Temple of Learning

Your Ambition. Our Inspiration

QUANTITATIVE APTITUDE

TIME,SPEED & DISTANCE,
BOATS & STREAMS

Average Speed Formula

- Average speed = **Total Distance covered/ Total Time Taken**
- When the distance is constant: **Average speed = 2xy/x+y**; Where, x and y are the two speeds at which the same distance has been covered.
- When time taken is constant: **Average speed = (x + y)/2;** Where, x and y are the two speeds at which we traveled for the same time.

Time and Distance Formula

- **Distance = Speed × Time.** Using this formula, all basic problems can be handled. However, you need to make sure about the correct usage of units while using the above formulas.
- Speed is inversely proportional to the time taken when distance travelled is constant. So **when speed increases, time decreases** and vice versa.

Relative Speed:

- Relative speed is defined as the speed of a moving object with respect to another. When two objects are moving in the same direction, relative speed is calculated as their difference. When the two objects are moving in opposite directions, relative speed is computed by adding the two speeds.

Speed

Speed basically tells us how fast or slow an object moves.

It is described as the distance travelled by an object divided with the time taken to cover that distance.

Speed = Distance/Time

This shows that Speed is directly proportional to distance but inversely proportional to time.

Distance = Speed * Time and,

Time = Distance/Speed

Example: What is the distance covered by a car travelling at a speed of 40 kmph in 15 minutes?

Solution:

Distance= speed* time= 40*15/60=10 km.

The important point to note is that time given was in minutes, whereas the speed was in kmph.

Therefore, either speed has to be converted to km/min or time has to be expressed in hours.

We have converted time in hours.

15 min=15/60 hours.

Average Speed

Case 1: When Time is Constant

The average speed of travelling at two different speeds for the same time span is just the simple average of two speeds.

Let Speed 1 be x km/hr

Let Speed 2 be y km/hr

Therefore,

Average Speed when time is same = (x+y)/2

Example: A car is travelling at an average speed of 45kmph for the 1^{st} hour and at 65 kmph for the next 1 hour. Calculate his average speed.

Solution:

As the time is same, i.e. 1 hour,

Average speed= (45+65)/2= 55 kmph.

Case 2: Average Speed When Distance is Constant

Average Speed = 2ab/(a+b) (where a and b are two speeds)

Let us understand how this came.

Let the two speeds be a km/hr and b km/hr.

Let the distance travelled in each of the speeds be x km.

As we know that, Time = Distance/Speed

Hence, time taken to cover x km at a km/hr will be x/a hrs

And, time taken to cover x km at b km/hr will be x/b hrs

Total time taken = x/a+x/b =(bx+ax)/ab = x(b+a)/ab

And the total distance covered = 2x

Therefore,

Average Speed = $\frac{2xab}{x(b+a)}$ =2ab/(a+b)

Example: On his way to office, Big Bull was travelling at 30 kmph and on the return journey, he was travelling at 45kmph. What is Big Bull's average speed?

Solution:

37.5 kmph is incorrect as the time travelled is different in both the cases and only the distances are same.

Let distance = x km

Therefore, Time taken on Big Bull's onward journey =x/30 hours and

Time taken on his return journey=x/45 hours

Therefore, total time = (x/30)+ (x/45) hours.

Total distance = 2x km

Average speed= $\frac{2x}{(x/30)+ (x/45)}$ kmph = 36kmph

Important Time and Distance Conversions

1 km = 1000 meters

1 meter = 100 cm

1 hour = 60 minutes

1 min = 60 seconds

1 hours = 3600 seconds

$$1 \text{ km/hr} = \frac{(1^* 1000)}{(1^* 3600)} = \frac{5}{18} \text{ m/sec}$$

$$\text{Hence, } 1 \text{ m/sec} = \frac{(1^* 1000)}{(1^* 3600)} = \frac{18}{5} \text{ km/hr}$$

1 mile = 1760 yards

1 yard = 3 feet

1 mile = 5280 feet

$$1 \text{ mph} = \frac{(1 * 1760)}{(1 * 3600)} = \frac{22}{45} \text{ yards/sec}$$

$$1 \text{ mph} = \frac{(1 * 5280)}{(1 * 3600)} = \frac{22}{15} \text{ ft/sec}$$

Important Points

- When two trains are going in the same direction, then their relative speed is the difference between the two speeds.
- When two trains are moving in the opposite direction, then their relative speed is the sum of the two speeds.
- When a train crosses a stationary man/ pole/ lamp post/ sign post- in all these cases, the object which the train crosses is stationary and the distance travelled is the length of the train.

- When it crosses a platform/ bridge- in these cases, the object which the train crosses is stationary and the distance travelled is the length of the train and the length of the object.
- When two trains are moving in same direction, then their speed will be subtracted.
- When two trains are moving in opposite directions, then their speed will be added.
- In both the above cases, the total distance is the sum of the length of both the trains.
- When a train crosses a car/ bicycle/ a mobile man- in these cases, the relative speed between the train and the object is taken depending upon the direction of the movement of the other object relative to the train- and the distance travelled is the length of the train.

- A boat is said to go downstream if it is moving along the direction of the stream. The net speed of the boat in this case is called downstream speed.
- A boat is said to go upstream if it is moving in the direction opposite to the direction of the stream. The net speed of the boat in this case is called upstream speed.

Let the speed of the boat in still water is 'b' km/hr and the speed of the stream is 'w' km/hr. When the boat goes downstream then the speed will be (b + w) km/hr as in this case the water will take the boat along with it.

When the boat goes upstream then the speed will be (b - w) km/hr as in this case the water will offer resistance to the boat.

Let the downstream speed = d = b + w .....(i)

Then the upstream speed = u = b − w .....(ii)

Adding the two equations, we get 2b = d + u.

⇒ b = (d+u) / 2 which gives the speed of the boat in terms of downstream and upstream speed. Subtracting the equation (i) and (ii), we get d − u = 2w ⇒ w = (d-u) / 2 which gives the speed of the stream in terms of downstream and upstream speed.

You should remember these boats and streams formulas.

Some Important Shortcuts:

- Suppose a man can row a boat at a speed of r km/hr in still water and covers the same distance up and down in a stream while a stream flows at a speed of s km/hr. His average speed will be :

$$\text{Avg. Speed} = \frac{(\text{Speed downstream} \times \text{Speed upstream})}{\text{Speed in still water}} = \frac{(r+s)(r-s)}{r} \text{ km/hr}$$

- A man rows downstream by covering a certain distance in p1 hours and returns the same distance upstream in p2 hours. If the speed of the stream is s km/hr, then the speed of the man in still water will be :

$$= s\left(\frac{p_2+p_1}{p_2-p_1}\right) \text{ km/hr}$$

- A man takes same number of times say m times to row upstream as to row downstream a river. If the speed of the man is r km/hr and the speed of the stream is s km/hr, then

$$r = s\left(\frac{m+1}{m-1}\right)$$

Question No. - 1

Walking $\frac{3}{4}$ of his normal speed, Rabi is 16 minutes late in reaching his office. The usual time taken by him to cover the distance between his home and office:

A. 48 min.

B. 60 min.

C. 42 min.

D. 62 min.

Answer & Solution

Answer: Option A

Solution:

1st method:

$\frac{4}{3}$ of usual time = Usual time + 16 minutes;

Hence, $\frac{1}{3}\text{rd}$ of usual time = 16 minutes;

Thus, Usual time = 16 × 3 = 48 minutes.

2nd method:

When speed goes down to $\frac{3}{4}\text{th}$ (i.e. 75%) time will go up to $\frac{4}{3}\text{rd}$ (or 133.33%) of the original time.

Since, the extra time required is 16 minutes; it should be equated to $\frac{1}{3}\text{rd}$ of the normal time.

Hence, the usual time required will be 48 minutes.

Question No. - 2

A journey of 192 km between two cities take 2 hours less by a fast train than by a slow train. If the average speed of the slow train is 16 km/hr less than that of the fast train, the average speed of the fast train is :

A. 32 km/hr

B. 36 km/hr

C. 48 km/hr

D. 64 km/hr

Answer & Solution

Answer: Option C

Solution:

Let the speed of the fast train be x km/hr

Then, speed of the slow train = (x - 16) km/hr

$$\therefore \frac{192}{x-16} - \frac{192}{x} = 2$$

$$\Rightarrow \frac{1}{x-16} - \frac{1}{x} = \frac{1}{96}$$

$$\Rightarrow x^2 - 16x - 1536 = 0$$

$$\Rightarrow (x-48)(x+32) = 0$$

$$\Rightarrow x = 48\,\text{km/hr}$$

Question No. - 3

Train A leaves Ludhiana for Delhi at 11 am, running at the speed of 60 km/hr. Train B leaves Ludhiana for Delhi by the same route at 2 pm on the same day, running at the speed of 72 km/hr. At what time will the two trains meet each other ?

A. 2 am on the next day

B. 5 am on the next day

C. 5 pm on the next day

D. None of these

Answer & Solution

Answer: Option B

Solution:

Distance covered by train A from 11 am to 2 pm i.e., in 3 hours :

= (60 × 3) km

= 180 km

Relative speed :

= (72 - 60) km/hr

= 12 km/hr

Time taken to cover 180 km at relative speed :

$= \frac{180}{12}$ hrs

= 15 hrs

So, the two trains will meet 15 hrs after 2 pm i.e., at 5 am on the next day.

Question No. - 4

Rani goes to school from her house in 30 minutes. Raja takes 45 minutes in covering the same distance. Find the ratio between time taken by Rani and Raja ?

A. 2 : 3

B. 4 : 3

C. 3 : 2

D. 1 : 3

Answer & Solution

Answer: **Option A**

Solution:

Rani goes to school from her house = 30 minutes

Raja goes to school from his house = 45 minutes

Required ratio :

= 30 : 45

= 2 : 3

Question No. - 5

Walking $\frac{6}{7}$ th of his usual speed, a man is 12 minutes too late. The usual time taken by him to cover that distance is :

A. 1 hour

B. 1 hr 12 min

C. 1 hr 15 min

D. 1 hr 20 min

Answer & Solution

Answer: Option B

Solution:

New speed = $\frac{6}{7}$ of usual speed

New time = $\frac{7}{6}$ of usual time

$$\therefore \left(\frac{7}{6} \text{ of usual time}\right) - (\text{usual time}) = \frac{1}{5} \text{ hr}$$

$$\Rightarrow \frac{1}{6} \text{ of usual time} = \frac{1}{5} \text{ hr}$$

$$\Rightarrow \text{usual time} = \frac{6}{5} \text{ hr}$$

$$\Rightarrow \text{usual time} = 1 \text{ hr } 12 \text{ min}$$

Question No. - 6

In a flight of 6000 km, an aircraft was slowed down due to bad weather. The average speed for the trip was reduced by 400 kmph and the time of flight increased by 30 minutes. The original planned duration of the flight was :

A. $2\frac{1}{2}$ hours

B. $3\frac{1}{3}$ hours

C. $4\frac{1}{3}$ hours

D. $5\frac{1}{3}$ hours

Answer & Solution

Answer: **Option A**

Solution:

Let the original planned duration of the flight be x hours

Then,

$$\Leftrightarrow \frac{6000}{x} - \frac{600}{\left(x + \frac{1}{2}\right)} = 400$$

$$\Leftrightarrow \frac{6000}{x} - \frac{12000}{(2x + 1)} = 400$$

$$\Leftrightarrow \frac{15}{x} - \frac{30}{(2x + 1)} = 1$$

$$\Leftrightarrow 2x^2 + x - 15 = 0$$

$$\Leftrightarrow (x + 3)(2x - 5) = 0$$

$$\Leftrightarrow x = \frac{5}{2}$$

$$\Leftrightarrow x = 2\frac{1}{2}$$

Question No. - 7

An aeroplane flies from place A to place B at the speed of 500 km/hr. On the return journey, its speed is 700 km/hr. The average speed of the aeroplane for the entire journey is ?

A. $566\frac{2}{3}$ km/hr

B. $583\frac{1}{3}$ km/hr

C. $583\frac{2}{3}$ km/hr

D. 600 km/hr

Answer & Solution

Answer: Option B

Solution:

Average speed :

$$= \left(\frac{2 \times 500 \times 700}{500 + 700}\right) \text{ km/hr}$$

$$= \left(\frac{1750}{3}\right) \text{ km/hr}$$

$$= 583\frac{1}{3} \text{ km/hr}$$

Question No. - 8

A train increases its normal speed by 12.5% and reaches its destination 20 min earlier. What is the actual time taken by the train in the journey ?

A. 145 minutes

B. 160 minutes

C. 180 minutes

D. 220 minutes

Answer & Solution

Answer: Option C

Solution:

Let the normal speed of the train be x km/hr

Then, new speed

$$= \left(112\frac{1}{2}\% \text{ of } x\right) \text{ km/hr}$$

$$= \left(\frac{225}{2} \times \frac{1}{100} \times x\right) \text{ km/hr}$$

$$= \left(\frac{9}{8}x\right) \text{ km/hr}$$

Let the distance covered be d km

Then,

$$\Rightarrow \frac{d}{x} - \frac{d}{\left(\frac{9x}{8}\right)} = \frac{20}{60}$$

$$\Rightarrow \frac{d}{x} - \frac{d}{\left(\frac{9x}{8}\right)} = \frac{1}{3}$$

$$\Rightarrow \frac{d}{x} - \frac{8d}{9x} = \frac{1}{3}$$

$$\Rightarrow \frac{d}{9x} = \frac{1}{3}$$

$$\Rightarrow d = 3x$$

$\therefore$ Actual time taken:

$$\frac{d}{x} = \frac{3x}{x} = 3 \text{ hours} = 180 \text{ minutes}$$

Question No. - 9

With an average speed of 50 km/hr, a train reaches its destination in time. If it goes with an average speed of 40 km/hr, it is late by 24 min. The total journey is :

A. 30 km

B. 40 km

C. 70 km

D. 80 km

Answer & Solution

Answer: **Option D**

Solution:

Difference between timings = 24 min = $\frac{24}{60}$ hr = $\frac{2}{5}$ hr

Let the length of the journey be x km

Then,

$$\Leftrightarrow \frac{x}{40} - \frac{x}{50} = \frac{2}{5}$$

$$\Leftrightarrow \frac{x}{200} = \frac{2}{5}$$

$$\Leftrightarrow x = \left(\frac{2}{5} \times 200\right)$$

$$\Leftrightarrow x = 80 \text{ km}$$

Question No. - 10

The speeds of three cars are the ratio 2 : 3 : 4. The ratio of the taken by these cars to travel the same distance is :

A. 2 : 3 : 4

B. 4 : 3 : 2

C. 4 : 3 : 6

D. 6 : 4 : 3

Answer & Solution

Answer: **Option D**

Solution:

Ratio of speeds = 2 : 3 : 4

∴ Ratio of times taken

$= \frac{1}{2} : \frac{1}{3} : \frac{1}{4}$

= 6 : 4 : 3

Question No. - 11

A star is 8.1×10^{13} km away from the earth. Suppose light travels at the speed of 3.0×10^{5} km per second. How long will it take the light from the star to reach the earth ?

A. 7.5×10^{3} hours

B. 7.5×10^{4} hours

C. 2.7×10^{10} seconds

D. 2.7×10^{11} seconds

Answer & Solution

Answer: Option B

Solution:

Required time :

$$= \left(\frac{8.1 \times 10^{13}}{3.0 \times 10^{5}} \right) \text{seconds}$$

$$= 2.7 \times 10^{8} \text{ seconds}$$

$$= \left(\frac{2.7 \times 10^{8}}{60 \times 60} \right) \text{hours}$$

$$= 7.5 \times 10^{4} \text{ hours}$$

Question No. - 12

The speed of A and B are in the ratio 3 : 4. A takes 20 minutes more than B to reach a destination. In what time does A reach the destination ?

A. $1\frac{1}{3}$ hours

B. $1\frac{2}{3}$ hours

C. 2 hours

D. $2\frac{2}{3}$ hours

Answer & Solution

Answer: **Option A**

Solution:

Ratio of speed = 3 : 4

Ratio of time taken = $\frac{1}{3} : \frac{1}{4}$ = 4 : 3

Let A and B take 4x and 3x minutes respectively to reach a destination.

Then,

$\Leftrightarrow$ 4x - 3x = 20

$\Leftrightarrow$ x = 20

$\therefore$ Time taken by A

= 4x

= (4 × 20) min

= 80 min

= $1\frac{1}{3}$ hours

Question No. - 13

A and B walk around a circular track. They start at 8 am from the same point in the opposite directions. A and B walk at a speed of 2 rounds per hour and 3 rounds per hour respectively. How many times shall they cross each other before 9.30 am ?

A. 5 times

B. 6 times

C. 7 times

D. 8 times

Answer & Solution

Answer: **Option C**

Solution:

Relative speed = (2 + 3) = 5 rounds per hour

So, they cross each other 5 times in an hour and 2 times in half an hour.

Hence, they cross each other 7 times before 9.30 am.

Question No. - 14

Two cyclists start on a circular track from a given point but in opposite directions with speeds of 7 m/sec and 8 m/sec respectively. If the circumference of the circle is 300 metres, after what time will they meet at the starting point ?

A. 20 sec

B. 100 sec

C. 200 sec

D. 300 sec

Answer & Solution

Answer: **Option D**

Solution:

Time taken by the two cyclists to cover one round of the track is $\frac{300}{7}$ sec and $\frac{300}{8}$ sec respectively.

$\therefore$ Required time :

= L.C.M. of $\frac{300}{7}$ and $\frac{300}{8}$

= 300 sec

Question No. - 15

A person wishes to reach his destination 90 km away 3 hours but for the first half of the journey his speed was 20 km/hr. His average speed for the rest of the journey should be :

A. 4 km/hr

B. 0.75 km/min

C. 1 km/min

D. None of these

Answer & Solution

Answer: **Option C**

Solution:

Time taken to travel 45 km :

$$= \left(\frac{45}{20}\right) \text{ hrs}$$

$$= \frac{9}{4} \text{ hrs}$$

$$= 2\frac{1}{4} \text{ hrs}$$

$$= 2 \text{ hrs } 15 \text{ min}$$

Remaining time = (3 hrs - 2 hrs 15 min) = 45 min

Hence, required speed :

$$= \left(\frac{45}{45}\right) \text{ km/min}$$

$$= 1 \text{ km/min}$$

Question No. - 16

A thief sees a jeep at a distance of 250 m, coming towards him at 36 km/h. Thief takes 5 seconds to realize that there is nothing but the police is approaching him by the jeep and start running away from police at 54 km/h. But police realise after 10 second, when the thief starts running away, that he is actually a thief and gives chase at 72 km/h. How long after thief saw police did catchup with him and what is the distance police had travel to do so?

A. 50 s, 1000 m

B. 65 s, 1150 m

C. 65 s, 1300 m

D. 45 s, 1050 m

Answer & Solution

Answer: **Option B**

Solution:

Initial speed of the police = 10 m/s

Increased speed of the Police = 20 m/s

Speed of the thief = 15 m/s

Initial difference between speed of thief and police = 250 m

After 5 seconds difference between thief and police = 200 + (5 × 10) = 250 m

Now, the time required by police to catch the thief = $\frac{250}{5}$ = 50 s

Total time = 50 + 15 = 65 s

Total distance = 1000 + (15 × 10) = 1150 m.

Question No. - 17

The ratio of speeds of A and B is 2 : 3 and therefore A takes 20 minutes more time than B. What is the ratio of time taken by A and B?

A. 2 : 3

B. 2 : 5

C. 3 : 2

D. 3 : 5

Answer & Solution

Answer: **Option C**

Solution:

When distance is constant then Speed is inversely proportional to time.

ST = D

When distance constant,

$S \propto \frac{1}{T}$

So, ratio of time taken by A and B = 3 : 2

Question No. - 18

A thief seeing a policeman at a distance of 150 metres starts running at 10 kmph and the policeman gives immediate chase at 12 kmph. When the thief is overtaken the thief has traveled a distance of:

A. 750 m

B. 900 m

C. 800 m

D. 1 km

Answer & Solution

Answer: **Option A**

Solution:

P__150m___T_____x m (Let)_____Q.

Let Policeman caught thief at a distance (x + 150)m. And Thief has traveled x m.

Speed of Policeman

$$= 12 \text{ kmph}$$

$$= \frac{12 \times 5}{18}$$

$$= \frac{60}{18} \text{ m/sec}$$

Speed of thief

$$= 10 \text{ km}$$

$$= \frac{10 \times 5}{18}$$

$$= \frac{50}{18} \text{ m/sec}$$

In this case time is constant means Policeman covered (x + 150)m in same time thief covered x m.

Thus,

$$\frac{\text{Speed of the thief}}{\text{Speed of Policeman}} = \frac{x}{150 + x}$$

$$\Rightarrow \frac{50}{60} = \frac{x}{150 + x}$$

$$\Rightarrow 7500 + 50x = 60x$$

$$\Rightarrow 10x = 7500$$

$$\Rightarrow x = 750 \text{ m}$$

So, Thief has traveled 750 m before the caught.

Question No. - 19

A train running at a speed of 54 km/hr crosses a platform in 30 seconds. The platform is renovated and its length is doubled. Now, the same train running at same speed crosses the platform in 46 seconds. Find the length of the train.

A. 180 metres

B. 200 metres

C. 210 metres

D. 240 metres

Answer & Solution

Answer: **Option C**

Solution:

Let length of the Platform is X m and Train is Y m.

Speed of the train = 54 kmph = $\frac{54 \times 5}{18}$ = 15 m/sec.

To cross the platform, train needs to travel (X + Y) m in 30 sec.

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

$$15 = \frac{X + Y}{30}$$

$$X + Y = 450 \ldots\ldots\ldots\ldots (1)$$

Now Platform is renovated and its length is doubled. So, Now, train need to travel (2X + Y) m to cross the platform.

Thus,

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

$$15 = \frac{2X + Y}{46}$$

$$2X + Y = 690 \ldots\ldots\ldots\ldots (2)$$

Multiplying equation (1) by (2)

2X + 2Y = 900 ---------- (3)

Now, equation (2) - (3)

2X + Y - 2X - 2Y = 690 - 900

- Y = - 210

Y = 210

Length of the train = 210 metres

Question No. - 20

A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour?

A. 3.6 km/hr

B. 7.2 km/hr

C. 8.4 km/hr

D. 10 km/hr

Answer & Solution

Answer: Option B

Solution:

$$\text{Speed} = \frac{600}{5 \times 60}\ \text{m/sec} = 2\text{m/sec}$$

$$\text{Converting m/sec to km/hr}$$

$$= 2 \times \frac{18}{5}\ \text{km/hr}$$

$$= 7.2\ \text{km/hr}$$

Question No. - 21

A train 100 m long is running at the speed of 30 km/hr. The time (in second) in which it passes a man standing near the railway line is :

A. 10 seconds

B. 11 seconds

C. 12 seconds

D. 15 seconds

Answer & Solution

Answer: Option C

Solution:

Speed :

$$= 30\ km/hr$$

$$= 30 \times \frac{5}{18}\ m/\sec$$

$$= \frac{25}{3} m/\sec$$

$$\text{So, time} = \frac{D}{S}$$

$$= \frac{100}{\frac{25}{3}}$$

$$= 12 \text{ seconds}$$

Question No. - 22

A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr, what is the length of the platform?

A. 120 m

B. 240 m

C. 300 m

D. None of these

Answer & Solution

Answer: Option B

Solution:

$$\text{Speed} = 54 \times \frac{5}{18}\ \text{m/sec} = 15\ \text{m/sec}$$

$$\text{Length of the train} = (15 \times 20)\ \text{m} = 300\ \text{m}$$

Let the length of the platform be x metres

$$\text{Then, } \frac{x + 300}{36} = 15$$

$$\Rightarrow x + 300 = 540$$

$$\Rightarrow x = 240\ \text{m}$$

Question No. - 23

A train passes a 50 meter long platform in 14 seconds and a man standing on platform 10 seconds.The speed of the train is?

A. 24 km/hr

B. 36 km/hr

C. 40 km/hr

D. 45 km/hr

Answer & Solution

Answer: Option D

Solution:

Distance travelled in 14 sec

$= 50 + l$

Distance travelled in 10 sec

$= l$

So speed of train

$$= \frac{50}{14 - 10} \text{m/sec}$$

$$= \frac{50}{4} \times \frac{18}{5} \text{km/hr}$$

$$= 45 \text{ km/hr}$$

Question No. - 24

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

A. 5 second

B. 7.5 second

C. 10 second

D. 15 second

Answer & Solution

Answer: Option B

Solution:

$$\text{Speed} = 132\ \text{km/hr}$$

$$= 132 \times \frac{5}{18}\text{m/sec}$$

$$= \frac{110}{3} m/\sec$$

$$T = \frac{D}{S}$$

$$= \frac{110 + 165}{\frac{100}{3}}$$

$$= \frac{3\,(275)}{110}$$

$$= 7.5\,\sec$$

Question No. - 25

A train passes by a lamp post at platform in 7 sec. and passes by the platform completely in 28 sec. If the length of the platform is 390m, then length of the train (in meters) is?

A. 120 m

B. 130 m

C. 140 m

D. 150 m

Answer & Solution

Answer: Option B

Solution:

Length of train

$$= \frac{\text{Length of the platform}}{\text{Difference in time}} \times \text{(Time taken to cross a lamp post)}$$

$$= \frac{390}{28 - 7} \times 7$$

$$= \frac{390}{21} \times 7$$

$$= \frac{390}{3}$$

$$= 130\,\text{m}$$

Question No. - 26

A train moving at a rate of 36 km/hr crosses a standing man in 10 seconds. It will cross a platform 55 meters long in?

A. 6 second

B. 7 second

C. $15\frac{1}{2}$ second

D. $5\frac{1}{2}$ second

Answer & Solution

Answer: Option C

Solution:

Length of the train

$= \text{Speed} \times \text{time}$

$= 36 \text{ km/hr} \times 10 \text{ sec}$

$= 36 \times \frac{5}{18} \text{m/s} \times 10 \text{ sec}$

$= 100 \text{ metres}$

Therefore,

Time taken by train to cross a plateform of 55 metre long in time

$= \frac{(100 + 55)}{36 \times \frac{5}{18}}$

$= \frac{155}{10}$

$\text{Time} = 15\frac{1}{2} \text{ sec}$

Question No. - 27

A train running at a speed of 90 km/hr crosses a platform double its length in 36 seconds. What is the length of the platform in meters?

A. 200

B. 300

C. 450

D. None of these

Answer & Solution

Answer: Option **D**

Solution:

Let the length of the train be x metres.

Then, length of the platform $= (2x)$ metres.

Speed of the train

$$= \left(90 \times \frac{5}{18}\right) m/\sec$$

$$= 25m/sec$$

$$\therefore \frac{x + 2x}{25} = 36$$

$$\Rightarrow 3x = 900$$

$$\Rightarrow x = 300$$

Hence, length of platform

$$= 2x = (2 \times 300)\,\text{m} = 600\text{m}$$

Question No. - 28

A train speeds past a pole in 20 seconds and speeds past a platform 100 meters in length in 30 seconds. What is the length of the train?

A. 100 meters

B. 150 meters

C. 180 meters

D. 200 meters

Answer & Solution

Answer: Option D

Solution:

Let the length of the train be x meters and its speed be y m/sec.

Then, $\frac{x}{y} = 20$

$\Rightarrow y = \frac{x}{20}$

$\therefore \frac{x + 100}{30} = \frac{x}{20}$

$\Rightarrow 30x = 20x + 2000$

$\Rightarrow 10x = 2000$

$\Rightarrow x = 200$ meters

Question No. - 29

A train 125 m long passes a man, running at 5 kmph in the same direction in which the train is going, in 10 seconds. The speed of the train is:

A. 45 km/hr

B. 50 km/hr

C. 54 km/hr

D. 55 km/hr

Answer & Solution

Answer: **Option B**

Solution:

Speed of the train relative to man

$$= \frac{125}{10}\text{m/sec}$$

$$= \frac{25}{2}\text{m/sec}$$

$$= \left(\frac{25}{2} \times \frac{18}{5}\right)\text{m/sec}$$

$$= 45\,\text{km/hr}$$

Let the speed of the train be x kmph.

Then, relative speed = (x - 5) kmph

$\therefore$ x - 5 = 45 or

x = 50 km/hr

Question No. - 30

Two trains are running in opposite directions with the same speed. If the length of each train is 120 meters and they cross each other in 12 seconds, then the speed of each train (in km/hr) is?

A. 10 km/hr

B. 18 km/hr

C. 72 km/hr

D. 36 km/hr

Answer & Solution

Answer: Option D

Solution:

Let the speed of each train be x m/sec.

Then, relative speed of the two trains = 2x m/sec

So, $2x = \frac{120 + 120}{12}$

$\Rightarrow 2x = 20$

$\Rightarrow x = 10$

$\therefore$ Speed of each train = 10 m/sec

$= \left(10 \times \frac{18}{5}\right)$ km/hr

= 36 km/hr

Question No. - 31

A 150 m long train crosses a milestone in 15 seconds and a train of same length coming from the opposite direction in 12 seconds. The speed of the other train is?

A. 36 kmph

B. 45 kmph

C. 50 kmph

D. 54 kmph

Answer & Solution

Answer: Option D

Solution:

Speed of first train = $\frac{150}{15}$ m/sec = 10 m/sec

Let the speed of second train be x m/sec

Relative speed = (10 + x) m/sec

$\therefore \frac{300}{10+x} = 12$

$\Rightarrow 300 = 120 + 12x$

$\Rightarrow 12x = 180$

$\Rightarrow x = \frac{180}{12} = 15$ m/sec

Hence, speed of other train

$= \left(15 \times \frac{18}{5}\right)$ kmph

= 54 kmph

Question No. - 32

The speed of a boat in still water in 15 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 12 minutes is:

A. 1.2 km

B. 1.8 km

C. 2.4 km

D. 3.6 km

Answer & Solution

Answer: **Option D**

Solution:

Speed downstream

= (15 + 3) kmph

= 18 kmph

Distance travelled

$= \left(18 \times \frac{12}{60}\right)$ km

= 3.6 km

Question No. - 33

A boat covers 24 km upstream and 36 km downstream in 6 hours, while it covers 36 km upstream and 24 km downstream in $6\frac{1}{2}$ hours. The speed of the current is?

A. 1 km/hr

B. 2 km/hr

C. 1.5 km/hr

D. 2.5 km/hr

Answer & Solution

Answer: Option B

Solution:

let speed of boat in still water = x km/h

Speed of stream current = y km/h

According to question,

$$\frac{24}{x-y}+\frac{36}{x+y}=6h\ldots\ldots\ (i)$$

$$\frac{36}{x-y}+\frac{24}{x+y}=\frac{13}{2}h\ldots\ldots\ (ii)$$

In these type of questions, make factor of 24 and 36 and choose the common values which satisfy the above equations.

$24 = 2,3,4,6,8,\boxed{12}$

$36 = 3, 4, 9, \boxed{12}$

Choose the common factor i.e. Put this value in equation (i)

$$\frac{24}{x-y}+\frac{36}{12}=6$$

$$\frac{24}{x-y}+3=6$$

$$x-y=8$$

$$\therefore x+y=12$$

$$\therefore x=10\ ,\quad y=2$$

Speed of the current,

$$y=2\ \text{km/h}$$

Question No. - 34

A boat moves downstream at the rate of 1 km in $7\frac{1}{2}$ minutes and upstream at the rate of 5 km an hour. What is the speed of the boat in the still water?

A. 8 km/hour

B. $6\frac{1}{2}$ km/hour

C. 4 km/hour

D. $3\frac{1}{2}$ km/hour

Answer & Solution

Answer: Option B

Solution:

Rate downstream of boat

$$= \left(\frac{1}{\frac{15}{2 \times 60}} \right) \text{ kmph}$$

$$= \frac{2 \times 60}{15} \text{ kmph}$$

$$= 8 \text{ kmph}$$

Rate downstream of boat = 5 kmph

Speed of boat in still water = $\frac{1}{2}$ (Rate downstream + Rate upstream)

$$= \frac{1}{2}(8 + 5)$$

$$= \frac{13}{2}$$

$$= 6\frac{1}{2} \text{ kmph}$$

Question No. - 35

A boat takes half time in moving a certain distance downstream than upstream. The ratio of the speed of the boat in still water and that of the current is?

A. 2 : 1

B. 4 : 3

C. 1 : 2

D. 3 : 1

Answer & Solution

Answer: **Option D**

Solution:

Let the speed of boat in still water = x km/hr,

and Speed of current = y km/hr

Rate downstream = (x + y) km/hr, and Rate upstream = (x – y) km/hr

Distance = Speed × Time

$$\therefore (x-y) \times 2t = (x+y) \times t$$

$$\Rightarrow 2x - 2y = x + y$$

$$\Rightarrow 2x - x = 2y + y$$

$$\Rightarrow x = 3y$$

$$\Rightarrow \frac{x}{y} = \frac{3}{1} = 3:1$$

Question No. - 36

The speed of a boat in still water is 10 km/hr. If it can travel 26 km downstream and 14 km upstream at the same time, the speed of the stream is-

A. 2 km/hr

B. 2.5 km/hr

C. 3 km/hr

D. 4 km/hr

Answer & Solution

Answer: Option C

Solution:

Let the speed of the stream be x km/hr

Then speed downstream = (10 + x) km/hr

Speed upstream

$= (10 - x)\, km/hr$

$$\therefore \frac{26}{(10+x)} = \frac{14}{(10-x)}$$

$$\Rightarrow 260 - 26x = 140 + 14x$$

$$\Rightarrow 40x = 120$$

$$\Rightarrow x = 3\, km/hr$$

Question No. - 37

Raju, walking at the rate of 6 kmph, covers a certain distance in three hours. In how much time will Raju cover this distance running at the speed of 18 kmph?

[1] 1 hour

[2] 3 hours

[3] 60 hours

[4] 22 hours

Option:

Let the distance be X.

=>Distance = Speed x Time taken = 6 x 3 = 18 km.

Now, speed = 18 km/hr.

=>Time taken = Distance/Speed = 18/ 18 = 1 hour.

Question No. - 38

If Sita walks at 5 kmph, she misses her train by 10 minutes. If she walks at 7 kmph, she reaches the station 10 minutes early. How much distance does she walk to the station?

[1] 5.8 km

[2] 35.6 km

[3] 10.6 km

[4] 92 km

Option:

Let the distance be D.

$$\frac{D}{5} - \frac{D}{7} = \frac{10+10}{60}$$

$$\Rightarrow D = \frac{35}{6} = 5.8km$$

Question No. - 39

A friend is spotted by Lalloo at a distance of 200 m.

When Lalloo starts to approach him, the friend also starts moving in the same direction as Lalloo. If the speed of his friend is 15 kmph, and that of Lalloo is 20 kmph, then how far will the friend have to walk before Lalloo meets him?

[1] 600 m

[2] 0.6 m

[3] 6km

[4] 900 m

Option:

Lalloo is unfortunate that the friend is moving away from him.

(Because the friend moves in same direction as Lalloo).

relative speed= 20- 15= 5,kmph. distance= 200 m.

Thus, Lalloo will meet his friend when he gains 200 m over him.

=> time required = distance / speed = 0.2/5 = 1/25 hrs.

=>Distance travelled by the friend in 1/25 hrs. (when Lalloo catches up him)

=> Time x Speed = 1/25 x 15 = 3/5 km = 600 m.

Question No. - 40

A distance is covered at a certain speed in a certain time. If the double of this distance is covered in four times the time, then what is the ratio of the two speeds?

[1] 1.5 : 0.7

[2] 1 : 1.9

[3] 4 : 2

[4] 6 : 1

Option:

Case I : Distance D Speed S_1 Time D/S_1

Case II : Distance 2D Speed S_2 Time $4\,(D/S_1)$

=> Speed for case II = S_2 = Distance/Time = $2D/\,(4D/S_1) = S_1/2$

Hence, speed for case I : speed for case II. = $S_1 : S_1/2 = 1 : 1/2 = 2 : 1$

Question No. - 41

Walking at $4/7^{th}$ of his usual speed, Ramu gets late by 15 minutes. Find the time he would have taken walking at his usual speed.

[1] 25 min

[2] 20 min

[3] 30 min

[4] 24 min

Option:

Speed = 4/7th of the usual speed.

=>Time required = 7/4th of the usual time.

=> ($7/4^{th}$ of the usual time)- (usual time required) = 15/60 hours.

=> usual time = 1/3 hours = 20 min.

Question No. - 42

A railway passenger counts the telegraph posts as he passes them. If they are 50 metres apart and the train is going at 48 kmph, how many posts will he pass per minute?

[1] 16

[2] 20

[3] 24

[4] 10

Option:

48 km/hr = 48 x 5/18 m/sec = $\frac{48 \times 5 \times 60}{18}$ m/min. = 800 m/min.

:. Number of posts = 800/50 = 16.

Question No. - 43

A man can row with the stream at the rate of 20 kmph and against the stream at 5 kmph. The man's rate in still water is

[1] 7.5 kmph

[2] 12.5 kmph

[3] 17.5 kmph

[4] 15.5 kmph

Option:

$X + Y = 20, X - Y = 5 \Rightarrow X = 12.5$ kmph.