹ 800 (*b*) ₹ 890
(*c*) ₹ 500 (*d*) ₹ 900

61. A starts a business by investing ₹ 28,000. After 2 months, B joins with ₹ 20,000 and after another two months C joins with ₹ 18,000. At the end of 10 months from the start of the business, if B withdraws ₹ 2,000 and C withdrawn ₹ 2,000, in what ratio should the profit be distributed among A, B and C at the end of the year? **[IBPS—Bank Spl. Officer (IT) Exam, 2015]**

(*a*) 12 : 7 : 5 (*b*) 12 : 9 : 5
(*c*) 12 : 6 : 3 (*d*) 14 : 7 : 5

62. In a business, B invests half the amount invested by A. After 6 months from the start of the business, C joins the business with an amount equal to twice of B's investment. After 8 months from the start of the business B withdraws completely from the business. If at the end of the years, C's share in the profit was ₹ 2460, what was the total profit received that year? **[United India Insurance Co. Ltd. (UIICL)—Assistant (Online) Exam 2015]**

(*a*) ₹ 11200 (*b*) ₹ 9600
(*c*) ₹ 9020 (*d*) ₹ 12000

63. A, B and C entered in to a partnership by investing ₹ 15, 400, ₹ 18,200 and ₹ 12,600 respectively. B left after 6 months. If after 8 months, there was a profit of ₹ 28,790, then what is the share of C in the profit? **[NICL—AAO Exam, 2015]**

(*a*) ₹ 8712 (*b*) ₹ 9432
(*c*) ₹ 8352 (*d*) ₹ 8568

64. A and B started a business by investing ₹ 2400 and ₹ 3600 respectively. At the end of 4th month from the start of the business, C joined with ₹ 'X'. After 8 months from the start of the business. B withdrew ₹600. If C's share is ₹ 8000 in the annual profit of ₹ 22500, what was the amount the C invested in the business? **[CET—Maharashtra (MBA) Exam, 2016]**

(*a*) ₹ 7200 (*b*) ₹ 5800
(*c*) ₹ 4000 (*d*) ₹ 4800

ANSWERS

1. (*b*)	**2.** (*e*)	**3.** (*c*)	**4.** (*d*)	**5.** (*b*)	**6.** (*a*)	**7.** (*a*)	**8.** (*c*)	**9.** (*b*)	**10.** (*d*)
11. (*d*)	**12.** (*c*)	**13.** (*e*)	**14.** (*a*)	**15.** (*a*)	**16.** (*b*)	**17.** (*c*)	**18.** (*a*)	**19.** (*e*)	**20.** (*b*)
21. (*b*)	**22.** (*d*)	**23.** (*e*)	**24.** (*b*)	**25.** (*c*)	**26.** (*b*)	**27.** (*d*)	**28.** (*d*)	**29.** (*c*)	**30.** (*a*)
31. (*c*)	**32.** (*b*)	**33.** (*b*)	**34.** (*b*)	**35.** (*c*)	**36.** (*c*)	**37.** (*c*)	**38.** (*a*)	**39.** (*b*)	**40.** (*a*)
41. (*b*)	**42.** (*b*)	**43.** (*b*)	**44.** (*c*)	**45.** (*b*)	**46.** (*d*)	**47.** (*c*)	**48.** (*d*)	**49.** (*d*)	**50.** (*a*)
51. (*c*)	**52.** (*c*)	**53.** (*c*)	**54.** (*d*)	**55.** (*a*)	**56.** (*b*)	**57.** (*d*)	**58.** (*b*)	**59.** (*a*)	**60.** (*b*)
61. (*a*)	**62.** (*c*)	**63.** (*a*)	**64.** (*d*)						

SOLUTIONS

1. Let the total capital be ₹ x. Then, Rahul's share = ₹ $\frac{x}{2}$,

Arun's share = ₹ $\frac{x}{3}$.

Sumit's share = ₹ $\left[x-\left(\frac{x}{2}+\frac{x}{3}\right)\right]$ = ₹ $\frac{x}{6}$.

∴ Required ratio = $\frac{x}{2}:\frac{x}{3}:\frac{x}{6}=\frac{1}{2}:\frac{1}{3}:\frac{1}{6}=3:2:1$.

2. P : Q = 85000 : 15000 = 85 : 15 = 17 : 3.

3. Ratio of their shares = 22500 : 35000 = 9 : 14. Deepak's share = ₹ $\left(13800\times\frac{14}{23}\right)$ = ₹ 8400.

4. Ratio of shares = 8 : 12 : 14 = 4 : 6 : 7.

∴ Kiara's share = ₹ $\left(578\times\frac{7}{17}\right)$ = ₹ 238.

5. P : Q : R = 45000 : 70000 : 90000 = 9 : 14 : 18.

∴ Q's share = ₹ $\left(164000\times\frac{14}{41}\right)$ = ₹ 56000.

6. Ratio of shares = 11 : 16.5 : 8.25 = 4 : 6 : 3.

Anil's share = ₹ $\left(19.5\times\frac{3}{13}\right)$ lakh = ₹ 4.5 lakh.

∴ Required amount = 50% of ₹ 4.5 lakh = ₹ 2.25 lakh.

7. Ratio of shares = 1500 : 2500 = 3 : 5.

Share of first friend = ₹ $\left[\frac{400}{2}+\left(400\times\frac{3}{8}\right)\right]$

= ₹ (200 + 150) = ₹ 350.

Share of second friend = ₹ $\left[\frac{400}{2}+\left(400\times\frac{5}{8}\right)\right]$

= ₹ (200 + 250) = ₹ 450.

8. Let A's capital = ₹ x. Then, B's capital = ₹ $(x - 600)$.
C's capital = ₹ $[(x - 600) - 300]$ = ₹ $(x - 900)$.
∴ $x + (x - 600) + (x - 900) = 3000$
⇒ $3x = 4500 \Rightarrow x = 1500$.
So, A : B : C = 1500 : 900 : 600 = 5 : 3 : 2.

Hence, B's share = ₹ $\left(886\times\frac{3}{10}\right)$ = ₹ 265.80.

9. Ratio of their shares = (35000 × 8) : (42000 × 10) = 2 : 3.

Reena's share = ₹ $\left(31570\times\frac{2}{5}\right)$ = ₹ 12628.

10. Shankar : Aniket = (120000 × 12) : (190000 × 9)
= 1440000 : 1710000 = 16 : 19.

∴ Aniket's share = ₹ $\left(1750000\times\frac{19}{35}\right)$ = ₹ 950000.

11. Arun : Bakul = (38000 × 12) : (55000 × 7)
= 456000 : 385000 = 456 : 385.

Required difference = ₹ $\left[22000\times\left(\frac{456}{841}-\frac{385}{841}\right)\right]$

= ₹ $\left(22000\times\frac{71}{841}\right)$ = ₹ 1857.31 ≈ ₹ 1857.

12. Gautam : Jatin = (60000 × 12) : (35000 × 8)
= 720000 : 280000 = 18 : 7.

13. Simran : Nanda = (50000 × 36) : (80000 × 30)
= 1800000 : 2400000 = 3 : 4.

∴ Simran's share = ₹ $\left(24500\times\frac{3}{7}\right)$ = ₹ 10500.

14. Dilip : Ram : Avtar = 2700 : 8100 : 7200 = 3 : 9 : 8.
Let the total profit be ₹ x.

Then, Ram's share = ₹ $\left(\frac{9}{20}x\right)$.

∴ $\frac{9}{20}x=3600 \Rightarrow x=\left(\frac{3600\times20}{9}\right)=8000$.

Hence, total profit = ₹ 8000.

15. A : B : C = (20000 × 24) : (15000 × 24) : (20000 × 18)
= 4 : 3 : 3.

∴ B's share = ₹ $\left(25000\times\frac{3}{10}\right)$ = ₹ 7500.

16. Aman : Rakhi : Sagar = (70000 × 36) : (105000 × 30) : (140000 × 24) = 12 : 15 : 16.

17. Sonia : Vivek : Kirti
= (60000 × 24) : (140000 × 18) : (120000 × 12)
= 1440000 : 2520000 : 1440000 = 4 : 7 : 4.

∴ Vivek's share = ₹ $\left(450000\times\frac{7}{15}\right)$ = ₹ 210000.

18. Arun : Kamal : Vinay = (8000 × 6) : (4000 × 8) : (8000 × 8)
= 48 : 32 : 64 = 3 : 2 : 4.

$\therefore$ Kamal's share = ₹ $\left(4005 \times \frac{2}{9}\right)$ = ₹ 890.

19. Let the initial capitals of P and Q be ₹ $2x$ and ₹ $3x$ respectively.
Then, Ratio of profits = $(2x \times 12) : (3x \times 24)$
$= 24x : 72x = 1 : 3.$

$\therefore$ Q's share = ₹ $\left(26000 \times \frac{3}{4}\right)$ = ₹ 19500.

20. Let the money invested by A, B and C be ₹ x, ₹ $2x$ and ₹ $3x$ respectively.
Then, A : B : C = $(x \times 12) : (2x \times 6) : (3x \times 4)$
$= 12x : 12x : 12x = 1 : 1 : 1.$

$\therefore$ C's share = ₹ $\left(27000 \times \frac{1}{3}\right)$ = ₹ 9000.

21. A : B : C = (40000 × 36) : (80000 × 12 + 40000 × 24) : (120000 × 24 + 40000 × 12)
= 144 : 192 : 336 = 3 : 4 : 7.

22. A : B : C = (25 lakhs × 1 + 35 lakhs × 2) : (35 lakhs × 2 + 25 lakhs × 1) : (30 lakhs × 3)
= 95 lakhs : 95 lakhs : 90 lakhs = 19 : 19 : 18.

23. Subhash : Aditya = (25000 × 36) : (15000 × 6 + 30000 × 24)
= 900000 : 810000 = 10 : 9.

$\therefore$ Aditya's share = ₹ $\left(247000 \times \frac{9}{19}\right)$ = ₹ 117000.

24. Shekhar : Rajeev : Jatin
= (25000 × 12 + 35000 × 12 + 45000 × 12) : (35000 × 24) : (35000 × 12)
= 1260000 : 840000 : 420000 = 3 : 2 : 1.

$\therefore$ Rajeev's share = ₹ $\left(150000 \times \frac{2}{6}\right)$ = ₹ 50000.

25. A : B : C = (16000 × 3 + 11000 × 9) : (12000 × 3 + 17000 × 9) : (21000 × 6)
= 147 : 189 : 126 = 7 : 9 : 6.

$\therefore$ Difference between B's and C's shares
= ₹ $\left(26400 \times \frac{9}{22} - 26400 \times \frac{6}{22}\right)$ = ₹ 3600.

26. A : B : C = (5000 × 4 + 2500 × 8) : (4500 × 6 + 3000 × 6) : (7000 × 6)
= 40000 : 45000 : 42000 = 40 : 45 : 42.

$\therefore$ A's share = ₹ $\left(5080 \times \frac{40}{127}\right)$ = ₹ 1600;

B's share = ₹ $\left(5080 \times \frac{45}{127}\right)$ = ₹ 1800;

C's share = ₹ $\left(5080 \times \frac{42}{127}\right)$ = ₹ 1680.

27. Let C = x. Then, B = x + 5000 and A = x + 5000 + 4000
= x + 9000.
So, $x + x + 5000 + x + 9000 = 50000$
$\Leftrightarrow 3x = 36000 \Leftrightarrow x = 12000.$
A : B : C = 21000 : 17000 : 12000 = 21 : 17 : 12.

$\therefore$ A's share = ₹ $\left(35000 \times \frac{21}{50}\right)$ = ₹ 14,700.

28. Ratio of investments of A, B and C = Ratio of their profits
= 337.50 : 1125 : 637.50 = 9 : 30 : 17.

$\therefore$ A's investment = ₹ $\left(14000 \times \frac{9}{56}\right)$ = ₹ 2250.

B's investment = ₹ $\left(14000 \times \frac{30}{56}\right)$ = ₹ 7500.

Hence, required difference = ₹ (7500 – 2250) = ₹ 5250.

29. Let the initial investments of A, B and C be $5x$, $6x$ and $8x$ respectively. Then,
A : B : C = [$5x$ × 12 + (160% of $5x$) × 12] : ($6x$ × 24) : ($8x$ × 12 + $4x$ × 12)
= $156x : 144x : 144x = 13 : 12 : 12.$

30. Fraction of profit received by each one of John and Mona
= $\frac{\left(1 - \frac{2}{3}\right)}{2} = \frac{1}{6}$.

Ratio of capitals of John, Mona and Gordon = Ratio of their profits = $\frac{1}{6} : \frac{1}{6} : \frac{2}{3} = 1 : 1 : 4.$

Let the total capital be ₹ x.

Then, $\frac{1}{6}$ of (7% of x – 4% of x) = $ 60 million

$\Rightarrow$ 3% of x = $ 360 million

$\Rightarrow$ x = $ $\left(\frac{360 \times 100}{3}\right)$ million = $ 12000 million.

$\therefore$ Mona's capital = $\left(\frac{1}{6} \times \$\,12000 \text{ million}\right)$
= $ 2000 million.

31. Anu : Bimla = 5000 : 6000 = 5 : 6.
Anu's share for managing business = 12.5% of ₹ 880 = ₹ 110.
Net profit = ₹ (880 – 110) = ₹ 770.

Anu's share = ₹ $\left(770 \times \frac{5}{11}\right)$ = ₹ 350.

Anu's total share = ₹ (110 + 350) = ₹ 460.

Bimla's share = ₹ $\left(770 \times \frac{6}{11}\right)$ = ₹ 420.

32. Let the total profit be ₹ x.

Then, 60% of the profit = ₹ $\left(\frac{60}{100} \times x\right)$ = ₹ $\left(\frac{3x}{5}\right)$.

From this part of the profit each gets = ₹ $\left(\frac{3x}{10}\right)$.

40% of total profit = ₹ $\left(\frac{40}{100} \times x\right)$ = ₹ $\left(\frac{2x}{5}\right)$.

Now, this amount of ₹ $\left(\frac{2x}{5}\right)$ has been divided in the ratio of capitals, which is 125000 : 85000 or 25 : 17 as interests.

$\therefore$ Interest on first capital = ₹ $\left(\frac{2x}{5}\times\frac{25}{42}\right)$ = ₹ $\left(\frac{5x}{21}\right)$.

Interest on second capital = ₹ $\left(\frac{2x}{5}\times\frac{17}{42}\right)$ = ₹ $\left(\frac{17x}{105}\right)$.

Total money received by first partner = ₹ $\left(\frac{3x}{10}+\frac{5x}{21}\right)$ = ₹ $\left(\frac{113x}{210}\right)$.

Total money received by second partner = ₹ $\left(\frac{3x}{10}+\frac{17x}{105}\right)$ = ₹ $\left(\frac{97x}{210}\right)$.

$\therefore$ $\frac{113x}{210}-\frac{97x}{210}$ = 3000 or x = 39375.

Hence, total profit = ₹ 39375.

33. Let C = x. Then, B = $4x$ and 2A = 3 × $4x$ = $12x$ or A = $6x$.

$\therefore$ A : B : C = $6x$: $4x$: x = 6 : 4 : 1.

So, B's share = ₹ $\left(16500\times\frac{4}{11}\right)$ = ₹ 6000.

34. Let 4A = 6B = 10C = k.

Then, A = $\frac{k}{4}$, B = $\frac{k}{6}$ and C = $\frac{k}{10}$.

$\therefore$ A : B : C = $\frac{k}{4}:\frac{k}{6}:\frac{k}{10}$ = 15 : 10 : 6.

Hence, C's share = ₹ $\left(4650\times\frac{6}{31}\right)$ = ₹ 900.

35. Let Ninad's investment be ₹ x.

Then, Ratio of capitals = (x × 12) : ($2x$ × 6) : ($3x$ × 4) = $12x$: $12x$: $12x$ = 1 : 1 : 1.

$\therefore$ Manav's share = ₹ $\left(45000\times\frac{1}{3}\right)$ = ₹ 15000.

36. A : B : C : D = 15 × 4 : 12 × 2 : 18 × 6 : 16 × 5

= 60 : 24 : 108 : 80 = 15 : 6 : 27 : 20.

Let the total rent be ₹ x.

Then, A's share = ₹ $\left(\frac{15x}{68}\right)$.

$\therefore$ $\frac{15x}{68}$ = 1020 $\Rightarrow$ x = $\left(\frac{1020\times68}{15}\right)$ = 4624.

Hence, C's share = ₹ $\left(4624\times\frac{27}{68}\right)$ = ₹ 1836.

37. Let the initial investments of A, B, C, be ₹ $3x$, ₹ $5x$ and ₹ $7x$ respectively. Then,

($3x$ – 45600) : $5x$: ($7x$ + 337600) = 24 : 59 : 167.

$\therefore$ $\frac{3x-45600}{5x}=\frac{24}{59}$ $\Rightarrow$ 177x – 2690400 = 120x $\Rightarrow$ 57x = 2690400 $\Rightarrow$ x = 47200.

Hence, A's initial investment = ₹ (47200 × 3) = ₹ 141600.

38. Ratio of initial investments = $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}$ = 20 : 15 : 12.

Let their initial investments be $20x$, $15x$ and $12x$ respectively.

A : B : C = (20x × 15 + 10x × 15) : (15x × 30) : (12x × 30)

= 450x : 450x : 360x = 5 : 5 : 4.

$\therefore$ C's share = ₹ $\left(4340\times\frac{4}{14}\right)$ = ₹ 1240.

39. Let their initial investments be x, $3x$ and $5x$ respectively. Then,

$$A:B:C=\left(x\times4+2x\times8\right):\left(3x\times4+\frac{3x}{2}\times8\right):\left(5x\times4+\frac{5x}{2}\times8\right)$$

= 20x : 24x : 40x = 5 : 6 : 10.

40. A : B

$$=\left[4x\times3+\left(4x-\frac{1}{4}\times4x\right)\times7\right]:\left[5x\times3+\left(5x-\frac{1}{5}\times5x\right)\times7\right]$$

= (12x + 21x) : (15x + 28x) = 33x : 43x = 33 : 43.

$\therefore$ A's share = ₹ $\left(760\times\frac{33}{76}\right)$ = ₹ 330.

41. Suppose A invests ₹ $\frac{x}{6}$ for $\frac{y}{6}$ months.

Then, B invests ₹ $\frac{x}{3}$ for $\frac{y}{3}$ months.

C invests $\left[x-\left(\frac{x}{6}+\frac{x}{3}\right)\right]$, i.e., ₹ $\frac{x}{2}$ for y months.

$\therefore$ A : B : C = $\left(\frac{x}{6}\times\frac{y}{6}\right):\left(\frac{x}{3}\times\frac{y}{3}\right):\left(\frac{x}{2}\times y\right)$

= $\frac{1}{36}:\frac{1}{9}:\frac{1}{2}$ = 1 : 4 : 18.

Hence, B's share = ₹ $\left(4600\times\frac{4}{23}\right)$ = ₹ 800.

42. For managing, A receives = 5% of ₹ 7400 = ₹ 370.

Balance = ₹ (7400 – 370) = ₹ 7030.

Ratio of their investments = (6500 × 6) : (8400 × 5) : (10000 × 3)

= 39000 : 42000 : 30000 = 13 : 14 : 10.

$\therefore$ B's share = ₹ $\left(7030\times\frac{14}{37}\right)$ = ₹ 2660.

43. Suppose Raunaq invested ₹ x.

Then, Manick : Raunaq = (20000 × 6) : (x × 12)

$\therefore$ $\frac{120000}{12x}=\frac{6000}{3000}$ or x = $\frac{120000}{24}$ = 5000.

44. Let C's capital be ₹ x.

Then, A : B : C = 2560 : 2000 : x.

A's share = ₹ $\left(1105\times\frac{2560}{4560+x}\right)$.

$\therefore$ 1105 × $\frac{2560}{4560+x}$ = 320

$\Rightarrow$ 320x + 1459200 = 2828800

$\Rightarrow$ 320x = 1369600

$\Rightarrow x = 4280.$

45. Let total capital = ₹ x. Then, A's capital = ₹ $\left(\frac{x}{3}\right)$.

B's capital = (A + C)'s capital $\Rightarrow$ 2(B's capital)
= (A + B + C)'s capital = ₹ x

$\Rightarrow$ B's capital = ₹ $\left(\frac{x}{2}\right)$.

C's capital = ₹ $\left[x-\left(\frac{x}{3}+\frac{x}{2}\right)\right]$ = ₹ $\frac{x}{6}$.

$\therefore$ A : B : C = $\frac{x}{3}:\frac{x}{2}:\frac{x}{6}$ = 2 : 3 : 1.

So, C's share = ₹ $\left(900\times\frac{1}{6}\right)$ = ₹ 150.

46. Suppose B invested ₹ x for y months.
Then, A invested ₹ $3x$ for $2y$ months.
So, A : B = $(3x \times 2y) : (x \times y) = 6xy : xy = 6 : 1$.
$\therefore$ B's profit : Total profit = 1 : 7.
Let the total profit be ₹ x.
Then, $\frac{1}{7}=\frac{4000}{x}$ or $x = 28000$.

47. Suppose B joined after x months.
Then, $21000 \times 12 = 36000 \times (12 - x)$
$\Leftrightarrow 36x = 180 \Leftrightarrow x = 5$.
Hence, B joined after 5 months.

48. Suppose B joined for x months.
Then, $\frac{85000\times12}{42500\times x}=\frac{3}{1}$ or $x=\frac{85000\times12}{42500\times3}=8$.
So, B joined for 8 months.

49. Let B's capital be ₹ x.
Then, $\frac{3500\times12}{7x}=\frac{2}{3} \Leftrightarrow 14x = 126000 \Leftrightarrow x = 9000$.

50. Clearly, A invested his capital for 12 months while each one of B and C invested his capital for $(12 - x)$ months.
Ratio of profits of A, B and C
$= (50000 \times 12) : [60000 \times (12 - x)] : [70000 \times (12 - x)]$
$= 60 : 6(12 - x) : 7(12 - x)$
$= 60 : (72 - 6x) : (84 - 7x)$
But ratio of profits = 20 : 18 : 21 = 60 : 54 : 63.
$\therefore$ $60 : (72 - 6x) : (84 - 7x) = 60 : 54 : 63$
So, $72 - 6x = 54 \Rightarrow 6x = 18 \Rightarrow x = 3$.

51. Let B's capital be ₹ x.
Then, A's capital = ₹ $(x + 600)$.

$\therefore$ A : B = $\left[(x+600)\times\frac{19}{2}\right]:\left(x\times\frac{15}{2}\right)$
$= (19x + 11400) : 15x$.

A's share = ₹ $\left[620\times\frac{(19x+11400)}{(34x+11400)}\right]$;

B's share = ₹ $\left[620\times\frac{15x}{(34x+11400)}\right]$.

$\therefore$ $620\left[\frac{19x+11400}{34x+11400}-\frac{15x}{34x+11400}\right]=140$

$\Rightarrow$ $62 (4x + 11400) = 14 (34x + 11400)$
$\Rightarrow$ $248x + 706800 = 476x + 159600$
$\Rightarrow$ $228x = 547200 \Rightarrow x = 2400$.
Hence, A's capital = ₹ (2400 + 600) = ₹ 3000.

52. Let the total profit be ₹ x.

Then, B = $\frac{2x}{7}$ and A = $\left(x-\frac{2x}{7}\right)=\frac{5x}{7}$.

So, A : B = $\frac{5x}{7}:\frac{2x}{7}$ = 5 : 2.

Let B's capital be ₹ y.

Then, $\frac{16000\times8}{y\times4}=\frac{5}{2} \Leftrightarrow y=\left(\frac{16000\times8\times2}{5\times4}\right)=12800$.

53. Let the total investment be ₹ z.

Then, 20% of $z = 98000 \Leftrightarrow z=\left(\frac{98000\times100}{20}\right)=490000$.

Let the capitals of P, Q and R be ₹ $5x$, ₹ $6x$ and ₹ $6x$ respectively.

Then, $(5x \times 12) + (6x \times 12) + (6x \times 6) = 490000 \times 12$

$\Leftrightarrow 168x = 490000\times12 \Leftrightarrow x=\left(\frac{490000\times12}{168}\right)=35000$.

$\therefore$ R's investment = $6x$ = ₹ (6×35000) = ₹ 210000.

54. Let their investments be ₹ x for 14 months; ₹ y for 8 months and ₹ z for 7 months respectively.

Then, $14x : 8y : 7z = 5 : 7 : 8$.

Now, $\frac{14x}{8y}=\frac{5}{7} \Leftrightarrow 70x = 40y \Leftrightarrow y=\frac{7}{4}x$.

And, $\frac{14x}{7z}=\frac{5}{8} \Leftrightarrow 112x = 35z \Leftrightarrow z=\frac{112}{35}x=\frac{16}{5}x$.

$\therefore$ $x : y : z = x : \frac{7}{4}x : \frac{16}{5}x = 20 : 35 : 64$.

55. Let their investments be ₹ $3x$ for p months; ₹ $4x$ for q months and ₹ $6x$ for r months respectively.
Then, $3xp : 4xq : 6xr = 1 : 1 : 1$
$\Rightarrow$ $3p : 4q : 6r = 1 : 1 : 1$
So, $3p=4q \Rightarrow q=\frac{3p}{4}$. And, $4q=6r \Rightarrow r=\frac{2q}{3}=\left(\frac{2}{3}\times\frac{3}{4}p\right)=\frac{p}{2}$.

$\therefore$ $p : q : r = p : \frac{3p}{4}:\frac{p}{2}$ = 4 : 3 : 2.

56. Let the total profit be ₹ 100.

After paying to charity, A's share = ₹ $\left(95\times\frac{3}{5}\right)$ = ₹ 57.

If A's share is ₹ 57, total profit = ₹ 100.

If A's share is ₹ 855, total profit = $\left(\frac{100}{57}\times855\right)$ = 1500.

57. Suppose Swati invested ₹ $5x$ for 7 months and Rajni invested ₹ $6x$ for y months. Then,
$\frac{5x\times7}{6x\times y}=\frac{5}{9} \Rightarrow 30y = 315 \Rightarrow y = 10\frac{1}{2}$.

Hence, Rajni's capital was used for $10\frac{1}{2}$ months.

58. Let the total profit be ₹ z. Then, Y's share = ₹ $\left(\frac{2z}{5}\right)$, X's share = ₹ $\left(z-\frac{2z}{5}\right)$ = ₹ $\left(\frac{3z}{5}\right)$.

$\therefore$ X : Y = $\frac{3z}{5}:\frac{2z}{5}=3:2.$

Let the total capital be ₹ x and suppose Y's money was used for y months. Then,

$$\frac{\frac{1}{3}x\times 9}{\frac{2}{3}x\times y}=\frac{3}{2} \Rightarrow 18x = 6xy \Rightarrow y = 3.$$

Hence, Y's money was used for 3 months.

59. Let the initial investment of A and B is $18x$ and $7x$. After four months from the start of business, A invest ₹ 2000 more for each eight months. Then total investment of A

$= 18x \times 4 + (18x + 2000) \times 8$

$= 72x + 144x + 16000$

$= 216x + 16000$

After four months, from the start of business, B invest ₹ 7000 more for each eight months.

Total investment by B

$= 7x \times 4 + (7x + 7000) \times 8$

$= 28x + 56x + 56000$

$= 84x + 56000$

According to the questions.

$$\frac{216x+16000}{84x+56000}=\frac{2}{1}$$

$\Rightarrow 216x + 16000 = 168x + 112000$

$\Rightarrow 216x - 168x = 112000 - 16000$

$48x = 96000 \Rightarrow x=\frac{96000}{48}=2000$

Total initial investment of A and B

$= (18 + 7) \times 2000 =$ ₹ 50000

60. Ratio of profit of Anil : Kamal : Vini

$= (8000\times 6) : (4000 \times 8) : (8000 \times 8) = 48000 : 32000 : 64000$

$= 48 : 32 : 64$

$= 3 : 2 : 4$

$\therefore$ Kamal's share = ₹ $\left(4005\times\frac{2}{9}\right)$ = ₹ 890

61. A invests money for 12 months

B invests money for 10 months

C invests money for 8 months

Ratio of profit of A to B to C

$= 28000\times 12 : 20000\times 8+18000\times 2 : 18000\times 6 + 16000\times 2$

$= 28 \times 12 \times 1000 : (160 + 36) \times 1000 : (108 + 32) \times 1000$

$= 28 \times 12 : 160 + 36 : 108 + 32$

$= 336 : 196 : 140 = 12 : 7 : 5$

62. Let B's investment be ₹ x

$\therefore$ A's investment = ₹ $2x$

$\therefore$ C's investment = ₹ $2x$

A invests money for 12 months

B invests money for 8 months

C invests money for 6 months.

Ratio of the equivalent capitals of A, B and C for 1 month

$= 2x \times 12 : x \times 8 : 2x \times 6 = 6 : 2 : 3$

Sum of the terms of ratio

$= 6 + 2 + 3 = 11$

If the total profit at the end of the year be ₹ a, then

Share of $c = \frac{3a}{11}=2460$

$\Rightarrow 3a = 2460 \times 11$

$\Rightarrow a=\frac{2460\times 11}{3}=$ ₹ 9020

63. Investment of A for 8 months = ₹ 15400

Investment of B for 6 months = ₹ 18200

Investment of C for 8 months = ₹ 12600

Ratio of the share of A, B and C

$= 15400 \times 8 : 18200 \times 6 : 12600 \times 8$

$= 154 \times 8 : 182 \times 6 : 126 \times 8$

$= 44 : 39 : 36$

Sum of the terms of ratio = 44 + 39 + 36 = 119

Share of C = ₹ $\left(\frac{36}{119}\times 28790\right)$ = ₹ 8710 $\approx$ ₹ 8712

64. A invests ₹ 2400 for 12 months

B invests ₹ 3600 for 8 months

And ₹ 3000 for 4 months

C invests ₹ X for 8 months

Ratio of profit of A, B and C

= Profit of A : Profit of B : Profit of C

$= 2400 \times 12 : (3600 \times 8) + (3000 \times 4) : X \times 8$

$= 28800 : 40800 : 8X = 3600 : 5100 : X$

Given profit of C = ₹ 8000

and total profit of A, B and C = ₹ 22,500

$\therefore \frac{X\times 22500}{3600+5100+X}\Rightarrow\frac{X\times 22500}{8700+X}=8000$

$\Rightarrow 22500X = 69600000 + 8000X$

$\Rightarrow 14500X = 69600000 \Rightarrow X =$ ₹ 4800

EXERCISE

(DATA SUFFICIENCY TYPE QUESTIONS)

Directions (*Questions 1 – 5*): *Each of the questions given below consists of a statement and/or a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statement(s) is/are sufficient to answer the question. Read both the statements and:*

Give answer **(a)** *if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question;*

Give answer **(b)** *if the data in Statement II alone are sufficient to answer the question, while the data in*

Statement I alone are not sufficient to answer the question;

Give answer (c) if the data either in Statement I or in Statement II alone are sufficient to answer the question;

Give answer (d) if the data even in both Statements I and II together are not sufficient to answer the question;

Give answer (e) if the data in both Statements I and II together are necessary to answer the question.

1. Ravi, Gagan and Nitin are running a business firm in partnership. What is Gagan's share in the profit earned by them? **(M.B.A., 2002)**

I. Ravi, Gagan and Nitin invested the amounts in the ratio of 2 : 4 : 7.

II. Nitin's share in the profit is ₹ 8750.

2. A and B start a business jointly. What is A's share out of an annual profit of ₹ 23,800?

I. B's investment is $12\frac{1}{2}\%$ more than A's investment.

II. A's investment is ₹ 1,20,000.

3. A and B are in a partnership business of one year. At the end of the year, a profit of ₹ 20,000 was earned. What is A's share?

I. A invested ₹ 50,000.

II. B withdrew his capital after 8 months.

4. Rahul, Anurag and Vivek started a business together. In what proportion would the annual profit be distributed among them?

I. Rahul got one-fourth of the profit.

II. Rahul and Vivek contributed 75% of the total investment.

5. What is Nikita's share in the profit of ₹ 50000 earned in the business run by her in partnership with Shalini? **(Bank P.O., 2009)**

I. Nikita invested an amount 150% of the amount invested by Shalini.

II. Amount invested by Shalini is two-thirds of the amount invested by Nikita.

Directions (*Questions 6–10*): *Each of the questions given below consists of a question followed by three statements. You have to study the question and the statements and decide which of the statement(s) is/are necessary to answer the given question.*

6. What is R's share of profit in a joint venture?

I. Q started business investing ₹ 80000.

II. R joined him after 3 months.

III. P joined after 4 months with a capital of ₹ 120000 and got ₹ 6000 as his share of profit.

(*a*) All I, II and III

(*b*) I and III only

(*c*) II and III only

(*d*) Even with all I, II, and III, the answer cannot be arrived at

(*e*) None of these

7. What is the difference in the shares of profit between P and Q in a joint business at the end of one year? **(M.B.A., 2007)**

I. P invested ₹ 80000 and withdrew ₹ 20000 after 6 months.

II. Q joined four months after the start of business.

III. Q's amount was 80% of P's amount during the last six months.

(*a*) I and II only

(*b*) II and III only

(*c*) All I, II and III

(*d*) Even with all I, II and III together, the answer cannot be arrived at.

(*e*) None of these

8. A, B and C together start a business with a total investment of ₹ 15,000. At the end of the year, the total profit is ₹ 3000. What is A's share in the profit?

I. A's contribution is $\frac{3}{2}$ times B's.

II. B's contribution is twice that of C.

III. A's contribution is thrice that of C.

(*a*) I and II only

(*b*) II and III only

(*c*) All I, II and III

(*d*) Any two of the three

(*e*) None of these

9. What will be the share of R in the profit earned by V, R and A together?

I. They together invested an amount of ₹ 54000 for a period of 1 year.

II. R's investment was 25% less than V's and 50% more than A's.

III. The profit of V is ₹ 4000 more than that of A. **(M.A.T., 2006)**

(*a*) Only I and II together

(*b*) Only II

(*c*) Only II and III together

(*d*) II and either I or III only

10. How much did Rohit get as profit at the year-end in the business done by Nitin, Rohit and Kunal?

I. Kunal invested ₹ 8000 for nine months, his profit was $\frac{3}{2}$ times that of Rohit's and his investment was four times that of Nitin.

II. Nitin and Rohit invested for one year in the proportion 1 : 2 respectively.

III. The three together got ₹ 1000 as profit at the year end.

(*a*) Only I and II

(*b*) Only I and III

(*c*) Question cannot be answered even with the information in all the three statements
(*d*) All I, II and III
(*e*) None of these

Directions (*Questions 11-13*): *Each of these questions is followed by three statements. You have to study the question and all the three statements given to decide whether any information provided in the statement(s) is redundant and can be dispensed with while answering the given question.*

11. Three friends P, Q and R started a partnership business investing money in the ratio of 5 : 4 : 2 respectively for a period of 3 years. What is the amount received by P as his share in the total profit?

I. Total amount invested in the business is ₹ 22000.

II. Profit earned at the end of 3 years is $\frac{3}{8}$ of the total investment.

III. The average amount of profit earned per year is ₹ 2750.

(*a*) I or II or III
(*b*) Either III only, or I and II together
(*c*) Any two of the three
(*d*) All I, II and III are required
(*e*) None of these

12. What will be the percentage share of Y in the profit earned by X, Y and Z together?

I. X, Y and Z invested a total amount of ₹ 25,000 for a period of two years.

II. The profit earned at the end of 2 years is 30%.

III. The amount invested by Y is equal to the amount invested by X and Z together.

(*a*) I and II only
(*b*) II and III only
(*c*) Any two of the three
(*d*) All I, II and III are required
(*e*) Question cannot be answered even with information in all the three statements.

13. What is Neeta's share in the profit of ₹ 50000 earned at the end of 2 years in a joint business run by Neeta, Seeta and Geeta?

I. Neeta invested ₹ 85000 to start the business.

II. Seeta and Geeta joined Neeta's business after six months, investing amounts in the ratio of 3 : 5.

III. Total amount invested by Seeta and Geeta is ₹ 2.5 lakh.

(*a*) Only II
(*b*) Only III
(*c*) Only either II or III
(*d*) Information in all the three statements is required to answer the question
(*e*) The question cannot be answered even with the information in all the three statements

ANSWERS

1. (*e*)	**2.** (*a*)	**3.** (*d*)	**4.** (*e*)	**5.** (*c*)	**6.** (*d*)	**7.** (*d*)	**8.** (*d*)	**9.** (*c*)	**10.** (*d*)
11. (*b*)	**12.** (*a*)	**13.** (*d*)							

SOLUTIONS

1. Let us name Ravi, Gagan and Nitin by R, G and N respectively.

I. R : G : N = 2 : 4 : 7.

II. N = 8750.

From I and II, we get :

When N = 7, then G = 4. When N = 8750, then

$$G = \left(\frac{4}{7} \times 8750\right) = 5000.$$

Thus, both I and II are needed to get the answer.

∴ Correct answer is (*e*).

2. Annual profit = ₹ 23800.

I. Let A's investment = ₹ x.

Then, B's investment = $112\frac{1}{2}\%$ of ₹ x = ₹ $\left(\frac{9x}{8}\right)$.

$$\therefore \quad A : B = x : \frac{9x}{8} = 8 : 9.$$

$$A's \text{ share} = ₹ \left(23800 \times \frac{8}{17}\right) = ₹ 11200.$$

Thus, I only gives the answer.

II. A's investment = ₹ 120000. This is not sufficient to get the answer.

Thus, I gives the answer but II is not sufficient to get the answer.

∴ Correct answer is (*a*).

3. Since B's investment is not given, both the statements together also do not give the answer.

∴ Correct answer is (*d*).

4. Let the total investment be ₹ x. Then, $R = \frac{x}{4}$.

$$R + V = \left(\frac{75}{100} \times x\right) = \frac{3x}{4} \Rightarrow V = \left(\frac{3x}{4} - \frac{x}{4}\right) = \frac{x}{2}.$$

$$\therefore \quad A = x - \left(\frac{x}{4} + \frac{x}{2}\right) = \frac{x}{4}.$$

$$R : A : V = \frac{x}{4} : \frac{x}{4} : \frac{x}{2} = 1 : 1 : 2.$$

Thus, both I and II are needed to get the answer.

∴ Correct answer is (*e*).

5. I. Let Shalini's capital = ₹ x.

Then, Nikita's capital = 150% of ₹ x = ₹ $\frac{3x}{2}$.

$\therefore$ Nikita : Shalini = $\frac{3x}{2} : x = 3 : 2$.

$\therefore$ Nikita's share = ₹ $\left(50000 \times \frac{3}{5}\right)$ = ₹ 30000.

II. Let Nikita's captial = ₹ x.

Then, Shalini's capital = ₹ $\left(\frac{2x}{3}\right)$.

Nikita : Shalini = $x : \frac{2x}{3} = 3 : 2$.

Again, Nikita's share can be calculated.
Thus, either I alone or II alone is sufficient to get the answer.
$\therefore$ Correct answer is (*c*).

6. From I, II and III, we get P : Q : R = (120000 × 8) : (80000 × 12) : (x × 9).
Since R's investment is not given, the above ratio cannot be determined.
$\therefore$ Given data is inadequate. $\therefore$ Correct answer is (*d*).

7. I. P's investment = (80000 × 6 + 60000 × 6) = 840000 for 1 month.

II & III. Q's investment = 80% of ₹ 60000 for 8 months
= ₹ (48000 × 8) for 1 month = 384000 for 1 month
P : Q = 840000 : 384000 = 35 : 16.
But, the total profit is not given, so data is inadequate.
$\therefore$ Correct answer is (*d*).

8. Let C's contribution be ₹ x.
From I and II, we get : C = ₹ x,

B = ₹ $2x$ and A = ₹ $\left(\frac{3}{2} \times 2x\right)$ = ₹ $3x$.

From II and III, we get C = ₹ x, B = ₹ $2x$ and A = ₹ $3x$.
From I and III, we get C = ₹ x,

A = ₹ $3x$ and B = ₹ $\left(\frac{2}{3} \times 3x\right)$ = ₹ $2x$.

Thus, A : B : C = $3x : 2x : x = 3 : 2 : 1$.

A's share = ₹ $\left(3000 \times \frac{3}{6}\right)$ = ₹ 1500.

Thus, any two of the three give the answer.
$\therefore$ Correct answer is (*d*).

9. From **II** and **III**, we have :
Let A's investment = ₹ x.

Then, R's investment = 150% of ₹ x = ₹ $\left(\frac{3x}{2}\right)$.

Now, 75% of V's investment = $\frac{3x}{2}$

$\Rightarrow$ V's investment = $\left(\frac{3x}{2} \times \frac{100}{75}\right)$ = ₹ $2x$.

V : R : A = $2x : \frac{3x}{2} : x = 4 : 3 : 2$.

Let the total profit be ₹ P.

Then, V's share = ₹ $\left(\frac{4P}{9}\right)$ and A's share = ₹ $\left(\frac{2P}{9}\right)$.

So, $\frac{4P}{9} - \frac{2P}{9} = 4000 \Rightarrow P = \left(\frac{4000 \times 9}{2}\right) = 18000$.

R's share = ₹ $\left(18000 \times \frac{3}{9}\right)$ = ₹ 6000.

Thus, both II and III together give the answer.
$\therefore$ Correct answer is (*c*).

10. **I** and **II** give, K = ₹ (8000 × 9) for 1 month
= ₹ 72000 for 1 month.

N = ₹ $\left(\frac{1}{4} \times 8000 \times 12\right)$ for 1 month
= ₹ 24000 for 1 month.

R = ₹ 48000 for 1 month.

$\therefore$ K : N : R = 72000 : 24000 : 48000 = 3 : 1 : 2.

III gives, total profit = ₹ 1000.

$\therefore$ Rohit's share = ₹ $\left(1000 \times \frac{2}{6}\right)$ = ₹ $333\frac{1}{3}$.

$\therefore$ Correct answer is (*d*).

11. **I** and **II** give, profit after 3 years = ₹ $\left(\frac{3}{8} \times 22000\right)$ = ₹ 8250.

From **III** also, profit after 3 years = ₹ (2750 × 3) = ₹ 8250.

$\therefore$ P's share = ₹ $\left(8250 \times \frac{5}{11}\right)$ = ₹ 3750.

Thus, (either III is redundant) or (I and II are redundant).
$\therefore$ Correct answer is (*b*).

12. From **III**, Y = X + Z $\Rightarrow$ Y's investment is 50%.
$\therefore$ Share of Y is 50%.
Thus, I and II are redundant.
$\therefore$ Correct answer is (*a*).

13. All the three statements I, II and III are required to calculate the ratio of profits of Neeta, Seeta and Geeta, as shown below :
Neeta's investment = ₹ 85000.

Seeta's investment = ₹ $\left(250000 \times \frac{3}{8}\right)$ = ₹ 93750.

Geeta's investment = ₹ (250000 – 93750) = ₹ 156250.

$\therefore$ Neeta : Seeta : Geeta = (85000 × 24) : (93750 × 18) : (156250 × 18)
= 2040000 : 1687500 : 2812500 = 272 : 225 : 375.

So, Neeta's share = ₹ $\left(50000 \times \frac{272}{872}\right)$.

$\therefore$ Correct answer is (*d*).