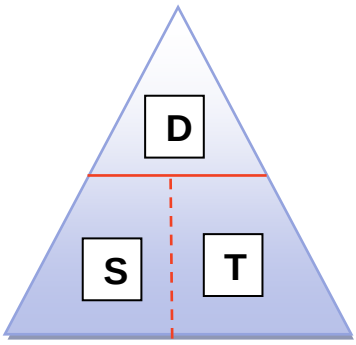
SPEED,TIME & DISTANCE

SPEED : It is the ratio of distance travelled by a person to the time taken to cover that distance.

$$\text{Speed} = \frac{\text{Distance}}{\text{time}}$$

$$\text{Distance} = (\text{Speed} * \text{Time})$$



- **'x' km \ hr ➔ m \ sec = $\left[x \times \frac{5}{18}\right]$ m / sec**
- **'x' m \ sec ➔ km \ hr = $\left[x \times \frac{18}{5}\right]$ km / hr**

➢ **if the speed of A and B is a : b , then the ratio of the times taken by them to cover the same distance is b : a**

➢ **If a man covers a distance from point A to B with a speed of X and return with a speed of Y then the average speed during the whole journey is**

$$\text{Avg.speed} = \left[\frac{2xy}{x+y}\right] \quad \text{(or)} \quad \text{Avg.speed} = \frac{\textit{Total distance}}{\textit{Total time taken}}$$

➢ **If two trains (or bodies) start at the same time from points A and B towards each other and after crossing they take a and b seconds in reaching B and A respectively, then (A's speed): (B's speed) = $\sqrt{b} : \sqrt{a}$**

Problems on Trains :

Train "**A**" ➔ Length = **L_1**, Speed = **X**

Train "**B**" ➔ Length = **L_2**, Speed = **Y**

❖ **If Train 'A' is moving faster and parallel to train 'B' then**

- **Relative speed is (S_r) = (X – Y)**
- **Time taken by two trains to cross each other is**

$$\text{Time} = \frac{L_1 + L_2}{X - Y}$$

❖ **If Train 'A' is moving opposite to train 'B' then**

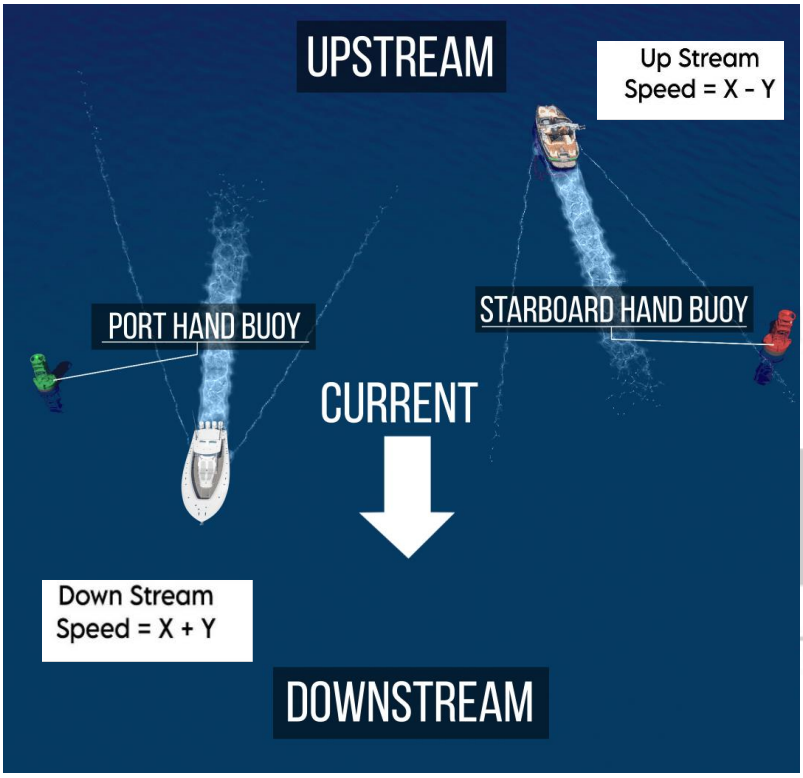
- **Relative speed is (S_r) = (X + Y)**
- **Time taken by two trains to cross each other is**

$$\text{Time} = \frac{L_1 + L_2}{X + Y}$$

- **A train without stoppage travels with an average speed of X km/h, and with stoppage, it travels with an average speed of Y km/h. For how many minutes does the train stop on an average per hour is**

$$\text{Stoppage per hour} = \frac{\text{Difference in Avg.Speed}}{\text{Speed without Stoppage}} \times 60 \text{ min}$$

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**

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

Basic Problems on Speed , Time & Distance :

1. The speed of a bike is 90 kmph. What distance can it cover in 10 sec. (distance in meters)

   a) 150 m b) 250 m c) 300 m d) None of these

2. A car can cover a distance of 160 meters in 16 sec. What is its speed in kmph ?

   a) 36 kmph b) 24 kmph c) 50 kmph d) 72 kmph

3. Siva travelling from Patna to Chennai ,covers a distance of 1000 kilometres at 4km/hr and return journey at 6 km/hr What was his average speed during his entire journey ?

   a) 5.2 kmph b) 4.8 kmph c) 7.8 kmph d) 3.4 kmph

4. An aeroplane flies along the four sides of field, which is in the shape of a square at the speeds of 200, 400, 600 & 800 km/hr. Find the average speed of the plane around the field.

   a) 324 kmph b) 384 kmph c) 289 kmph d) 528 kmph

5. Akhil and Pawan started from Point A at same time in separate cars and travelling to Point B, The ratio of the time taken by Akhil to Pawan is 5 : 7, then what will be the ratio between speed of Pawan to Akhil ?

   a) 5:7 b) 7 : 5 c) 8 : 9 d) 25 : 49

6. “3” Wheel of a motor bike has radius 35cm. how many revolutions per minute ,must the wheel make so that the speed of the bike is 33 km/hr ?

a) 298 b) 250 c) 325 d) 425

7. A boy covers 5 rounds of a circular ground of diameter 48 m, around its circumference at the rate of 27 km/hr. Find the time taken by him to cover this distance. [Use π = 3]

a) 96 sec b) 104 sec c) 80 sec d) 120 sec

8. Find the time taken by a train to cover a distance of 840 km if the speed of train is 40% more than the speed of car and speed of car is 20% more than the speed of a truck which covers 650 km in 26 hours.

a) 12 hours b) 20 hours c) 28 hours d) 30 hours

Problems on Trains:

1) A train 100m long is running at the speed of 30 km/hr. Find the time taken by it to pass a man standing near the railway line.
a) 12sec b) 20sec c) 25 sec d) 18 sec

2) A 240-metre long train crosses a platform twice its length in **‘2’** minutes. What is the speed of the train ?
a) 6 m/s b) 8 m/s c) 10m/s d) 15 m/s

3) Krishna covers a certain distance by train at 25 km/hr and the same distance on foot at 4 km/hr. If the time taken by him for the whole journey be 5 hrs and 48 minute, how much total distance did he cover ?

a) 32 km b) 40 km c) 20 km d) 28 km

4) A train is moving at a speed of 132 km/hr. If the length of the train is 110 metres, how long will it take to cross a railway platform 165 metres long ?

a) 5.2 sec b) 8.5 sec c) 7.5 sec d) 9.8 sec

5) A train crossed a platform in 43 seconds. The length of the platform is 170 metres and train is 260 meters. What is the speed of the train(**km/hr**) ?

a) 32 km / hr b) 50 km/hr c) 36 km /hr d) 48 km/hr

6) A train 800 metres long is running at a speed of 78 km/hr. If it crosses a tunnel in **1** minute, then the length of the tunnel (in meters) is:

a)350 m b) 500 m c) 650 m d) 1000 m

7) A Train travelling at 100 kmph over takes a motor bike travelling at 64 kmph in 40 seconds .What is the length of the train in meters ?

a) 250 meters b) 400 meters c) 320 meters d)660 meters

8) Two trains of length 110 m and 90 m are running on parallel lines in the same direction with a speed of 50 km/hr and 45km/hr respectively. In what time will they pass other ?

a) 121 sec b) 152 sec c) 200 sec d)144 sec

9) A person is walking at a speed of 5 km/hr along a railway track. If he is 200 m ahead of the train which is 100 m long and runs at a speed of 60 km/hr in same direction, then what is the time required to pass the person ?

a)16.27 sec b) 19.64 sec c)23.64sec d)29.65 sec

10) A 180-metre long train crosses another 270-metre long train running in the opposite direction in 10.8 seconds. If the speed of the first train is 60 kmph, what is the speed of the second train in **kmph** ?

a)90 kmph b) 54 kmph c) 60 kmph d)25 kmph

11) A 210 metre long train takes 6 seconds to cross a man running at 9 km/hr in a direction opposite to that of the train. What is the speed of the train? (**in km/hr**)

a) 86 kmph b) 77 kmph c)126 kmph d) 117 kmph

12) A man sitting in a train which is traveling at 50 kmph observes that a goods train, traveling in opposite direction, takes 9 seconds to pass him. If the goods train is 280 m long, then the speed of goods train is _____ .

a)62 kmph b) 54kmph c) 85 kmph d)Can't be determined

13) Two trains start from point A to B and point B to A respectively. After they cross each other, they take 16 and 25 hours respectively to reach their respective destinations. If the speed of 1st train is 25 km/h then find the speed of second train.

a) 16 km/hr b) 20 km/hr c) 25 km/hr d) 32 km/hr

14) Without stopping the speed of the train is 120 kmph, and with stopping the speed of the train is 80kmph. Find the stop time of the train per hour ?

a)18min b) 10 min c) 15.30 min d) 20 min

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 swimmer swims from a point A against a current for **5** min and then swims backwards in favour of the current for next 5 minutes and comes to the point B.
If AB = 100 m, then the speed of the current in (km/h) is

a. 1 b. 0.6 C. 0.4 D. 0.2

8) 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**

9) Speed of the boat is 16(2/3)% more than the speed of the car which moves 120 km at 5 hours. The boat covers a distance of 124 km downstream in 4 hrs. Find the distance covered by the boat upstream in 6 hrs.

a.120 km **b.160 km** **c.130 km** **d.150 km**

10) A man can row 18 km upstream and 42 km downstream in 6 hours. Also he can row 30 km upstream and 28 km downstream in 7 hours. Find the speed of the man in still water.

a.15 kmph **b.10kmph** **c. 20kmph** **d.12 kmph**

11) 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**