# Quantitative Aptitude

## Boat and Stream

## Level-1

**Q1** A boat can travel at a speed of X km/hr in still water. If the speed of the stream is 2 km/hr, find the time taken by the boat to go Y km downstream and come back.

I. $X = (27)^{\frac{1}{3}} \times 3\sqrt{2} \times \sqrt{2}$

II. $Y = 5X + 70$

(A) 18 hours (B) 24 hours

(C) 15 hours (D) 12 hours

(E) 21 hours

**Q2** A boat covers 144 km against the stream in 16 hours. If the average speed of the boat and current is 10.5 km/ h, then find the speed of the current.

(A) 4 km/hr (B) 8 km/hr

(C) 6 km/hr (D) 10 km/hr

(E) 15 km/hr

**Q3** A man can row 28 km/hr in still water and finds that it takes him thrice as much time to row up than as to row down the distance in the river. Find the speed of the current.

(A) 18 km/hr (B) 16 km/hr

(C) 14 km/hr (D) 12 km/hr

(E) None of these

**Q4** A man can row 36 km/hr in still water. It takes him thrice as long to row up as to row down the river. Find the rate of the stream.

(A) 14 km/hr (B) 16 km/hr

(C) 18 km/hr (D) 20 km/hr

(E) none of these

**Q5** The speed of boat in still water is three times the speed of the stream. If a boat covers 120 km upstream in 6 hours, then find the downstream speed of the boat.

(A) 23 km/hr (B) 20 km/hr

(C) 40 km/hr (D) 30 km/hr

(E) None of these

**Q6** The speed of boat in still water is 7 times the speed of the stream. If the boat covers 225 km upstream in 5 hours, then find the downstream speed of the boat.

(A) 60 km/hr (B) 75 km/hr

(C) 80 km/hr (D) 70 km/hr

(E) None of these

**Q7** A man can row 80 km upstream and 110 km downstream in 26 hours, also he can row 60 km upstream and 88 km downstream in 20 hours. Find the speed of the man in still water and the speed of the current.

(A) 8 km/hr and 2 km/hr

(B) 7 km/hr and 2 km/hr

(C) 8 km/hr and 3 km/hr

(D) 7 km/hr and 3 km/hr

(E) None of these

**Q8** If the ratio of the speed of a boat in upstream and the speed of the stream is 8 : 1. If the boat can travel 1500 km downstream in 60 hours then find the total distance travelled by the boat in still water in the same time?

(A) 1550 km (B) 1250 km

(C) 1350 km (D) 1500 km

(E) none of these

**Q9** There are 3 points X, Y and Z in a straight line, such that point Y is equidistant from points X and Z. A man can swim from point X to Z downstream in 24 hours and from Y to X upstream in 16 hours. Find the ratio of the speed of man in still water to the speed of the stream.

(A) 6:1 (B) 7:1

(C) 5:1 (D) 5:3
(E) None of these

**Q10** If the upstream speed of the boat is 50% less than the downstream speed of the boat and if an object is thrown in the river it covers 200 m in 1.66 minute, then how much distance a boat can cover in still water in 10 hours.
(A) 214 km (B) 215 km
(C) 216 km (D) 217 km
(E) none of these

**Q11** In a stream running at 2 kmph, a motor boat goes 10 km upstream and back again to the starting point in 55 minutes. Find the speed of the motor boat in still water.
(A) 22 km/hr (B) 22 km/hr
(C) 23 km/hr (D) 24 km/hr
(E) none of these

**Q12** Speed of a man in still water is 32 km/hr and the river is running at 12 km/hr. The total time taken to go to a place and come back is 16 hrs. Find the total distance travelled by man.
(A) 90 km (B) 100 km
(C) 110 km (D) 120 km
(E) 440 km

**Q13** Speed of a boat in still water is 16 km/hr and the speed of the stream is 3 km/hr. A man rows to a place at a distance of 123.5 km and comes back to the starting point. Find the total time taken by him.
(A) 18 hrs (B) 17 hrs
(C) 16 hrs (D) 15 hrs
(E) None of these

**Q14** Ratio between the speed of the boat in still water to the speed of the stream is 5:2. If 448 km is travelled downstream in 8 hours then find the difference between the speed of the boat in still water and speed of stream.
(A) 25 km/hr (B) 24 km/hr
(C) 30 km/hr (D) 32 km/hr
(E) 42 km/hr

**Q15** The ratio of the speed of the boat and the speed of the current is 4:1. If downstream the boat can cover 80 km and upstream 60 km in 18 hours. find the time taken by boat to cover 30 km downstream.
(A) 6 hr (B) 3 hr
(C) 5 hr (D) 8 hr
(E) 9 hr

**Q16** The speed of a motorboat in still water is 200% more than that of the speed of stream. If the motorboat can travel 300 km upstream in 6 hours. How much distance upstream does the motorboat travel in 10 hours?
(A) 520 km (B) 510 km
(C) 500 km (D) 490 km
(E) nonre of these

**Q17** The speed of the boat in downstream is twice the speed of the boat in upstream if the boat covers 96 km in downstream and 72 km upstream in a total of 20 hours. Find the speed of the boat in still water.
(A) 6 km/hr (B) 7 km/hr
(C) 8 km/hr (D) 9 km/hr
(E) 12 km/hr

**Q18** The speed of a boat downstream is 150% more than its speed upstream. If the time taken by the boat to go 80 km downstream and 50 km upstream is 8.2 hours, then what is the speed (in km/h) of the boat upstream?
(A) 51 km/h (B) 25 km/h
(C) 12 km/h (D) 10 km/h
(E) none of these

**Q19** The ratio of time taken by a boat and a man in travelling same distance in downstream is 1 : 2 while that in upstream is 1 : 4. If the speed of stream of the river is 6 km/h, then what are the speeds of the boat and the man in still water respectively?
(A) 20 km/hr and 15 km/hr
(B) 50 km/hr and 12 km/hr
(C) 30 km/hr and 12 km/hr

(D) 45 km/hr and 20 km/hr
(E) 40 km/hr and 22 km/hr

**Q20** Speed of the boat is 12.5 km/hr in still water and the speed of the stream is 2.5 km/hr. If the boat takes 7.5 hours to go to a place and come back. Find the distance of the place.

(A) 45 km (B) 50 km
(C) 55 km (D) 60 km
(E) None of these

# Level-2

**Q1** A boat takes 130 hours for travelling upstream from point A to point B and coming back to point C midway between A and B. If the speed of the stream is 8 km/hr. and the speed of the boat in still water is 32 km/hr. What is the distance between A and C?
(A) 1150 km (B) 1200 km
(C) 1250 km (D) 1300 km
(E) None of these

**Q2** Downstream speed is 66.67% more than upstream speed. Speed of boat in still water is 4 km/hr. Find time(in hours) required for boat to cover a round trip of 240 km (120 km each side)
(A) 16 (B) 32
(C) 18 (D) 40
(E) none of these

**Q3** Two boats M and N travels downstream in the same direction from two different places which are 24 km away from each other. The speed of boat M and N in still water is 13 kmph and 12 kmph respectively. Speed of stream is 8 kmph. If both boats travel down then after how much time they will meet each other?
(A) 20 hours (B) 24 hours
(C) 36 hours (D) 12 hours
(E) none of these

**Q4** A boat has to cover 13 km in downstream direction and speed of the boat in still water is 14 km/h. After traveling for 30 minutes, the speed of the stream is decreased to 4 km/h and the remaining distance is covered in 10 minutes. Find the initial speed of the stream.
(A) 6 km/h
(B) 5 km/h
(C) 7 km/h
(D) Data inadequate
(E) 8 km/h

**Q5** A boat travels from point A to B, a distance of 12 km. From A it travels 4 km downstream in 15 minutes and the remaining 8 km upstream to reach B. If the downstream speed is twice as high as the upstream speed, what is the average speed of the boat for the journey from A to B?
(A) 7.5 km/hr (B) 10.5 km/hr
(C) 12 km/hr (D) 9.6 km/hr
(E) 12.5 km/hr

**Q6** A man swimming at 75 percent of his usual speed can covers 256 km in 16 hours in downstream. In the return journey he swims at 50% of his usual speed and takes 64 hours. Speed of man is what percent more than speed of stream?
(A) 450% (B) 400%
(C) 300% (D) 320%
(E) 500%

**Q7** The speed of a Boat in still water is 30 km/hr. It travelled Downstream from point A to B in a certain time. After reaching B the Boat is powered by Engine then Boat starts to return from Point B to A. The time taken for Forward journey and Backward journey are same. Then what is the speed of the stream?
(A) 24 km/hr
(B) Can't be determine
(C) 28 km/hr
(D) 30 km/hr
(E) 50 km/hr

**Q8** Speed of boat in still water is two times more than the speed of the current, if the boat travels 30 km downstream and 24 km upstream in 6.5 hours. Find how much time will be required to boat in covering 42 km downstream and 18 km upstream?
(A) 5.5 hours (B) 6 hours
(C) 6.5 hours (D) 7 hours

(E) None of these

**Q9** Pawan went to a place X opposite the flow of the stream. He took 5 hours to reach X and 3 hours to come back to his starting point. He dropped his hat at point X at 3 a.m. At what time his hat will reach at the starting point?

(A) 3 PM (B) 3:30 PM
(C) 4 PM (D) 5 PM
(E) 6 PM

**Q10** A motorboat can travel x km upstream and x + 40 km downstream in 35 hours. If the ratio of the speed of the motorboat in still water to the speed of the stream is 3: 1 and the difference between their speed is 8 km. What is the approx. value of x?

(A) 140 km (B) 150 km
(C) 173 km (D) 145 km
(E) None of these

**Q11** The ratio of speed of boat P and Q in still water is 3:2. P and Q start from the same point in the river P goes upstream and Q goes downstream. After 6 hours the stream stops flowing and P starts rowing in the opposite direction to meet Q. How much time after the stream stops flowing does P meet Q?

(A) 50 hrs (B) 45 hrs
(C) 30 hrs (D) 25 hrs
(E) None of these

**Q12** The speed of boat P is 80% more than the speed of boat Q in still water if both boats start in a lake at same time from point A downstream at the same time and reach point B, which is 144 km away from point A at the same time. Boat P lost 240 minutes during the journey because the engine did not work properly. Find the time taken by boat P to cover a given distance upstream with 80% of its speed.

(A) $\frac{28}{9}$hrs (B) $\frac{26}{9}$hrs
(C) $\frac{25}{9}$hrs (D) $\frac{29}{9}$hrs
(E) None of these

**Q13** A motorboat can travel d km upstream and d + 20 km downstream in 17.5 hours. If the ratio of the speed of the motorboat in still water to the speed of stream is 3: 1 and the difference between their speed is 4 km. What is the value of d?

(A) 40 km
(B) 41 km
(C) 42 km
(D) 43 km
(E) 45 km

**Q14** The ratio of time taken by boat P and boat Q to swim a certain distance downstream in a river is 3 : 4 respectively. The time taken by boat Q to cover some other distance upstream is 50% more than the time taken by it to cover the same distance downstream. What is the ratio of speed of boat P to that of boat Q in still water?

(A) 7:8 (B) 7:5
(C) 6:5 (D) 5:2
(E) None of these

**Q15** The speed of current is 10 km/h. What will be the respective downstream speed and upstream speed of a boy rowing a boat, if one third of the distance covered going downstream in a certain time is equal to the distance covered going upstream in the same time?

(A) 20 km/hr and 15 km/hr
(B) 30 km/hr and 10 km/hr
(C) 15 km/hr and 35 km/hr
(D) 25 km/hr and 35 km/hr
(E) none of these

**Q16** A takes 133 %more time to cover a distance in upstream as compare to cover same distance in downstream. If his friend's speed and his speed are in ratio 6 : 7, when they go in downstream, then find the ratio of speed of A and his friend in still water. (Speed of stream is same in both cases)?

(A) 3 : 7 (B) 4 : 3

(C) 5 : 4 (D) 5 : 6
(E) 2:3

**Q17** A steamer takes 18 minutes less to travel 18 miles downstream than to travel the same distance upstream. If the speed of the steamer in still water is 3 miles per minute the speed of the stream(miles per minute)is:
(A) $\sqrt{19}$ +1 km/hr (B) $\sqrt{19}$ -2 km/hr
(C) $\sqrt{19}$ -1 km/hr (D) $\sqrt{19}$ +2 km/hr
(E) None of these

**Q18** A Boat takes $\frac{D}{36}$ hours less to cover a certain distance downstream than upstream. If the speed of Boat in downstream is 18 km/h, then find the speed of the boat in still water. (D is the distance covered by the boat upstream and downstream).
(A) 15 km/h (B) 36 km/h
(C) 48 km/h (D) 56 km/h
(E) 50 km/h

**Q19** The ratio of time taken by A and B to swim a certain distance downstream in a river is 3: 4 respectively. The time taken by B to cover a certain distance upstream is 50% more than the time taken by him to cover the same distance downstream. Both of them hired a boat that runs with a speed equal to the sum of their individual speeds. If A can cover a straight path of length 28 km in 120 minutes, then find the time taken by both of them to travel a distance of 96 km to and fro by the hired boat.
(A) $6\frac{4}{575}$ hours
(B) $4\frac{4}{575}$ hours
(C) 5 hours
(D) 3 hours
(E) none of these

**Q20** The boat covers (P) km downstream in river Sharda in 20 hours and the same boat covers (Q) km upstream in River Yamuna in 36 hours. If the speed of the current in X is 40% less than that of Yamuna, then what can be the possible value(s) of the speed of the boat in still water and the speed of the current in Sharda?
(I) (24 & 6)
(II) (80 & 16)
(III) (32 & 8)
(IV) (30 & 7.5)
(V) (40 & 8)
(A) Only (I), (III) and (IV)
(B) Only (III), (IV) and (V)
(C) only (V)
(D) All of the above
(E) only (II) and (V)

# Level-3

**Q1** Ratio of time taken by a Ship to go 'S' km distance upstream to the time taken by that ship to go (S - 6) km downstream is 15:8 respectively and also the ratio of the speed of a ship in still water to the speed of the stream is 5: 1 respectively. What is the respective ratio of time taken by that ship to go (S + 2) km upstream and (S + 12) km downstream?

(A) 4 : 5 (B) 6 : 7
(C) 8 : 7 (D) 1 : 2
(E) None of these

**Q2** In downstream, two steamers A and B start simultaneously from the point P but the steamer B reaches point Q, 4 hours before the steamer A reaches the same point. If the distance between point P and Q is 240 km and the speed of steamer B in upstream is 6 km per hour more than that of steamer B in upstream and the speed of stream is 4 km per hour, then find the sum of the speed of steamer A in still water and that of steamer B in still water?

(A) 42 km/hr (B) 43 km/hr
(C) 44 km/hr (D) 45 km/hr
(E) 46 km/hr

**Q3** Data I– Boat A can travel 25.6 km distance downstream in 48 minutes in ocean. The ratio between the speed of boat A in still water to the speed of the current is 7: 1.

Data II– Boat B can travel 19.6 km distance upstream in 42 minutes in the sea. The ratio between the speed of B in still water to the speed of the current is 9: 2.

Boat B covers a total distance of 120 km from A to B and comes back from B to A in ocean in total 6 hr 45 minutes, then find speed of Boat B in still water in the ocean is what percent more than that of speed of Boat A in still water in sea?

(A) $32\frac{4}{7}\%$
(B) $30\frac{4}{7}\%$
(C) $29\frac{4}{7}\%$
(D) $28\frac{4}{7}\%$
(E) None of these

**Q4** Three boats A, B, and C cover 135 km in still water in 5 hours 24 minutes, 'p' hours, and 4 hours 30 minutes respectively. The stream is flowing with a speed of 'p' km/h. The upstream speed of boat B is 3 km/h less than the upstream speed of boat C.

If boat A rows (2y + 5) km up and returns in total 10 hours 45 minutes, then the value of 'y' is -

(A) 53 km (B) 52 km
(C) 62 km (D) 78 km
(E) none of these

**Q5** Speed of a boat in still water is 12 km/h while the speed of stream is ____ km/h. Total time taken by the boat to go 120 km upstream and 180 km downstream is ____ hours.

The values given in which of the following options will fill the blanks in the same order in which is it given to make the above statement true:

A. 8, 39
B. 6, 30
C. 9, 46
D. 4, 26.25
(A) Only A
(B) Only B
(C) Only A and B
(D) Only A, B and D
(E) Only B and D

**Q6** The speed of the boat in still water is Z km/h and the speed of the stream is Y km/h. The boat travels M km upstream in N hours, while it takes (N – 2) hours to travel a downstream distance of 72 km. The downstream speed of the boat is 24 km/h. The total time taken by boat to travel an upstream distance of 360 km

(with twice the speed of a boat in still water) and a downstream distance of 120 km is 15 hours.

Find which of the given statements is true.

I. M = 80

II. 3Y is 40% less than that of Z

III. Time taken by boat to travel [2M + 4(Z – Y)] km downstream distance > $(N - 2)^2$.

(A) II and III only

(B) I and III only

(C) I and II only

(D) I, II, and III

(E) I only

**Q7** The speed of a boat in still water is _____% more than that of the current. The boat takes _____ hours to cover 110 km downstream. The upstream speed of the boat is _____ km/hr.

The values given in which of the following options will fill the blanks in the same order in which is it given to make the statement true:

I. 20, 5, 2

II. 40, 3, 6

III. 75, 10, 3

(A) Only I and III (B) Only II

(C) Only I and II (D) Only III

(E) Only I

**Q8** The speed of a boat in still water is 'x' km/hr, and speed of the stream is 8 km/hr. If the speed of the boat in still water had been 4 km/hr more, then the total time taken by the boat to cover 120 km downstream and the same distance upstream would have been 20 hours. The time taken by the boat to cover 120 km in downstream with the original speed can be:

I. (x – 2.5) hours

II. (0.5x + 2) hours

III. (1.5x – 12) hours

(A) Only III (B) Only I and II

(C) Only II (D) Only I

(E) Only I and III

**Q9** The speed of the current is 8 km/hr less than the speed of the boat in still water. The boat takes 6.5 hours to cover 260 km downstream. If the speed of the boat in still water is 'x' km/hr, then the speed of the current is:

I. (0.75x – 2) km/hr

II. {(1.5x – 12) – 8} km/hr

III. $\{(x + 0.4^2) - 5.16\}$ km/hr

(A) Only III (B) Only I and III

(C) Only I (D) Only I and II

(E) only II

**Q10** The sum of the speeds of boat 'A' and 'B' in still water is 64 km/hr such that the speed of boat B in still water is _____ km/hr and the speed of the current is 16 km/hr. The time taken by the boat 'A' to cover 196 km downstream is _____ hours.

The values given in which of the following options will fill the blanks in the same order in which is it given to make the statement true:

i. 24, 3.5

ii. 31, 4

iii. 40, 4.9

(A) Only i and iii

(B) Only i and ii

(C) All i, ii and iii

(D) Only i

(E) Only iii

# Answer Key

## Level-1

| | | | |
|---|---|---|---|
| Q1 | (A) | Q11 | (A) |
| Q2 | (C) | Q12 | (E) |
| Q3 | (C) | Q13 | (C) |
| Q4 | (C) | Q14 | (B) |
| Q5 | (C) | Q15 | (B) |
| Q6 | (A) | Q16 | (C) |
| Q7 | (C) | Q17 | (D) |
| Q8 | (C) | Q18 | (D) |
| Q9 | (B) | Q19 | (C) |
| Q10 | (C) | Q20 | (A) |

# Level-2

| | | | |
|---|---|---|---|
| Q1 | (B) | Q11 | (C) |
| Q2 | (B) | Q12 | (C) |
| Q3 | (B) | Q13 | (A) |
| Q4 | (A) | Q14 | (B) |
| Q5 | (D) | Q15 | (B) |
| Q6 | (C) | Q16 | (C) |
| Q7 | (B) | Q17 | (C) |
| Q8 | (C) | Q18 | (A) |
| Q9 | (E) | Q19 | (B) |
| Q10 | (C) | Q20 | (E) |

# Level-3

| | | | |
|---|---|---|---|
| Q1 | (C) | Q6 | (D) |
| Q2 | (E) | Q7 | (A) |
| Q3 | (D) | Q8 | (A) |
| Q4 | (C) | Q9 | (D) |
| Q5 | (D) | Q10 | (C) |

# Hints & Solutions

## Level-1

**Q1 Text Solution:**

$X = (27)^{\frac{1}{3}} \times 3\sqrt{2} \times \sqrt{2}$

$X = 3 \times 6 = 18$

$Y = 5X + 70$

$Y = 5 \times 18 + 70 = 160$ km

Downstream speed = 18 + 2 =20 km/hr

Upstream speed = 18-2=16 km/hr

Required time = $\frac{160}{20} + \frac{160}{16} = 8 + 10 = 18$ hours.

**Q2 Text Solution:**

Speed of upstream = $\frac{144}{16} = 9km/hr$

Speed of downstream = 10.5 × 2 = 21 km/hr

Therefore, speed of current = $\frac{21-9}{2} = 6\ kmph$

∴ The answer is 6 kmph.

**Q3 Text Solution:**

Let speed upstream be x km/hr then speed downstream = 3x km/hr

Speed in still water = $\frac{1}{2}$ (x+3x) = 2x km/hr

2x = 28km/hr

x = 14 km/hr

So speed upstream = 14 km/hr

Speed downstream = 42 km/hr

Speed of current = $\frac{1}{2}(42 - 14)$

=14km/h

**Q4 Text Solution:**

Given,

Speed of man(x) = 36 km/hr

Let speed upstream be x kmph Then speed downstream = 3x kmph

speed in still water = $\frac{1}{2}(x + 3x)$ = 2x km/h

2x = 36

x = 18

So speed upstream = 18 km/hr

Speed downstream = 54 km/hr

Speed of current = $\frac{1}{2} \times (54 - 18)$

= 18 km/h

**Q5 Text Solution:**

Ans: 40 km/hr

Let the speed of the stream be x km/hr.

So, the speed of the boat in still water = 3x km/hr.

$\frac{120}{6} = (3x - x)$

$\Rightarrow 2x = 20$

$\Rightarrow$x = 10

So, required downstream speed of boat = (3x + x) = 4x = 40 km/hr

**Q6 Text Solution:**

Let the speed of the stream be x km/hr.

So, speed of boat in still water = 7x km/hr

$\frac{225}{5} = (7x - x)$

$x = 7.5$

So, required downstream speed of the boat.

=> (7x + x) = 8 x = 8 (7.5) = 60 km/hr

**Q7 Text Solution:**

Let rate upstream = x km/hr and rate downstream = y km/hr

Then, $\frac{80}{x} + \frac{110}{y}$ = 26

$\frac{40}{x} + \frac{55}{y}$ = 13

40y + 55x = 13xy.....(i)

And $\frac{60}{x} + \frac{88}{y}$ = 20

$\frac{15}{x} + \frac{22}{y} = 5$

15y + 22x = 5xy.....(ii)

Multiplying (i) by 3 and (ii) by 8 we get,

120y + 165x = 39xy.....(iii)

120y + 176x = 40xy.....(iv)

Subtracting (iii) from (iv) we get,

11x = xy

y = 11

Substituting the value of y in (i) we get,

4011 + 55x = 13

440 + 55x = 143x

88x = 440

x = 5

Rate of boat in still water = $\frac{1}{2}$×(11 + 5) = 8 km/hr

Rate of current = $\frac{1}{2}$×(11 - 5) = 3 km/hr

**Q8 Text Solution:**

Let the speed of the boat in upstream = 8x km/hr

And the speed of the stream = x km/hr

Speed of boat in downstream = $\frac{1500}{60}$ = 25 km/hr

Let the speed of the boat in still water = p km/hr

Then,

p + x = 25 km/hr .....(i)

p – x = 8x ,

p = 9x .....(ii)

Put the value of p in the equation (i)

10x = 25, x = 2.5

From the equation (ii)

speed of boat in still water = 9x = 9 × 2.5 = 22.5 km/hr

The total distance travelled by boat in still water in 60 hours is = 60 × 22.5 = 1350 km

**Q9 Text Solution:**

From the given information,

Let speed of man in still water = a km/h

Speed of current = b km/h

Downstream speed = (a + b) km/h

Upstream speed = (a – b) km/h

Let XY = YZ = P and XZ = 2P

So,

$\frac{2P}{a+b} = 24 \; and \; \frac{P}{a-b} = 16$

By dividing both equations-

$\frac{2P(a-b)}{P(a+b)} = \frac{24}{16} \Rightarrow 4a - 4b = 3a + 3b$

$\Rightarrow \frac{a}{b} = \frac{7}{1}$

Required ratio = Speed of man in still water : Speed of current

$\Rightarrow 7 : 1$

**Q10 Text Solution:**

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

As the object covers 200m in 100 sec, the distance traveled by the object will be with the help of the speed of the stream only.

Speed of stream = 2m/sec (1.66 min = 100 sec)

Given that,

(x - 2) = 50% of (x + 2)

2×(x - 2) = (x + 2)

x = 6m/sec

x = $6 \times \frac{18}{5} = 21.6$km/hr

Distance covered by boat in still water in 10 hours

= 216 km

**Q11 Text Solution:**

Let the speed of the motor boat in still water be x kmph.

Speed downstream = (x + 2) kmph

Speed upstream = (x - 2) kmph

Therefore,

$\frac{10}{x} - 2 + \frac{10}{x} + 2 = \frac{55}{60}$

$\frac{1}{x} - 2 + \frac{1}{x+2} = \frac{55}{600} = \frac{11}{120}$

$11x^2$-240x-44=0

(x - 22)(11x + 2)=0

x = 22

Therefore, the speed of a motorboat in still water is 22 kmph.

**Q12 Text Solution:**

Speed of downstream = 32 + 12 = 44 km/hr

Speed of upstream = 32 - 12 = 20 km/hr

Let the distance traveled be x km

$\frac{x}{44} + \frac{x}{20} = 16$

$\frac{5x+11x}{4\times11\times5} = 16$

$x = 220$

Total distance = 220 + 220 = 440km

**Q13 Text Solution:**

Rate upstream = 16 - 3 = 13 km/hr

Rate downstream = 16 + 3 = 19 km/hr

Time taken to go upstream = $\frac{123.5}{13}$ = 9.5hr

Time taken to go downstream = $\frac{123.5}{19}$ = 6.5hr

Total time taken = 9.5 + 6.5 = 16hrs

**Q14 Text Solution:**

Let the speed of the boat in still water be 5x and the speed of the stream be 2x

According to the question,

$\frac{448}{8}$= 5x + 2x

7x = 56

x = 8

Required difference = 5x – 2x = 3x

= 8×3 =24 km/hr

**Q15 Text Solution:**

Ratio of speed of boat and speed of current = 4:1

downstream speed = 4x + x = 5x

upstream speed = 4x - x = 3x

time = $\frac{80}{5x} + \frac{60}{3x}$=18

$\frac{36}{x} = 18$

$x = 2$

downstream speed = 5x = 5×2 = 10kmph

time is taken to cover 30km downstream= $\frac{30}{10} = 3$hour

Hence the answer is 3 hours.

**Q16 Text Solution:**

Let the speed of the stream = x km/hr

The speed of the motorboat in still water = (100+200)% of x

300% of x = 3x km/hr

The upstream speed = 3x – x = 2x km/hr

downstream speed = 3x + x = 4x

time = distance/speed

6 = $\frac{300}{2x}$

x = 25

=> The upstream speed = 50 km/hr

downstream speed=100 km/hr

The distance the motorboat can travel in 10 hours upstream

=> 10×50

=> 500 km

**Q17 Text Solution:**

Let the speed of the boat in upstream be u km/hr and downstream speed be 2u km/hr.

$\frac{96}{2u} + \frac{72}{u} = 20$

$\frac{96+144}{2u} = 20$

$40u = 240$

$u = \frac{240}{40} = 6km/hr$

Downstream speed = 12 km/hr

Speed of the boat in still water = $\frac{12+6}{2} = 9\ km/hr$

**Q18 Text Solution:**

The ratio of upstream speed to downstream speed

⇒ 100a : 250a = 2a : 5a

As per the question;

80 km/5a + 50 km/2a = 8.2 hours

$\Rightarrow \frac{16}{a} + \frac{25}{a} = 8.2$

$\Rightarrow \frac{41}{a} = 8.2$

$\Rightarrow a = \frac{41}{8.2}$

$\Rightarrow a = 5$

∴ The speed upstream of the boat = 2a

⇒ 2a = 2 × 5

⇒ 10 km/h

**Q19 Text Solution:**

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

Since the distance is same, the ratio of speeds will be inverse of the ratio of the time taken.

Downstream speed of boat : downstream speed of man = 2 : 1

=$\frac{x+6}{y+6} = \frac{2}{1}$

x + 6 = 2y + 12

x - 2y = 6.....(i)

Upstream speed of boat : upstream speed of man = 4 : 1

=$\frac{x-6}{y-6} = \frac{4}{1}$

x - 6 = 4y – 24

x - 4y = –18 .....(ii)

Solving (i) and (ii) we get,

x = 30 and y = 12

Hence, the speeds of boat and the man in still water be 30 km/hr and 12 km/hr respectively.

**Q20 Text Solution:**

Upstream speed = 12.5 – 2.5 = 10 km/hr

Downstream speed = 12.5+2.5 = 15 km/hr

Let the distance be x km,

time(upstream) + time(downstream) = total time

$\frac{x}{15} + \frac{x}{10} = 7.5$

$\frac{2x+3x}{30} = 7.5$

$\frac{5x}{30} = 7.5$

$x = 7.5 \times 6$

$x = 45km$

# Level-2

**Q1 Text Solution:**

Let the distance between A and B is 2d km

Upstream speed = 32 – 8 = 24 km/h

Downstream speed = 32 + 8 = 40 km/h

According to the question,

$\frac{2d}{24} + \frac{d}{40} = 130$

$\frac{10d+3d}{120} = 130$

$\frac{13d}{120} = 130$

$d = 1200km$

**Q2 Text Solution:**

Downstream speed = u + v

Upstream speed = u - v

u and v are boat and stream speeds.

We know,

66.67% = 2/3

(1 + 2/3) (8 - v) = 8 + v

40 - 5v = 24 + 3v

8v = 16

v = 2 km/hr

Required time = $\frac{120}{8+2} + \frac{120}{8-2} = 32$ hours

**Q3 Text Solution:**

Speed of boat M in still water = 13 kmph

Speed of boat N in still water = 12 kmph

Speed of the stream = 8 kmph

Downstream speed of boat M = 13 + 8 = 21 kmph

Downstream speed of boat N = 12 + 8 = 20 kmph

As the boats are traveling in same direction,

⇒ 21N - 20N = 24

⇒ N = 24

After24 hours of travelling both boats M and N meet.

**Q4 Text Solution:**

Let the initial speed of the stream = 'x' km/h

From the question:

$\frac{(14+x)\times 30}{60} + \frac{(14+4)\times 10}{60} = 13$

14 + x = 20

x = 6

So, the initial speed of the stream = 6 km/h

**Q5 Text Solution:**

ATQ, 4 km downstream is covered in 15 min.

∴ Speed of downstream = 16 km/hr.

So the speed of upstream = 8km/hr.

Total time taken for downstream journey = 15 min (given).

Now total time taken for the upstream journey = 8/8 = 1 hr = 60 min.

Hence total time taken from A to B = 15 + 60 = 75 min.

As average speed = Total distance /total time, so average speed from A to B $= \frac{12}{75} \times 60 = \frac{48}{5} = 9.6$ km/hr

**Q6 Text Solution:**

Let speed of man = x

And speed of stream = y

According to question,

0.75x + y = 16 .....(i)

And 0.5x – y =

0.5x – y = 4 .....(ii)

On solving (i) and (ii)

x = 16, y = 4

Required percentage =

= $\frac{16-4}{4} \times 100$

= 300%

**Q7 Text Solution:**

Speed of boat in still water = 30 km/hr

Let speed of stream = x km/hr

Speed in downstream = (30+x) km/hr

Speed in upstream = (30-x) km/hr

Let us also assume that distance between A to B is D km

According to question, = time taken for Forward journey and Backward journey are same

$\frac{D}{30+x} = \frac{D}{30-x}$

=> 30 + x = 30 – x

x + x = 30 – 30

2x = 0

Which is not possible

Hence, the speed of the current cant be determine.

**Q8 Text Solution:**

Let the speed of the boat = x km/hr

And speed of current = y km/hr

Given x = y+2y = 3y km/hr

According to question,

$\frac{30}{4y} + \frac{24}{2y} = 6.5$

y = 3 km/hr

$\frac{42}{4y} + \frac{18}{2y} = t$

Put y = 3

Required time (t) = 6.5 hours

**Q9 Text Solution:**

Upstream time is 5 hours and downstream time is 3 hours.

So, the ratio of the speed of Pawan and stream = $= \frac{1}{2}\left(\frac{d}{3} + \frac{d}{5}\right) : \frac{1}{2}\left(\frac{d}{3} - \frac{d}{5}\right)$ = 4:1.

Let the speed of Pawan be 4k km/hr in still water and the speed of the hat be k km/hr

Distance of point X = $(4k + k) \times 3 = 15k$ km

Time taken by hat cover 15k km = $\frac{15k}{k} = 15$ hours

So that will reach at 6 PM.

**Q10 Text Solution:**

Let the speed of the motorboat in still water = 3a km/hr

then the speed of the motorboat in stream = a km/hr

According to the question, 3a – a = 2a = 8

a = 4 km/hr

the speed of the motorboat in still water = 3a km/hr = 12 km/hr

the speed of the motorboat in stream = a km/hr = 4 km per hour

Upstream speed = 12 – 4 = 8 km/hr

Downstream speed = 12 + 4 = 16 km per hour

$\frac{x}{8} + \frac{x+40}{16} = 35$

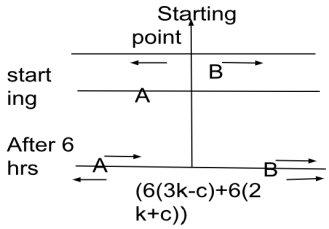
$\frac{2x+x+40}{16} = 35$

3x + 40 = 560

3x = 520

x = 173 approx.

**Q11 Text Solution:**




Let speed of current = c km/hr

Let the speed of P and Q in still water be 3k km/hr and 2k km/hr

Upstream speed of P = (3k-c) km/hr

Downstream speed of Q = (2k+c) km/hr

Distance between P and Q after 6 hrs = [6(3k-c)+6(2k+c)] km

= (18k - 6c + 12k + 6c)

= 30k km

After stream becomes stationary relative speed when both go in same direction = (3k-2k) km/hr = k km/hr

Time after which they meet = $\frac{30k}{k}$ = 30 hrs

**Q12 Text Solution:**

We know that there is no speed of current in the lake

Let the speed of the boat in still water = x km/hr and speed of boat P in still water = 1.8x km/hr

If boat P did not loss time, it would have reached four hours earlier so,

$\frac{144}{x} - \frac{144}{1.8x} = \frac{240}{60}$

$\frac{144}{x} - \frac{80}{x} = 4$

$\frac{144-80}{x} = 4$

$64 = 4x$

$x = 16\ km/hr$

$Speed\ of\ boat = 1.8 \times 16 = 28.8\ km/hr$

$Let\ boat\ takes\ t\ hours\ in\ covering$

$dis\tan ce\ upstream$

$Then,\ t = \frac{144}{28.8 \times 1.8}$

$t = \frac{25}{9}\ hrs$

**Q13 Text Solution:**

Let the speed of the motorboat in still water = 3a km/hr

Then the speed of the motorboat in stream = a km/hr

According to the question,

3a - a = 2a

2a = 4 km/hr

a = 2 km/hr

The speed of the motorboat in still water = 3a km/hr = 6 km/hr

The speed of the motorboat in stream = a km/hr = 2 km/hr

Upstream speed = 6 – 2 = 4 km/hr

Downstream speed = 6+2 = 8 km/hr

$\frac{d}{4} + \frac{d+20}{8} = 17.5$

$\frac{2d+d+20}{8} = 17.5$

$3d + 20 = 140$

$3d = 120$

d = 40 km

**Q14 Text Solution:**

Let the total distance be D km

And speed of boat P in still water be x km/hr

And speed of boat Q in still water be y km/hr

And speed of stream be r km/hr

According to question,

$\frac{D}{x+r} : \frac{D}{y+r}$ = 3:4

Or $\frac{y+r}{x+r}$ = 3:4.....(i)

Also for distance D1 = $\frac{D1}{y-r} = \frac{3}{2}\left(\frac{D1}{y+r}\right)$

2y+2r = 3y-3r

Or y = 5r

Putting this in eq(i) we get,

$\frac{6r}{x+r} = \frac{3}{4}$

3x+3r = 24r

x = 7r , ratio of speed of boat P and boat Q in still water = 7r : 5r = 7:5

**Q15 Text Solution:**

Let the speed of boy in still water be x km/h

The speed of the current is given = 10 km/h

Downstream speed = (x + 10) km/h

Upstream speed = (x – 10) km/h

Let time be 't' hours.

According to question,

$\frac{(x+10)}{3} \times t = \left(x - 10\right) \times t$

x + 10 = 3x – 30

2x = 40

x = 20 km/hr

Downstream speed = 20 + 10 = 30 km/hr

Upstream speed = 20 – 10 = 10 km/hr

**Q16 Text Solution:**

Let time taken by A to cover a distance 'D' in downstream is 3x

So, time taken to cover 'D' distance in upstream = 7x

Speed of A in downstream and upstream be 7x and 3x respectively

Speed of stream = $\frac{7x-3x}{2} = \frac{4x}{2}$ = 2x

And, speed of A's friend in downstream = 7x $\times \frac{6}{7}$ = 6x

Speed of A in still water = 7x – 2x = 5x

Speed of A's friend in still water = 6x – 2x = 4x

Required ratio = 5 : 4

**Q17 Text Solution:**

Let the speed of the stream be x.

Rate of downstream = 3 + x

Rate of upstream = 3 – x

$\frac{18}{3-x} - \frac{18}{3+x}$ = 18

=> 3 + x - 3 + x = 18 $-x^2$

=> 2x = 18 – $x^2$

=>$x^2$ + 2x - 18 = 0

By sridharacharya's formula, roots of quadratic eq. $ax^2$+bx+c = 0

Will be $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

Here, a = 1, b = 2 and c = -18

Therefore

$x = \frac{-2\pm\sqrt{2^2-4\times1\times(-18)}}{2\times1}$

$x = \frac{-2\pm\sqrt{76}}{2} = \frac{-2\pm2\sqrt{19}}{2} = -1 \pm \sqrt{19}$

$x = \sqrt{19} - 1 km/hr$

**Q18 Text Solution:**

Let the speed of the boat in still water and the stream be x and y kmph respectively.

Upstream speed = $x - y\ kmph$

Downstream speed = 18 kmph

As per question;

$\frac{D}{X-Y} - \frac{D}{18} = \frac{D}{36}$

$=> \frac{1}{x-y} = \frac{1}{36} + \frac{1}{18}$

$=> \frac{1}{x-y} = \frac{1}{12}$

$=> x - y = 12$

$=> x + y = 18$

$=> x = 15$

**Q19 Text Solution:**

Let, speed of A be '$a$'

Speed of B be '$b$'

And speed of stream be '$r$',

According to question,

let distance=D

$\frac{D}{a+r} : \frac{D}{b+r} = \frac{3}{4}$

$\frac{b+r}{a+r} = \frac{3}{4}$ ..... (i)

B to cover a certain distance upstream is 50% more than the time taken by him to cover the same distance downstream

$\frac{D_1}{b-r} = \frac{3}{2}\frac{D_1}{b+r}$

Or, 2b + 2r = 3b – 3r

Or, b = 5r

Putting this in (i),

Or, 3a + 3r = 24r

Or, a = 7r

Ratio of their speed = 7r : 5r = 7 : 5

Speed of A = $\frac{28\times60}{120}$ = 14 km/hr

7r=14

r=2

Then, speed of B = 5r = 10 km/hr

Required time taken = $\frac{96}{48+2} + \frac{96}{48-2}$

=$\frac{96}{50} + \frac{96}{46}$

=4$\frac{4}{575}$hr

**Q20 Text Solution:**

Let speed of current in Yamuna be 5a km/hr. and speed of boat in still water be y km/hr.

So, speed of current in sharda = 5a × $\frac{60}{100}$ = 3a km/hr

According to question,

(3a + y)×20 = (y – 5a)×36

60a + 20y = 36y – 180a

240a = 16y

$\frac{a}{y} = \frac{1}{15}$

Let a & y be r & 15r respectively.

So, speed of boat in still water = y = 15r km/hr

And, speed of current in sharda = 3a = 3r km/hr

Hence, the speed of boat in still water is 5 times of speed of current in sharda and only (80 & 16) & (40 & 8) satisfy this condition.

# Level-3

**Q1 Text Solution:**

Let the speed of the ship in still water and the speed of the stream is 5x and x respectively.

According to the question:

The ratio of time taken by the ship to go S km distance upstream and (S - 6) km downstream is 15: 8 respectively.

$\Rightarrow (\frac{S}{4x}) : \frac{(S-6)}{6x}$ = 15 : 8

$\Rightarrow \frac{\frac{S}{4x}}{\frac{(S-6)}{6x}} = \frac{15}{8}$

$\Rightarrow 8 \times \frac{S}{4x} = 15 \times \frac{(S-6)}{6x}$

⇒ 4S = 5 (S - 6)

⇒ 4S = 5S - 30

⇒ S = 30

Time taken by ship to go (S + 2) km upstream = ( $\frac{32}{4x}$) = ($\frac{8}{x}$)

Time taken by ship to go (S + 12) km downstream = ($\frac{42}{6x}$) = ($\frac{7}{x}$)

Then required ratio:

⇒ ($\frac{8}{x}$) : ($\frac{7}{x}$)

⇒ 8: 7

**Q2 Text Solution:**

Let the speed of steamer A in still water = a km/hr

And the speed steamer B in still water = b km/hr

The speed of stream = 4 km/hr

Then, according to question,

Let the speed of steamer A in still water = a km per hour

and the speed of steamer B in still water = b km per hour

The speed of stream = 4 km per hour

Then, according to the question,

(b – 4) – (a – 4) = b – a = 6

In downstream, the speed of steamer

A = a + 4 = b – 6 + 4 = b – 1 km per hour

The speed of steamer B = b + 4 km per hour

Then, according to the question,

By solving,

b = 26 km/hr

Therefore the speed of steamer A in still water = 26 – 6 = 20 km/hr

The required sum = 20 + 26 = 46 km/hr

**Q3 Text Solution:**

**Data I:**

Let speed of Boat A be 7x km/hr and speed of current be x km/hr

Downstream speed = 25.6 × $\frac{60}{48}$ = 32 km/hr

Speed of Boat A = 32 × $\frac{7x}{8x}$ = 28 km/hr

Speed of ocean = 25.6 × $\frac{x}{8x}$ = 4 km/hr

**Data II :**

Let speed of Boat A be 9y km/hr and 2y km/hr respectively

Upstream speed = 19.6 × $\frac{60}{42}$ = 28 km/hr

Speed of Boat B = 28 × $\frac{9y}{(9y-2y)}$ = 36 km/hr

Speed of sea = 28 × $\frac{2x}{9x-7x}$ = 8 km/hr

Let speed of Boat B in still water be x km/hr

According to question,

$\frac{120}{(x+4)} + \frac{120}{(x-4)} = \frac{27}{4}$

4(40x – 160 + 40x + 160 ) = 9($x^2$ – 4x + 4x – 16)

320x = 9$x^2$ – 144

9$x^2$ – 144 – 320x = 0

x = 36 km/hr

Speed of Boat B = 36 km/hr

Required percentage = $\frac{36-28}{28} \times 100 = 28\frac{4}{7}\%$

**Q4 Text Solution:**

Three boats A, B and C covers 135 km in still water in 5 hours 24 minutes, 'p' hours and 4 hours 30 minutes respectively.

5 hours 24 minutes = (5 + $\frac{24}{60}$) hours = 5.4 hours

4 hours 30 minutes = (4 + $\frac{30}{60}$ hours = 4.5 hours

Now, speed of boat A in still water = $\frac{135}{5.4}$ = 25 km/h

Speed of boat B in still water = $\frac{135}{p}$

Speed of boat C in still water = $\frac{135}{4.5}$ = 30 km/h

Stream is flowing with a speed of 'p' km/h.

Stream speed = p

Upstream speed of boat B = $\frac{135}{p}$ – p

Upstream speed of boat C = 30 - p

Upstream speed of boat B is 3 km/h less than the upstream speed of boat C. Then,

(30 - p) - ($\frac{135}{p}$ – p) = 3

30 - $\frac{135}{p}$ = 3

$\frac{135}{p}$ = 27

p = 5

Now, stream speed = 5 km/h

Speed of boat B in still water = $\frac{135}{5}$ = 27 km/h

Upstream speed of boat A = 25 - 5 = 20 km/h

Upstream speed of boat B = 27 - 5 = 22 km/h

Upstream speed of boat C = 30 - 5 = 25 km/h

And downstream speed of boat A = 25 + 5 = 30 km/h

Downstream speed of boat B = 27 + 5 = 32 km/h

Downstream speed of boat C = 30 + 5 = 35 km/h

For boat A:

Upstream speed = 20 km/h

Downstream speed = 30 km/h

10 hours 45 minutes = (10 + $\frac{45}{60}$) hours = 10.75 hours

Then, total time taken

= $\frac{(distance\ covered\ upstream)}{(upstream\ speed)}$ + $\frac{(distance\ covered\ downstream)}{(downstream\ speed)}$

10.75 = $\frac{(2y+5)}{20}$ + $\frac{(2y+5)}{30}$

2y + 5 = 129

2y = 124

y = 62

**Q5 Text Solution:**

For A:

Speed of boat = 12 km/h

Speed of stream = 8 km/h

Speed in upstream = 12 – 8 = 4 km/h

Speed in downstream = 12 + 8 = 20 km/h

Total time = $\frac{120}{4}$ + $\frac{180}{20}$ = 30 + 9 = 39 hours

So, A can be the answer.

For B:

Speed of boat = 12 km/h

Speed of stream = 6 km/h

Speed in upstream = 12 – 6 = 6 km/h

Speed in downstream = 12 + 6 = 18 km/h

Total time = $\frac{120}{6}$ + $\frac{180}{18}$ = 20 + 10 = 30 hours

So, B can be the answer.

For C:

Speed of boat = 12 km/h

Speed of stream = 9 km/h

Speed in upstream = 12 – 9 = 3 km/h

Speed in downstream = 12 + 9 = 21 km/h

Total time = $\frac{120}{3}$ + $\frac{180}{21}$ = 40 + $\frac{60}{7}$ = 48.5 hours (approx)

So, C can't be the answer.

For D:

Speed of boat = 12 km/h

Speed of stream = 4 km/h

Speed in upstream = 12 – 4 = 8 km/h

Speed in downstream = 12 + 4 = 16 km/h

Total time = $\frac{120}{8}$ + $\frac{180}{16}$ = 15 + 11.25 = 26.25 hours

So, D can be the answer.

Hence, option d.

**Q6 Text Solution:**

According to the question,

$\frac{360}{2Z-Y} + \frac{120}{24} = 15$

2Z – Y = 36..... (1)

Also,

Z + Y = 24..... (2)

On solving both

We get

Z = 20 and Y = 4

Upstream speed of boat = 20 – 4 = 16 km

(N – 2) = $\frac{72}{24}$

Value of N = 5

Value of M = 16 ×5 = 80 km

I. M = 80

Value of M = 80

This statement is true.

II. 3Y is 40% less than that of Z

Value of 3Y = 4 3 = 12

Value of Z = 20

Required % change = $\frac{20-12}{20}$ × 100 = 40%

This statement is true.

III. Time taken by boat to travel [2M + 4(Z – Y)] km downstream distance > $(N-2)^2$.

Downstream distance to be covered = 80 × 2 + 4 × (20 − 4) = 224 km

Required time = $\frac{224}{24}$ = 9.33 hours

$(N - 2)^2 = 9$

So, 9.33 > 9

This statement is true.

So, all given statements are true.

Hence answer is option D

**Q7 Text Solution:**

For I:

Let the speed of the current be x km/hr

Therefore, the speed of the boat in still water = 1.2x km/hr

According to the question,

0.2x = 2

Or, x = 10 km/hr

Time taken = $\frac{110}{2.2x}$ = 5 hours

Therefore, I is true.

For II:

Let the speed of the current be 'a' km/hr

Therefore, the speed of the boat in still water = 1.4a km/hr

Therefore,

0.4a = 6

Or, a = 15 km/hr

Time taken = $\frac{110}{2.4a}$ = 3.05 hours

Therefore, II is false.

For III:

Let the speed of the current be 'y' km/hr

Therefore, speed of the boat in still water = 1.75y km/hr

Therefore,

0.75y = 3

Or, y = 4

Time taken = $\frac{110}{2.75y}$ = 10 hours

Therefore, III is true.

Hence, option a.

**Q8 Text Solution:**

According to the question,

$\frac{120}{x+4+8} + \frac{120}{x+4-8} = 20$

Or, 6(x − 4) + 6(x + 12) = (x + 12)(x − 4)

Or, 6x − 24 + 6x + 72 = $x^2$ + 12x − 4x − 48

Or, $x^2$ − 4x − 96 = 0

Or, $x^2$ − 12x + 8x − 96 = 0

Or, x(x − 12) + 8(x − 12) = 0

Or, (x − 12)(x + 8) = 0

x = 12, -8

Since, the speed of boat cannot be negative

Therefore, x = 12

Time taken by boat to cover 120 km in downstream with original speed = $\frac{120}{x+8}$ = $\frac{120}{20}$ = 6 hours

For I:

Time taken by boat to cover 120 km in downstream with original speed = (x − 2.5) = (12 − 2.5) = 9.5 hours

Therefore, I cannot be the answer.

For II:

Time taken by boat to cover 120 km in downstream with original speed = (0.5x + 2) = (6 + 2) = 8 hours

Therefore, II cannot be the answer.

For III:

Time taken by boat to cover 120 km in downstream with original speed = (1.5x − 12) = (18 − 12) = 6 hours

Therefore, III can be the answer.

Hence, the correct option is A.

**Q9 Text Solution:**

Downstream speed of the boat = (x + x − 8) = (2x − 8) km/hr

According to the question,

2x − 8 = $\frac{260}{6.5}$

Or, 2x = 40 + 8

Or, x = $\frac{48}{2}$ = 24 km/hr

Therefore, speed of boat in still water = x = 24 km/hr

Speed of the current = (x − 8) = 16 km/hr

For I:

(0.75x − 2) = (18 − 2) = 16 km/hr

Therefore, I can be the answer.

For II:

{(1.5x − 12) − 8} = {(36 − 12) − 8} = 16 km/hr

Therefore, II can be the answer.

For III:

$\{(x + 0.4^2) - 5.16\} = \{(24 + 0.16) - 5.16)\} = 19$ km/hr

Therefore, III cannot be the answer.

Hence, option d.

**Q10 Text Solution:**

By using option method,

Given that, boat speed of A + B = 64 km/hr

Water speed = 16 km/hr

Option i,

Boat speed of B = 24 km/hr

So, Boat speed of A in still water = 64 – 24 = 40 km/hr

ACCORDING TO QUESTION:, $\frac{196}{40+16} = \frac{196}{56} = 3.5$ hours

Option i is correct.

Option ii,

Boat speed of B = 31 km/hr

So, Boat speed of A in still water = 64 – 31 = 33 km/hr

ACCORDING TO QUESTION:, $\frac{196}{33+16} = \frac{196}{49} = 4$ hours

Option ii is correct.

Option iii,

Boat speed of B = 40 km/hr

So, Boat speed of A in still water = 64 – 40 = 24 km/hr

ACCORDING TO QUESTION:, $\frac{196}{24+16} = \frac{196}{40} = 4.9$ hours

Hence, the correct answer is option C.