

Quantitative Ability - III

Boats and Streams :

Stream :

A stream is a body of water that flows continuously on the surface of the Earth.

1. Up-Stream (speed) $(U) = B.S - W.S$ ↗ Against the stream
[Boat stream - water stream]

2. Down-Stream (speed) $(V) = B.S + W.S$ ↘ along the stream

3. Boat stream $(B) = \frac{D.S + U.S}{2}$ → $U = 20 \text{ km/hr}, V = 100 \text{ km/hr}$
Boat stream - ? $B - S$
down stream - ? $B + S$

4. Water stream $(S) = \frac{D.S - U.S}{2}$

$$B = \frac{U+V}{2}$$

Case (i)
S/B/D

Case (ii)
S/T/D

$$\begin{array}{l} D.S \rightarrow B.S + W.S \\ W.S \rightarrow \frac{D.S - U.S}{2} \\ B.S \rightarrow \frac{D.S + U.S}{2} \\ W.S \rightarrow \frac{D.S - U.S}{2} \\ U.S \rightarrow B.S - W.S \end{array}$$

Ex:

D.S	8 K/h	diff
W.S	2	
Still	6	
W.S	2	
U.S	4 K/h	

$$\frac{D.S + U.S}{2} = \frac{8+4}{2} = \frac{12}{2} = 6$$

Problems:

1. In one hour, a boat goes 11 km ^{D.S} along the stream and 5 km ^{U.S} against the stream. The speed of the boat in still water (in km/hr) is:

ஒரு மணி நேரத்தில், ஒரு படகானது டவுன்ஸ்ட்ரீம் 11 கி-மீ மற்றும் அபர்ஸ்ட்ரீம் 5 கி-மீ பயணிக்கும். நிலையான நீரில் படகின் வேகம் என்ன?

- a) 3 b) 5 ☒ c) 8 d) 9

$$B.S = \frac{D.S + U.S}{2} = \frac{11 + 5}{2} = \frac{16}{2} = 8$$

2. A man can row upstream at 8 km/hr and downstream at 13 km/hr. The speed of the stream is:

- ☒ a) 2.5 b) 4.2 c) 5 d) 10.5

D.S	13 km/hr
W.S	2.5
B.S	10.5
W.S	2.5
U.P	8 km/hr

$$B.S = \frac{13 + 8}{2} = \frac{21}{2} = 10.5$$

3. A man rows downstream 32 km and 14 km upstream. If he takes 6 hours to cover each distance, then the velocity (in kmph) of the current is:

- a) $\frac{1}{2}$ b) 1 ☒ c) $1\frac{1}{2}$ d) 2

D.S	$\frac{32}{6} = 5.3$
W.S	1.5
B.S	3.8
W.S	1.5
U.P	$\frac{14}{6}$

$$\frac{\frac{32}{6} - \frac{14}{6}}{2} = \frac{\frac{18}{6}}{2} = \frac{3}{2} = 1.5$$

4. A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water? (in km/hr)

a) 4 b) 6 c) 8 d) Data inadequate

$$\begin{array}{l}
 \text{D.S} - \frac{16}{2} = 8 \text{ km/hr} \\
 \text{W.S} - 2 \text{ km/h} \\
 \text{B.S} - 6 \text{ km/h} \\
 \text{W.S} - 2 \text{ km/h} \\
 \text{U.S} - \frac{16}{4} = 4 \text{ km/hr}
 \end{array}$$

$$\frac{B + u}{2} = \frac{12}{2} = 6$$

5. A boatman goes 2 km ^{U.S} against the current of the stream in 1 hour and goes 1 km ^{D.S} along the current in 10 minutes. How long will it take to go 5 km in stationary water?

a) 40 b) 60 c) 75 d) 90

$$\begin{array}{l}
 \text{D.S} - 6 \text{ km/h} \\
 \text{W.S} - 2 \\
 \text{B.S} - 4 \\
 \text{W.S} - 2 \\
 \text{U.S} - 2 \text{ km/h}
 \end{array}$$

$$D = 5$$

$$B.S = 4$$

$$T = \frac{D}{S} = \frac{5}{4} \times 60 = 75$$

$$\frac{10-1}{60-?} = \frac{6 \text{ km/h}}{6 \text{ km/h}}$$

$$\frac{6+2}{2} = 4$$

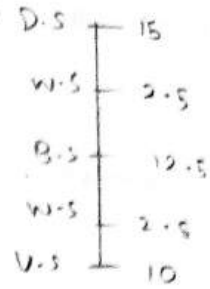
6. If a boat goes 7 km upstream in 42 minutes and the speed of the stream is 3 km/h, then the speed of the boat in still water is (in km/h)

a) 4.2 b) 9 c) 13 d) 21

$$\begin{array}{l}
 \text{D.S} - \\
 \text{W.S} - 3 \\
 \text{B.S} - \\
 \text{W.S} - 3 \\
 \text{U.S} - 10
 \end{array}$$

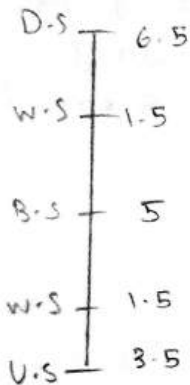
7. A man's speed with the current is 15 km/hr and the speed of the current is 2.5 km/hr. The man's speed against the current is (in km/hr)

a) 8.5 b) 9 c) 10 d) 12.5

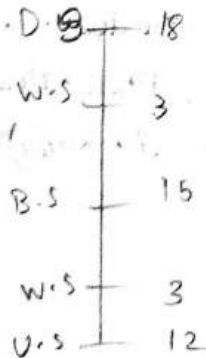


8. If a man rows at the speed rate of 5 kmph in still water and his speed rate against the current is 3.5 kmph then the man's speed rate along the current is : (in km/hr).

a) 4.25 b) 6 c) 6.5 d) 8.5



9. The speed of a boat in still water is 15 km/hr and the speed rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is (in km)
- a) 1.2 b) 1.8 c) 2.4 d) 3.6



Downstream = 18 km/h.

$$60 - 18$$

$$12 - ?$$

$$\Rightarrow \frac{18}{5} = 3.6$$