BOATS & STREAMS

Boats and Streams

Speed =
Speed of Boat +
Speed of Stream

Speed =
Speed of Boat -
Speed of Stream

Downstream

Upstream

Direction of Stream →

Direction of Boat →

← Direction of Boat

formulae,

$$D = B + W$$

$$U = B - C$$

$$B = (D + U)/2$$

$$C = (D - U)/2$$

Example:

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

Solution:

Rate downstream = 1/10 × 60 km/h = 6 km/h

Rate upstream = 2 km/h

Speed in still water = 1/2(6 + 2) km/h = 4 km/h

Therefore, the required time for 5 km = 5/4hrs = 1 ¼ hrs = 75 min.

Practice Questions:

1. A boat takes a circular route to travel a total distance of 24 km to reach its initial position. The speed of the boat in still water is 5 km/hr and the speed of the stream is 3 km/h. How much time (in hrs) does the boat travel upstream and downstream respectively?

a) 12, 3

b) 3, 12

c) 5, 3

d) 3, 5

2. Boat goes downstream from P to Q in 2hrs, upstream in 6hrs and if speed of stream is 6km/h, then find the distance PQ

a) 6 km

b) 4 km

c) 10 km

d) 36 km

3. A river runs at 4 km/hr. if the time taken by a man to row is boat upstream is thrice as the time taken by him to row it downstream then find the speed of the boat in still water.

a) 16 km/hr
b) 8 km/hr
c) 6 km/hr
d) 12 km/hr

4. A motorboat whose speed is 15 km/h in still water goes 30 km downstream and comes back in a total of 4hrs 30min. What is the speed of the stream?

a) 5 km/h
b) 6 km/h
c) 10 km/h
d) 12 km/h

5. A boat sails 15 km of a river towards upstream in 5 hours. How long will it take to cover the same distance downstream, if the speed of current is one-fourth the speed of the boat in still water:

a) 1.8 h

b) 3 h

c) 4 h

d) 5 h

6. A man can row a certain distance against the stream in six hours. However, he would take two hours less to cover the same distance with the current. If the speed of the current is 2 Km/h, then what is the speed of the man in still water.

a) 10 km/h

b) 12 km/h

c) 16 km/h

d) 8 km/h

7. A man can row downstream at 12 Km/h and upstream at 8 Km/h. Find the ratio of the speed of the current to the speed of the man in still water?

a) 1 : 5

b) 5 : 4

c) 25 : 16

d) 16 : 25

8. In a stream running at 2 km/h, a motorboat goes 10 km upstream and returns to the starting point in 55 minutes. Find the speed (all in km/h) of the motorboat in still water.

a) 2

b) 11

c) 22

d) None of these

9. The ratio of the speed of the boat in still water to the speed of the current is 4:1. What is the ratio of the downstream speed of the boat to the upstream speed?

a) 2:1

b) 1:1

c) 5:3

d) None of these

10. A boatman rows to a place at a distance 45 km and comes back in 20 hours. He finds that he can row 12 km with the stream in the same time as 4 km against the stream. Find the speed of the stream.

a) 3 km/h

b) 2.5 km/h

c) 4 km/h

d) 3.5 km/h

11. Two boats, travelling at 5 km/h and 10 km/h respectively, head directly towards each other. They begin at a distance of 20 km from each other. How far apart are they (in km) one minute before they collide?

a) 1/12

b) 1/6

c) 1/4

d) 1/3

12. A man takes twice as long to row a distance against the stream as to row the same distance along the stream. The ratio of the speed of the boat (in still water) and the stream is

a) 2:1

b) 3:1

c) 3:2

d) 4:3

13. A man takes a total time of 2hours to cover a distance of 6 km while doing upstream and downstream. If the speed of stream is 4 km/h find speed of boat in still water?

a) 2 km/h

b) 6 km/h

c) 3 km/h

d) 8 km/h

14. While going A to B against the stream and coming back from B to A with stream it takes a total time of 3 hours. If the distance from B to A is 4 km and speed of stream is 1 km/h. Find speed of boat in still water?

a) 2 km/h

b) 4 km/h

c) 3 km/h

d) 1 km/h

Advance Questions

15. Ratio of Speed of boat to the speed of current of water is 36:5. The boat goes along with the current in 5 hours 10 minutes. It will come back in ?

16. A boat covers 25 km upstream and 39 km downstream in 8 hours. While it covers 35 km upstream and 52 km downstream in 11 hours. Find speed of current. ?