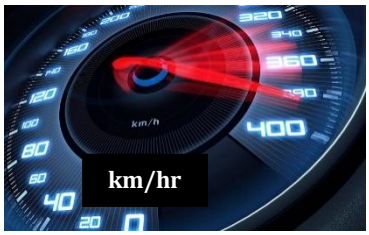
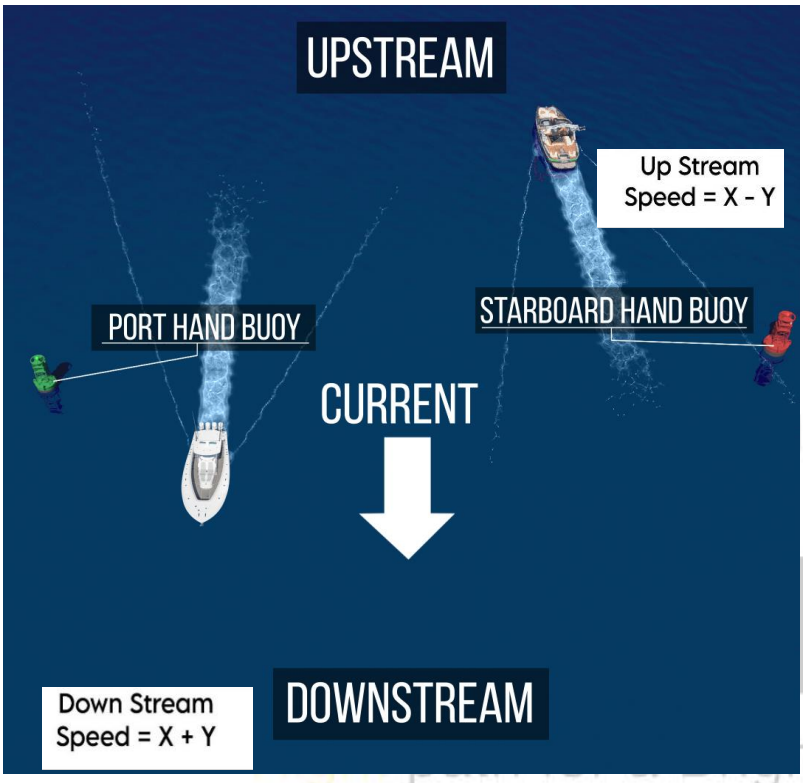
SPEED,TIME & DISTANCE



Problems on Boats and Streams :



➢ **If the downstream speed and upstream speed is given**

- **then speed of the boat in still water is**

$$\left(\frac{1}{2}\right)(\text{Downstream speed + Upstream speed})$$

- **then speed of the stream is**

$$\left(\frac{1}{2}\right)(\text{Downstream speed - Upstream speed})$$

Problems on Boats and Streams:

1) The speed of the stream is 5km/hr and the speed of the boat is 30 km/hr, then what is the speed of the boat in upstream ?

a)25 km/hr b) 20 km/hr c) 15 km/hr d) 35 km/hr

2) Find the speed of the boat in the downstream, Boat speed is 50 km/hr and stream speed is 2 km/hr.

a)45 km/hr b) 52 km/hr c) 25 km/hr d) 48 km/hr

3) A boat goes 15 km distance in downstream at 30km/hr and upstream at 20km/hr , then find the speed of the boat in still water

a)38 km/hr b) 52 km/hr c) 25 km/hr d) 48 km/hr

4) A boat goes 10 km in one hour along the stream and 4 km in one hour against the stream. The speed of the boat in still water and the speed of the stream (in kmph) respectively are

a) 8,6 b) 7,3 c) 6,9 d) 7, 2

5) 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 stream.

a) 2 km/hr b) 4 km/hr c) 5 km/hr d) 6 km/hr

6) A boat is moving 2 km against the current of the stream in 1 hour and moves 1 km in the direction of the current in 10 minutes. How long will it take the boat to go 5 km in stationary water?

a)1 hr 20 minutes **b) 1 hr 30 minutes**

c)1 hr 15 minutes **d) 30 minutes** **e) 45 minutes**

7) A ship is moving at a speed of 30 km/h. To know the depth of the ocean beneath it. It sends a radio wave which travels at a speed 200 m/s The ship receives the signal after it has moved 500 m. The depth of the ocean is

a. √143/2 km **b. 12 km** **c. 6 km** **d. 8 km**

8) A man can row 30 km upstream and 44 km downstream in 10 hours. He can also row 40 km upstream and 55 km downstream in 13 hours. Find the rate of current.

a. 3 km/h **b. 2 km/h** **c. 4 km/h** **d. 5 km/h**

BOATS & STREAMS

1.) Speed of stream (y) = 5 km/hr

Speed of boat (x) = 30 km/hr

Speed of boat in upstream = $x - y$

= 30 − 5 = 25 km/hr

2.) Boat speed (x) = 50 km/hr

Stream speed (y) = 2 km/hr

Speed of boat in downstream = $x + y$

= 50 + 2 = 52 km/hr

3.) Here distance is same in both ways.

Hence; D.S (Downstream speed)

$(x+y)$ D.S = 30 km/hr

$(x-y)$ U.S = 20 km/hr

find the speed of boat in still water (x)

$$x = \frac{1}{2}(D.S + U.S)$$

$$= \frac{1}{2}(30+20) = 25 \text{ km/hr}$$

4.) $x + y$ (D.S) = 10 km/hr

$x - y$ (U.S) = 4 km/hr

• Speed of boat in still water (x)

$$x = \frac{1}{2}(D.S + U.S)$$

$$= \frac{1}{2}(10+4) = 7 \text{ km/hr}$$

~~Speed of boat in upstream~~

• Speed of stream (y)

$$y = \frac{1}{2}(D.S - U.S)$$

$$= \frac{1}{2}(10-4) = 3$$

∴ 7, 3 Ans:

5.) $x = 6$

'x' is speed of Man.

$$\frac{\frac{d}{x+y}}{\frac{d}{x-y}} = \frac{1}{2}$$

$$\frac{\frac{d}{6+y}}{\frac{d}{6-y}} = \frac{1}{2}$$

$$2(6-y) = 1(6+y)$$

$$12 - 2y = 6 + y$$

$$3y = 6$$

$$y = 2$$

6.)

"2" kms in one hour, against stream.

Which means U.S = 2 km/hr

- 1 km in 10 minutes.

∴ 6 km in "60" minutes.

D.S = 6 km/hr

Boat speed (x) = $\frac{1}{2}$ (D.S + U.S)

= $\frac{1}{2}$ (8) = 4 km/hr

∴ In still water boat takes $T = \frac{d}{s} = \frac{5}{4}$

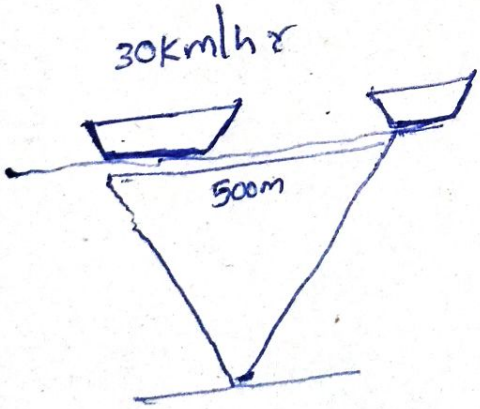
$T = 1.25$ hr

⇒ if 1 hr = "100" parts.

15 minutes = 25 parts.

∴ So, Ans:- $\boxed{T = 1 \text{ hr } 15 \text{ min}}$

7.)



Speed of boat 30km/h

$\Rightarrow 30 \times \frac{5}{18} \Rightarrow \frac{25}{3}$ m/s

Speed of radio wave = 200 m/s

Time taken by boat to move 500 mts is

$T = \frac{D}{S} = \frac{500}{\frac{25}{3}}$

$T = .60$ sec

Distance travelled by radio wave in '6' seconds is

$D = S \times T = 200 \times 60$

$= 12000$ mts

- Depth = $\frac{12000}{2} = 6000$ m

$= \underline{6 \text{ km}}$

Ans: 6 km

8.)

$\frac{30}{x+y} + 1$

8.) $\frac{30}{x-y} + \frac{44}{x+y} = 10h$

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

Let $\frac{1}{x-y} = a$, $\frac{1}{x+y} = b$

∴ $30a + 44b = 10$

$40a + 55b = 13h$

Simplify we get $a = \frac{1}{5}$, $b = \frac{1}{11}$

$x + y = 11$, $x - y = 5$

∴ $x = 8$, $y = 3$

∴ Speed of current = 3 km/hr