

Arithmetic (Level 2)**MCQ Test, Set 08**

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

1. There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
2. Each correct answer carries 1 mark. There is no negative marking.
3. The key sheet and worked solutions are at the end of this test.

1. A is twice as good a workman as B. If B can finish a piece of work in 84 days, in how many days can A finish it?
A. 168 days **B.** 56 days **C.** 28 days **D.** 42 days
2. If the number of men to do a work is changed in the ratio 2 : 7, the time taken by them to finish the work changes in the ratio
A. 2 : 7 **B.** 49 : 4 **C.** 7 : 2 **D.** 4 : 49
3. A can finish a piece of work in 44 days and B can finish it in 20 days. In how many days can they finish it working together?
A. $13\frac{3}{4}$ days **B.** 24 days **C.** 64 days **D.** 32 days
4. A and B together can do a piece of work in 4 days. B alone can finish it in 6 days. In how many days can A alone finish the work?
A. 5 days **B.** 2 days **C.** $2\frac{2}{5}$ days **D.** 12 days
5. A, B and C together can finish a piece of work in 20 days. B and C together can finish it in 120 days. In how many days can A alone finish it?
A. 24 days **B.** 100 days **C.** $17\frac{1}{7}$ days **D.** 70 days
6. A can do a piece of work in 54 days and B can finish it in 12 days. They work together for 8 days and then B goes away. In how many days will A finish the remaining work?
A. $48\frac{1}{2}$ days **B.** 46 days **C.** $2\frac{2}{9}$ days **D.** 10 days
7. A can do a piece of work in 36 days and B in 16 days. They work together for 6 days. The rest of the work is finished by C in 8 days. If they get ₹2880 for the whole work, what is A's share?
A. ₹1080 **B.** ₹480 **C.** ₹960 **D.** ₹1320
8. A is thrice as good a workman as B and is therefore able to finish a piece of work in 50 days less than B. How many days does A take to finish it alone?
A. $16\frac{2}{3}$ days **B.** 150 days **C.** 75 days **D.** 25 days

9. A can do a piece of work in 40 days, B in 25 days and C in 20 days. All begin together, but A leaves the work after 2 days and B leaves 1 day before the work is finished. How long did the work last?
- A. 12 days B. 8 days C. 11 days D. 10 days
-
10. A can do a piece of work in 210 days and B can do it in 196 days. They work together for 14 days. Then B leaves and A alone continues the work. 5 days after that, C joins A and the work is completed in 64 days more. In how many days can C do the work alone?
- A. 120 days B. $76\frac{4}{11}$ days C. 330 days D. 56 days
-
11. A and B together can do a piece of work in 45 days. B and C together can do it in 60 days. If A is twice as good a workman as C, C alone can do it in
- A. 360 days B. 90 days C. 180 days D. 15 days
-
12. A and B together can do a piece of work in 39 days. B and C together can do it in 52 days. If A is twice as good a workman as C, A alone can do it in
- A. 13 days B. 156 days C. 312 days D. 78 days
-
13. A and B working alone can finish a piece of work in 20 and 15 days respectively. If they work at it alternately for a day, A beginning, in how many days will the work be finished?
- A. $8\frac{4}{7}$ days B. 18 days C. $17\frac{1}{7}$ days D. $17\frac{1}{4}$ days
-
14. A certain number of men complete a piece of work in 63 days. If there were 20 men more, the work could be finished in 18 days less. How many men were there originally?
- A. 50 B. 30 C. 70 D. 90
-
15. If 3 men or 8 boys can finish a piece of work in 40 days, in how many days can 3 men and 2 boys finish it?
- A. 64 days B. 32 days C. $102\frac{2}{5}$ days D. 50 days
-
16. 6 men and 3 women working 3 hours a day finish a piece of work in 6 days; 2 men and 3 women working 3 hours a day do the same work in 12 days. Find the number of days in which the work is done by 6 men only, working 6 hours a day.
- A. 8 days B. 4 days C. $5\frac{1}{4}$ days D. $4\frac{1}{2}$ days
-
17. If 3 men with 3 boys can earn ₹4080 in 8 days and 9 men with 12 boys can earn ₹15525 in 9 days, how much does 1 man earn in a day?
- A. ₹105 B. ₹170 C. ₹65 D. ₹85
-
18. 40 men are employed to do a piece of work which they could finish in 33 days, but the men drop off by 4 at the end of every 10 days. In what time will the work be completed?
- A. 33 days B. $36\frac{2}{3}$ days C. $38\frac{4}{7}$ days D. 40 days
-
19. A can do half as much again as B can do in the same time. B alone can do a piece of work in 51 days. In how many days can both together finish it?
- A. $42\frac{1}{2}$ days B. $20\frac{2}{5}$ days C. $25\frac{1}{2}$ days D. $30\frac{3}{5}$ days
-

20. A man rows in still water at 4 km/hr and the rate of the current is 2 km/hr. The man's rate with the current is
- A. 2 km/hr B. 6 km/hr C. 4 km/hr D. 1 km/hr
-
21. A man rows upstream 18 km and downstream 33 km, taking 6 hours each time. The man's speed in still water is
- A. 1.25 km/hr B. 8.5 km/hr C. 4.25 km/hr D. 5.5 km/hr
-
22. A man can row 10 km/hr in still water and he finds that it takes him thrice as long to row up as to row down the river. The rate of the stream is
- A. 2.5 km/hr B. 7.5 km/hr C. 5 km/hr D. 7 km/hr
-
23. A man can row 12.5 km/hr in still water. If the river is running at 4.5 km/hr, it takes him 2 hours to row to a place and back. The place is at a distance of
- A. 10.88 km B. 12.5 km C. 21.76 km D. 16 km
-
24. The current of a stream runs at the rate of 5 km/hr. A motor boat goes 11 km upstream and back again to the starting point in 1 hour 25 minutes. The speed of the motor boat in still water is
- A. 12 km/hr B. 27 km/hr C. 22 km/hr D. 17 km/hr
-
25. A man can row 28 km upstream and 9 km downstream in 5 hours, while he can row 42 km upstream and 54 km downstream in 12 hours. The speed of the man in still water is
- A. 7 km/hr B. 8 km/hr C. 1 km/hr D. 9 km/hr
-

Key sheet

1. D	2. C	3. A	4. D	5. A
6. D	7. B	8. D	9. C	10. A
11. C	12. D	13. D	14. A	15. B
16. B	17. A	18. C	19. B	20. B
21. C	22. C	23. A	24. D	25. B

Solutions

1. A is twice as good a workman as B. If B can finish a piece of work in 84 days, in how many days can A finish it?

$$\begin{aligned}\text{Time taken by A} &= \frac{1}{2} \times (\text{Time taken by B}) \\ &= \frac{1}{2} \times 84 = 42 \text{ days}\end{aligned}$$

Ans: (D) 42 days

2. If the number of men to do a work is changed in the ratio 2 : 7, the time taken by them to finish the work changes in the ratio

$$\begin{aligned}\text{No. of men} &\propto \frac{1}{\text{Time taken}} \\ \frac{T_1}{T_2} &= \frac{M_2}{M_1} = \frac{7}{2} \\ \therefore T_1 : T_2 &= 7 : 2\end{aligned}$$

Ans: (C) 7 : 2

3. A can finish a piece of work in 44 days and B can finish it in 20 days. In how many days can they finish it working together?

$$\begin{aligned}\text{A's 1 day's work} &= \frac{1}{44} \\ \text{B's 1 day's work} &= \frac{1}{20} \\ \therefore (\text{A} + \text{B})\text{'s 1 day's work} &= \frac{1}{44} + \frac{1}{20} = \frac{5+11}{220} = \frac{16}{220} = \frac{4}{55} \\ \therefore \text{Both together can finish the work in } &\frac{55}{4} \text{ days} = 13\frac{3}{4} \text{ days}\end{aligned}$$

Ans: (A) $13\frac{3}{4}$ days

4. A and B together can do a piece of work in 4 days. B alone can finish it in 6 days. In how many days can A alone finish the work?

$$\begin{aligned}(\text{A} + \text{B})\text{'s 1 day's work} &= \frac{1}{4} \\ \text{B's 1 day's work} &= \frac{1}{6} \\ \Rightarrow \text{A's 1 day's work} &= \frac{1}{4} - \frac{1}{6} = \frac{3-2}{12} = \frac{1}{12} \\ \therefore \text{A alone can finish the work in } &12 \text{ days.}\end{aligned}$$

Ans: (D) 12 days

5. A, B and C together can finish a piece of work in 20 days. B and C together can finish it in 120 days. In how many days can A alone finish it?

$$\begin{aligned}(\text{A} + \text{B} + \text{C})\text{'s 1 day's work} &= \frac{1}{20} \\ (\text{B} + \text{C})\text{'s 1 day's work} &= \frac{1}{120} \\ \text{A's 1 day's work} &= (\text{A} + \text{B} + \text{C})\text{'s 1 day's work} - (\text{B} + \text{C})\text{'s 1 day's work} \\ &= \frac{1}{20} - \frac{1}{120} = \frac{6-1}{120} = \frac{5}{120} = \frac{1}{24} \\ \therefore \text{A alone can finish the work in } &24 \text{ days}\end{aligned}$$

Ans: (A) 24 days

6. A can do a piece of work in 54 days and B can finish it in 12 days. They work together for 8 days and then B goes away. In how many days will A finish the remaining work?

$$\text{A's 1 day's work} = \frac{1}{54}$$

$$\text{B's 1 day's work} = \frac{1}{12}$$

$$(\text{A} + \text{B})\text{'s 1 day's work} = \frac{1}{54} + \frac{1}{12} = \frac{2+9}{108} = \frac{11}{108}$$

$$(\text{A} + \text{B})\text{'s 8 days' work} = 8 \times \frac{11}{108} = \frac{22}{27}$$

$$\text{Remaining work} = 1 - \frac{22}{27} = \frac{5}{27}$$

$$\text{This work is done by A in } \frac{5}{27} \times 54 = 10 \text{ days}$$

Ans: (D) 10 days

7. A can do a piece of work in 36 days and B in 16 days. They work together for 6 days. The rest of the work is finished by C in 8 days. If they get ₹2880 for the whole work, what is A's share?

$$\text{A's 1 day's work} = \frac{1}{36}, \text{ B's 1 day's work} = \frac{1}{16}$$

$$(\text{A} + \text{B})\text{'s 1 day's work} = \frac{1}{36} + \frac{1}{16} = \frac{4+9}{144} = \frac{13}{144}$$

$$(\text{A} + \text{B})\text{'s 6 days' work} = \frac{13}{24}$$

$$\text{Remaining work} = 1 - \frac{13}{24} = \frac{11}{24}, \text{ done by C in 8 days}$$

$$\text{A's 6 days' work} = \frac{6}{36} = \frac{1}{6}, \text{ B's 6 days' work} = \frac{6}{16} = \frac{3}{8}, \text{ C's 8 days' work} = \frac{11}{24}$$

$$\text{Consider } \frac{1}{6} : \frac{3}{8} : \frac{11}{24} = 4 : 9 : 11$$

$$\text{A's share} = 4 \times \frac{2880}{24} = 480, \text{ i.e. ₹480}$$

Ans: (B) ₹480

8. A is thrice as good a workman as B and is therefore able to finish a piece of work in 50 days less than B. How many days does A take to finish it alone?

Suppose B finishes the work in x days

$\Rightarrow$ A is able to finish it in $(x - 50)$ days

Time taken by A = $\frac{1}{3}$ (Time taken by B)

$$\therefore x - 50 = \frac{1}{3}x$$

$$\Rightarrow 3x - 150 = x \Rightarrow 2x = 150 \Rightarrow x = 75$$

$\therefore$ Time taken by B = 75 days, time taken by A = 25 days

Ans: (D) 25 days

9. A can do a piece of work in 40 days, B in 25 days and C in 20 days. All begin together, but A leaves the work after 2 days and B leaves 1 day before the work is finished. How long did the work last?

$$\text{A's 1 day's work} = \frac{1}{40}, \text{ B's} = \frac{1}{25}, \text{ C's} = \frac{1}{20}$$

A, B, C together work for 2 days; C alone works for the last 1 day; B and C work together in between.

$$(\text{A} + \text{B} + \text{C})\text{'s 1 day's work} = \frac{1}{40} + \frac{1}{25} + \frac{1}{20} = \frac{5+8+10}{200} = \frac{23}{200}$$

$$(\text{A} + \text{B} + \text{C})\text{'s 2 days' work} = 2 \times \frac{23}{200} = \frac{23}{100}$$

$$\text{C's 1 day's work} = \frac{1}{20}$$

$$\text{Remaining work} = 1 - \left(\frac{23}{100} + \frac{1}{20} \right) = \frac{18}{25}$$

$$(\text{B} + \text{C})\text{'s 1 day's work} = \frac{1}{25} + \frac{1}{20} = \frac{4+5}{100} = \frac{9}{100}$$

$$\text{Remaining work is done by (B + C) in } \frac{18}{25} \div \frac{9}{100} = 8 \text{ days}$$

$$\text{Total time} = 2 + 8 + 1 = 11 \text{ days}$$

Ans: (C) 11 days

10. A can do a piece of work in 210 days and B can do it in 196 days. They work together for 14 days. Then B leaves and A alone continues the work. 5 days after that, C joins A and the work is completed in 64 days more. In how many days can C do the work alone?

$$\begin{aligned} \text{A's 1 day's work} &= \frac{1}{210}, \text{ B's 1 day's work} = \frac{1}{196} \\ (\text{A} + \text{B})\text{'s 1 day's work} &= \frac{1}{210} + \frac{1}{196} = \frac{14+15}{2940} = \frac{29}{2940} \\ (\text{A} + \text{B})\text{'s 14 days' work} &= 14 \times \frac{29}{2940} = \frac{29}{210} \\ \text{A's 5 days' work} &= \frac{5}{210} = \frac{1}{42} \\ (\text{A} + \text{C})\text{'s 64 days' work} &= 1 - \left(\frac{29}{210} + \frac{1}{42} \right) = \frac{88}{105} \\ \Rightarrow (\text{A} + \text{C})\text{'s 1 day's work} &= \frac{88}{105} \div 64 = \frac{11}{840} \\ \text{C's 1 day's work} &= \frac{11}{840} - \frac{1}{210} = \frac{11-4}{840} = \frac{7}{840} = \frac{1}{120} \\ \text{C can finish the work in 120 days} \end{aligned}$$

Ans: (A) 120 days

11. A and B together can do a piece of work in 45 days. B and C together can do it in 60 days. If A is twice as good a workman as C, C alone can do it in

$$\begin{aligned} (\text{A} + \text{B})\text{'s 1 day's work} &= \frac{1}{45}, (\text{B} + \text{C})\text{'s 1 day's work} = \frac{1}{60} \\ \text{A's 1 day's work} &= \text{C's 2 days' work} \\ \text{C's 2 days' work} + \text{B's 1 day's work} &= \frac{1}{45} \\ \Rightarrow \text{C's 1 day's work} + (\text{B} + \text{C})\text{'s 1 day's work} &= \frac{1}{45} \\ \Rightarrow \text{C's 1 day's work} + \frac{1}{60} &= \frac{1}{45} \\ \text{C's 1 day's work} &= \frac{1}{45} - \frac{1}{60} = \frac{4-3}{180} = \frac{1}{180} \\ \therefore \text{C alone can finish it in 180 days} \end{aligned}$$

Ans: (C) 180 days

12. A and B together can do a piece of work in 39 days. B and C together can do it in 52 days. If A is twice as good a workman as C, A alone can do it in

$$\begin{aligned} (\text{A} + \text{B})\text{'s 1 day's work} &= \frac{1}{39}, (\text{B} + \text{C})\text{'s 1 day's work} = \frac{1}{52} \\ \text{A's 1 day's work} &= \text{C's 2 days' work} \\ \text{C's 2 days' work} + \text{B's 1 day's work} &= \frac{1}{39} \\ \Rightarrow \text{C's 1 day's work} + (\text{B} + \text{C})\text{'s 1 day's work} &= \frac{1}{39} \\ \Rightarrow \text{C's 1 day's work} + \frac{1}{52} &= \frac{1}{39} \\ \text{C's 1 day's work} &= \frac{1}{39} - \frac{1}{52} = \frac{4-3}{156} = \frac{1}{156} \\ \text{A's 1 day's work} &= 2 \times \frac{1}{156} = \frac{1}{78}, \text{ so A alone takes 78 days} \end{aligned}$$

Ans: (D) 78 days

13. A and B working alone can finish a piece of work in 20 and 15 days respectively. If they work at it alternately for a day, A beginning, in how many days will the work be finished?

$$\text{A's 1 day's work} = \frac{1}{20}, \text{ B's 1 day's work} = \frac{1}{15}$$

$$\text{Work done in the first 2 days} = \frac{1}{20} + \frac{1}{15} = \frac{3+4}{60} = \frac{7}{60}$$

$$\text{Work done in the first 16 days} = 8 \times \frac{7}{60} = \frac{14}{15}$$

$$\text{On day 17 it is A's turn: work done in the first 17 days} = \frac{14}{15} + \frac{1}{20} = \frac{59}{60}$$

$$\text{Remaining work} = 1 - \frac{59}{60} = \frac{1}{60}$$

$$\text{B does it in } \frac{1}{60} \div \frac{1}{15} = \frac{1}{4} \text{ day}$$

$$\therefore \text{Total no. of days} = 17 + \frac{1}{4} = 17\frac{1}{4} \text{ days}$$

Ans: (D) $17\frac{1}{4}$ days

14. A certain number of men complete a piece of work in 63 days. If there were 20 men more, the work could be finished in 18 days less. How many men were there originally?

Let the original number of men be x

$$\text{No. of men} \propto \frac{1}{\text{No. of days}}$$

$$x \times 63 = (x + 20) \times 45$$

$$63x = 45x + 900$$

$$18x = 900 \Rightarrow x = 50$$

Ans: (A) 50

15. If 3 men or 8 boys can finish a piece of work in 40 days, in how many days can 3 men and 2 boys finish it?

$$3 \text{ men} = 8 \text{ boys}$$

$$3 \text{ men} = \frac{8}{3} \times 3 = 8 \text{ boys}$$

$$3 \text{ men} + 2 \text{ boys} = 8 \text{ boys} + 2 \text{ boys} = 10 \text{ boys}$$

$$\text{No. of boys} \propto \frac{1}{\text{No. of days}}$$

$$8 \times 40 = 10 \times x \Rightarrow x = 32 \text{ days}$$

Ans: (B) 32 days

16. 6 men and 3 women working 3 hours a day finish a piece of work in 6 days; 2 men and 3 women working 3 hours a day do the same work in 12 days. Find the number of days in which the work is done by 6 men only, working 6 hours a day.

Let 1 man do m and 1 woman do w units of work in 1 hour.

$$\text{Case (i): } (6m + 3w) \times 3 \times 6 = 108m + 54w$$

$$\text{Case (ii): } (2m + 3w) \times 3 \times 12 = 72m + 108w$$

$$\text{Same work: } 108m + 54w = 72m + 108w$$

$$\Rightarrow 54w = 36m \Rightarrow 3w = 2m$$

$$\text{So } 3 \text{ women} = 2 \text{ men, and } 6m + 3w = 8 \text{ men}$$

8 men working 3 hours a day for 6 days do the same work as 6 men working 6 hours a day for x days

$$8 \times 3 \times 6 = 6 \times 6 \times x \Rightarrow x = 4 \text{ days}$$

Ans: (B) 4 days

17. If 3 men with 3 boys can earn ₹4080 in 8 days and 9 men with 12 boys can earn ₹15525 in 9 days, how much does 1 man earn in a day?

Let 1 man earn ₹ x and 1 boy earn ₹ y in 1 day.

$$(3x + 3y) \times 8 = 4080 \Rightarrow 3x + 3y = 510 \quad \dots (1)$$

$$(9x + 12y) \times 9 = 15525 \Rightarrow 9x + 12y = 1725 \quad \dots (2)$$

$$(1) \times 3 \Rightarrow 9x + 9y = 1530$$

$$(2) - (1) \times 3 \Rightarrow 3y = 195 \Rightarrow y = 65$$

$$\text{From (1): } 3x = 510 - 195 = 315 \Rightarrow x = 105$$

Ans: (A) ₹105

18. 40 men are employed to do a piece of work which they could finish in 33 days, but the men drop off by 4 at the end of every 10 days. In what time will the work be completed?

$$\text{Work done by 40 men in 10 days} = 10 \times \frac{1}{33} = \frac{10}{33}$$

$$\text{So 1 man's work in 10 days} = \frac{10}{33} \div 40 = \frac{1}{132}$$

$$\text{Remaining work} = \frac{23}{33}, \text{ remaining men} = 36; \text{ work done by 36 men in 10 days} = 36 \times \frac{1}{132} = \frac{3}{11}$$

$$\text{Remaining work} = \frac{14}{33}, \text{ remaining men} = 32; \text{ work done by 32 men in 10 days} = 32 \times \frac{1}{132} = \frac{8}{33}$$

$$\text{Remaining work} = \frac{2}{11}, \text{ remaining men} = 28; \text{ work done by 28 men in 10 days} = \frac{7}{33}$$

$$\frac{2}{11} \text{ work is done by 28 men in } \frac{2}{11} \div \frac{7}{33} \times 10 = 8\frac{4}{7} \text{ days}$$

$$\text{Total time} = 10 + 10 + 10 + 8\frac{4}{7} = 38\frac{4}{7} \text{ days}$$

Ans: (C) $38\frac{4}{7}$ days

19. A can do half as much again as B can do in the same time. B alone can do a piece of work in 51 days. In how many days can both together finish it?

$$\text{If B does } x, \text{ A does } \frac{x}{2} + x = \frac{3x}{2} \text{ in the same time}$$

$$\text{Ratio of working of A and B} = \frac{3}{2} : 1 = 3 : 2$$

$$\text{Ratio of time taken for the same work} = 2 : 3$$

$$\text{Time taken by B} = 3k = 51 \Rightarrow k = 17$$

$$\text{Time taken by A} = 2k = 34 \text{ days}$$

$$\text{A's 1 day's work} = \frac{1}{34}, \text{ B's 1 day's work} = \frac{1}{51}$$

$$\text{(A + B)'s 1 day's work} = \frac{1}{34} + \frac{1}{51} = \frac{3+2}{102} = \frac{5}{102}$$

$$\text{Time taken by (A + B) to finish the work} = 20\frac{2}{5} \text{ days}$$

Ans: (B) $20\frac{2}{5}$ days

20. A man rows in still water at 4 km/hr and the rate of the current is 2 km/hr. The man's rate with the current is

$$\text{Speed downstream} = (x + y) \text{ km/hr}$$

$$= 4 + 2 = 6 \text{ km/hr}$$

Ans: (B) 6 km/hr

21. A man rows upstream 18 km and downstream 33 km, taking 6 hours each time. The man's speed in still water is

$$\text{Speed downstream: } x + y = \frac{33}{6} \text{ km/hr}$$

$$\text{Speed upstream: } x - y = \frac{18}{6} \text{ km/hr}$$

$$\text{Adding, } 2x = \frac{33}{6} + \frac{18}{6} = \frac{51}{6}$$

$$x = \frac{51}{12} = 4.25 \text{ km/hr}$$

Ans: (C) 4.25 km/hr

22. A man can row 10 km/hr in still water and he finds that it takes him thrice as long to row up as to row down the river. The rate of the stream is

Let the rate of the stream be y km/hr

Same distance, thrice the time, so speed down = $3 \times$ speed up

$$\text{Given } 3(10 - y) = 10 + y$$

$$\Rightarrow 30 - 3y = 10 + y \Rightarrow 4y = 20$$

$$\Rightarrow y = 5 \text{ km/hr}$$

Ans: (C) 5 km/hr

23. A man can row 12.5 km/hr in still water. If the river is running at 4.5 km/hr, it takes him 2 hours to row to a place and back. The place is at a distance of

Let the required distance be d km

$$\text{Speed downstream} = 12.5 + 4.5 = 17 \text{ km/hr}$$

$$\text{Speed upstream} = 12.5 - 4.5 = 8 \text{ km/hr}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}, \text{ so } \frac{d}{17} + \frac{d}{8} = 2$$

$$\Rightarrow d \left(\frac{1}{17} + \frac{1}{8} \right) = 2$$

$$\Rightarrow d \times \frac{25}{136} = 2$$

$$\Rightarrow d = 10.88 \text{ km}$$

Ans: (A) 10.88 km

24. The current of a stream runs at the rate of 5 km/hr. A motor boat goes 11 km upstream and back again to the starting point in 1 hour 25 minutes. The speed of the motor boat in still water is

Let the speed of the boat in still water be x km/hr

$$\text{Speed upstream} = (x - 5) \text{ km/hr, speed downstream} = (x + 5) \text{ km/hr}$$

$$\text{Total time} = 85 \text{ min} = \frac{85}{60} \text{ hr} = \frac{17}{12} \text{ hr}$$

$$\frac{11}{x-5} + \frac{11}{x+5} = \frac{17}{12}$$

$$\Rightarrow 11 \left(\frac{(x+5)+(x-5)}{(x-5)(x+5)} \right) = \frac{17}{12}$$

$$\Rightarrow \frac{22x}{x^2-25} = \frac{17}{12}$$

$$\Rightarrow 264x = 17x^2 - 425$$

$$\Rightarrow 17x^2 - 264x - 425 = 0$$

$$\Rightarrow (x - 17)(17x + 25) = 0$$

$$\Rightarrow x = 17 \text{ (or) } x = -\frac{25}{17} \text{ (rejected, a speed cannot be negative)}$$

$\therefore$ Speed of the boat in still water = 17 km/hr

Ans: (D) 17 km/hr

25. A man can row 28 km upstream and 9 km downstream in 5 hours, while he can row 42 km upstream and 54 km downstream in 12 hours. The speed of the man in still water is

Let the speed of the man in still water be x km/hr and the rate of the current y km/hr.

Speed upstream = $(x - y)$ km/hr, speed downstream = $(x + y)$ km/hr. Put $p = \frac{1}{x-y}$, $q = \frac{1}{x+y}$

$$\frac{28}{x-y} + \frac{9}{x+y} = 5 \Rightarrow 28p + 9q = 5 \quad \dots (1)$$

$$\frac{42}{x-y} + \frac{54}{x+y} = 12 \Rightarrow 42p + 54q = 12 \quad \dots (2)$$

$$(1) \times 3 \Rightarrow 84p + 27q = 15; (2) \times 2 \Rightarrow 84p + 108q = 24$$

$$(2) \times 2 - (1) \times 3 \Rightarrow 81q = 9 \Rightarrow q = \frac{1}{9}$$

$$\text{From (1): } 28p + 1 = 5 \Rightarrow 28p = 4 \Rightarrow p = \frac{1}{7}$$

$$\text{So } x - y = 7 \text{ and } x + y = 9$$

$$\text{Adding, } 2x = 16 \Rightarrow x = 8; \text{ then } y = 9 - 8 = 1$$

Ans: (B) 8 km/hr
