Still water: If the speed of water of the river is zero, then water is said to be still.
Stream: If the water of the river is moving at a certain speed, then it is said to be a stream.
Speed of the boat: It means speed of the boat in still water.
Downstream: If the boat is moving in the direction of the stream.
Upstream: If the boat is moving against the direction of the stream.

If the speed of the boat in still water and stream be b and s km/hr
Downstream speed = (b + s) km/hr
Upstream speed = (b – s) km/hr
s = (Downstream speed + Upstream speed)/2
b = (Downstream speed – Upstream speed)/2

Q1) A boat goes 14 km upstream in 56 minutes. The speed of the stream is 2 km/hr. The speed of the boat in still water is
1) 6 km/hr **2) 15 km/hr** **3) 14 km/hr** **4) 17 km/hr**

Solution:

Let the speed of the boat in still water and stream be b and s km/hr
Upstream speed of the boat = b – s = 48/24 = 2 km/hr
Downstream speed of the boat = b + s = 48/20 = 2.4 km/hr
b = 2.2 km/hr

Q2) The speed of the boat in still water is 10 km/hr. If its downstream speed is 13 km/hr, then the speed of the stream is
1) 1.5 km/hr **2) 3 km/hr** **3) 4.5 km/hr** **4) 6 km/hr**

Solution:

Let the speed of the stream be s km/hr
Speed of the boat along the stream be (10 + s) km/hr = 13 km/hr
On solving, s = 3 km/hr

Q3) A boat moves with a speed of 11 km/hr along the stream and 7 km/hr against the stream in still water. The rate of the stream(in km/hr) is
1) 1 km/hr **2) 1.5 km/hr** **3) 2 km/hr** **4) 2.5 km/hr**

Solution:

Let the speed of the boat in still water and stream be b and s km/hr
Speed of the boat along the stream be (b + s) km/hr = b + s = 11 km/hr
Speed of the boat against the stream be (b – s) km/hr = b – s = 7 km/hr
On solving, s = 2 km/hr

Q4) A man can row 6 km/hr in still water. It takes him twice as long to row up as to row down the river. Find the rate of the stream.
1) 2 km/hr 2) 3 km/hr 3) 1.5 km/hr 4) 1 km/hr

Solution:

Let the distance travelled be y km, speed of the stream s km/hr.
Speed of the boat in still water = 6 km/hr
Time taken upstream = 2(Time taken downstream)

$$\frac{y}{6-s} = \frac{2y}{6+s}$$

On solving, s = 2 km/hr

Q5) Speed of a boat in standing water (still water) is 7 km/hr and the speed of the stream is 1.5 km/hr. A distance of 7.7 km, going upstream is covered in
1) 1 hr 15 min 2) 1 hr 12 min 3) 1 hr 24 min 4) 1 hr 36 min

Solution:

Upstream speed of the boat = 7 – 1.5 = 5.5 km/hr
Time taken upstream = 7.7/5.5 = 1.4 hr = 1 hr 24 min

Q6) A boat can travel upstream from B to A and downstream from A to B in 3 hours. If the speed of the boat in still water is 9 km/hr and the speed of the current is 3 km/hr, the distance between A and B (in km) is
1) 4 km 2) 6 km 3) 8 km 4) 12 km

Solution:

Let the distance travelled be y km

$$\frac{y}{12} + \frac{y}{6} = 3$$

On solving, y = 12 km

Q7) In a stream running at 2 km/hr, a motorboat goes 12 km upstream and back again to the starting point in 2.5 hours. Find the speed of the motorboat in still water.

1) 15 km/hr **2) 12 km/hr** **3) 10 km/hr** **4) 9 km/hr**

Solution:

Speed of the boat in still water be b km/hr

$$\frac{12}{b+2}+\frac{12}{b-2}=\frac{5}{2}$$

On checking options, b = 10 km/hr

Q8) A man can row 45 km upstream and 66 km downstream in 15 hours. Also, he can row 65 km upstream and 77 km downstream in 20 hours. Find the speed of the man in still water and rate of the stream.

1) 8 km/hr, 3 km/hr **2) 11 km/hr, 3 km/hr**

3) 11 km/hr, 8 km/hr **4) 9 km/hr, 2 km/hr**

Solution:

Let the speed of the boat in still water and stream be b and s km/hr

Upstream speed = (b – s) km/hr

Downstream speed = (b + s) km/hr

$$\frac{45}{b-s}+\frac{66}{b+s}=15$$

$$\frac{65}{b-s}+\frac{77}{b+s}=20$$

For the above equations to be true, 45 and 65 must be divisible by b – s; 66 and 77 must be divisible by b + s.

So, b – s = HCF(45, 65) = 5; b + s = HCF(66, 77) = 11

s = 8 km/hr , s = 3 km/hr.

Q9) A man can row 60 km upstream and 88 km downstream in 20 hours. Also, he can row 80 km upstream and 110 km downstream in 26 hours. Find the speed of the man in still water and rate of the stream.

1) 12 km/hr, 4 km/hr **2) 16 km/hr, 6 km/hr**

3) 8 km/hr, 3 km/hr **4) 7 km/hr, 4 km/hr**

Solution:

Let the speed of the boat in still water and stream be b and s km/hr

Upstream speed = (b – s) km/hr
Downstream speed = (b + s) km/hr

$$\frac{60}{b-s}+\frac{88}{b+s}=20$$
$$\frac{80}{b-s}+\frac{110}{b+s}=26$$

For the above equations to be true, 88 and 110 must be divisible by b + s.
So, b + s = HCF(66, 77) = 11 and b – s = HCF(60, 80) = 20 however, in this question we need to use a factor of 20 i.e. 5 as b + s = 11 and b – s = 20 won't satisfy the above two equations.
NOTE: HCF or a factor of HCF has to be used.
On solving, s = 8 km/hr , s = 3 km/hr.

Q10) A man can row 5 km/hr in still water. If he river is running at 1 km/hr, it takes 2 more hours upstream than to go downstream for the same distance. How far is the place?
1) 24 km **2) 20 km** **3) 18 km** **4) 16 km**

Solution:

Let the distance between the two ports be x km.
Upstream speed = x/4 km/hr
Downstream speed = x/6 km/hr

$$\frac{x}{4}-\frac{x}{6}=2$$

On solving, x = 24 km