**Time, Speed & Distance**

The speed of a body is defined as the distance covered by it in unit time.

Speed = Distance/Time;

Time = Distance/Speed;

Distance = Speed X Time

Important Points:-

1. If a body travels d1, d2,d3…..dn distances at a speed of s1,s2,s3……sn km/hr, in time t1, t2,t3……tn, then the average speed = =
2. If a certain distance d, from A to B, is covered at ‘a’ km/hr and the same distance is covered again from B to A in ‘b’ km/hr, then the average speed during whole journey

= km/hr

Also, if t1 and t2 is the time taken to travel from A to B and B to A, respectively, the distance ‘d’ from A to B is given by:

d= (t1+t2)

d= (t1-t2)

d= (a-b)

1. While travelling a certain distance , if a man changes his speed in the ratio m:n, then the ratio of time becomes n:m
2. If two person A and B start at the same time in opposite directions from two points and arrive at the two points in ‘a’ and ‘b’ hrs, respectively after having met, then

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1. To convert km/hr to m/s, multiply by 5/18 and to convert m/s to km/hr, multiply by 18/5.

Relative Speed:-

Relative speed means the speed of an object A with respect to another object B, which may be staitionary, moving (in the same direction or opposite direction)

Case 1(When one object is stationary and other is moving)

Relative speed of stationary object and moving object = Speed of the moving object

Case 2(When two objects are moving in opposite direction)

Relative speed = Sum of their speeds

Case 3(When two objects are moving in same direction)

Relative speed = Difference of their speeds

Important Points

1. Time taken by a moving object ‘x’meters long in passing a stationary object ‘y’ meters long from the time they meet, is same as the time taken by the moving object to cover ‘x+y’ meters with its own speed.
2. If two objects of length ‘x’ and ‘y’ meters move in the same direction or in opposite direction at ‘a’ and ‘b’ m/s, then the time taken to cross each other from the time they meet

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= (In case of same direction)

= (In case of opposite direction)

1. If the speed of a boat in still water is x km/hr and the speed of the stream is y km/hr

speed while travelling with the stream i.e., speed downstream = (x+y) km/hr

speed while travelling against the stream i.e., speed upstream = (x-y) km/hr

1. speed of the boat in still water =(Speed with Stream + Speed against stream)

speed of the river =(Speed with Stream - Speed against stream)

Practice Questions for Time Speed Distance

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| Question | If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. The actual distance travelled by him is? |
| Option A | 50 km |
| Option B | 56 km |
| Option C | 70 km |
| Option D | 80 km |
| Answer | Option **A** |
| Explanation | Let the actual distance travelled be *x* km.   |  |  |  |  | | --- | --- | --- | --- | | Then, | *x* | = | *x* + 20 | | 10 | 14 |   http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif 14*x* = 10*x* + 200  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif 4*x* = 200  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif *x* = 50 km. |

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| Question | In covering a distance of 30 km, Abhay takes 2 hours more than Sameer. If Abhay doubles his speed, then he would take 1 hour less than Sameer. Abhay's speed is: |
| Option A | 5 kmph |
| Option B | 6 kmph |
| Option C | 6.25 kmph |
| Option D | 7.5 kmph |
| Answer | Option **A** |
| Explanation | Let Abhay's speed be *x* km/hr.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Then, | 30 | - | 30 | = 3 | | *x* | 2*x* |   http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif 6*x* = 30  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif *x* = 5 km/hr. |

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| Question | Walking at the rate of 4kmph a man cover certain distance in 2hr 45 min. Running at a speed of 16.5 kmph the man will cover the same distance in. |
| Option A | 12 min |
| Option B | 25 min |
| Option C | 40 min |
| Option D | 60 min |
| Answer | Option C |
| Explanation | Distance = Speed X Time  Here time = 2 hr 45 min = 11/4 hr  Distance = 4 X 11/4 = 11 km  New Speed = 16.5 kmph  Therefore time = 11/16.5 = 2/3 hr = 40 min. |

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| Question | A man sitting in train travelling at the rate of 50 km/hr observes that it takes 9 sec for a goods train travelling in the opposite direction to pass him. If the goods train is 187.5m long. Find its speed |
| Option A | 40 kmph |
| Option B | 30 kmph |
| Option C | 24 kmph |
| Option D | 25 kmph |
| Answer | Option **D** |
| Explanation | **Solution:**  Let the speed of goods train be x km/hr. Then, (50+x)×(5/18) = 187.5/9  ⇒ x= **25 km/hr** |

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| Question | Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour? |
| Option A | 4 |
| Option B | 6 |
| Option C | 8 |
| Option D | 10 |
| Answer | Option **D** |
| Explanation | Due to stoppages, it covers 9 km less. Time taken to cover 9 km =(9/54) X 60 min = **10 min** |

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| Question | A car driver driving in fog, passes a pedestrian who was walking at the rate of 2km/h in the same direction. The pedestrian could see the car for 6 min and it was visible to him up to a distance of 0.6 km. The speed of the car would be : |
| Option A | 8 kmph |
| Option B | 800 mph |
| Option C | 6.25 kmph |
| Option D | 15 kmph |
| Answer | Option **A** |
| Explanation | Traveller distance in 6 min = (2/60) X 6 = 2/10 km.  Total distance in 6 min = (2/10) + (6/10) = 8/10 km   |  | | --- | |  | |  |   Speed = (8/10) X 10  = **8 km/hr** |

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| Question | In a race, the speeds of A and B are in the ratio 3:4. A takes 30 minutes more than B to reach the destination. The time taken by A to reach the destination is: |
| Option A | 1 hr |
| Option B | 1.5 hr |
| Option C | 2 hr |
| Option D | 2.5 hr |
| Answer | Option **C** |
| Explanation | Ratio of speeds = 3:4 Distance remaining constant, the ratio of time taken = 4:3  A takes 0.5 hours more than B Hence time taken by A=4×0.5= **2 hour** |

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| Question | A train traveling at 72 kmph crosses a platform in 30 seconds and a man standing on the platform in 18 seconds. What is the length of the platform in meters? |
| Option A | 240 meter |
| Option B | 360 meter |
| Option C | 420 meter |
| Option D | 600 meter |
| Answer | Option **A** |
| Explanation | The extra time that the train takes when crossing the platform is on account of the extra distance that it has to cover = length of the platform.  Therefore, length of the platform = speed of train \* extra time taken to cross the platform  Length of platform = 72 kmph \* 12 seconds  Converting 72 kmph into m/sec, we get 72 kmph = (5/18) X 72 = 20 m/sec  Therefore, length of the platform = 20 \* 12 = 240 meters. |

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| Question | Jane covered a distance of 340 miles between city A and city taking a total of 5 hours. If part of the distance was covered at 60 miles per hour speed and the balance at 80 miles per hour speed, how many hours did she travel at 60 miles per hour? |
| Option A | 2 hours 30 minutes |
| Option B | 3 hours |
| Option C | 2 hours |
| Option D | 1 hour 45 minutes |
| Answer | Option **B** |
| Explanation | Let 'x' hours be the time for which Jane traveled at 60 miles per hour. As the total time taken to cover 340 miles is 5 hours, Jane would have traveled (5 - x) hours at 80 miles per hour.  Distance covered at 60 miles per hour = Speed \* time = 60 \* x = 60x miles Distance covered at 80 miles per hour = Speed \* time = 80 (5 - x) = 400 - 80x miles  Total distance covered = Distance covered at 60 miles per hour + Distance covered at 80 miles per hour.  Therefore, total distance = 60x + 400 - 80x.  But, we know that the total distance = 340 miles.  Therefore, 340 = 60x + 400 - 80x   => 20x = 60 or x = 3 hours. |

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| Question | Steve traveled the first 2 hours of his journey at 40 mph and the remaining 3 hours of his journey at 80 mph. What is his average speed for the entire journey? |
| Option A | 60 mph |
| Option B | 56.67 mph |
| Option C | 53.33 mph |
| Option D | 64 mph |
| Answer | Option **D** |
| Explanation | Total distance traveled by Steve = Distance covered in the first 2 hours + distance covered in the next 3 hours. Distance covered in the first 2 hours = speed \* time = 40 \* 2 = 80 miles Distance covered in the next 3 hours = speed \* time = 80 \* 3 = 240 miles Therefore, total distance covered = 80 + 240 = 320 miles  Total time taken = 2 + 3 = 5 hours.  Hence, average speed = 320/5 = 64 miles per hour. |

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| Question | A farmer travelled a distance of 61 km in 9 hours. He travelled partly on foot @ 4 km/hr and partly on bicycle @ 9 km/hr. The distance travelled on foot is: |
| Option A | 14 km |
| Option B | 15 kmph |
| Option C | 16 kmph |
| Option D | 17 kmph |
| Answer | Option **C** |
| Explanation | Let the distance travelled on foot be *x* km.  Then, distance travelled on bicycle = (61 -*x*) km.  So (x/4) + (61 – x) = 9  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif 9*x* + 4(61 -*x*) = 9 x 36  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif 5*x* = 80  http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif *x* = 16 km. |

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| Question | A thief steals a car and drives it at 15 km/hr. The theft has been discovered after one hour and the owner of the car sets off in another car at 25 km/hr. When will the owner overtake the thief from the starting point? |
| Option A | 1 hr |
| Option B | 1.5 hr |
| Option C | 2 hr |
| Option D | 2.5 hr |
| Answer | Option **B** |
| Explanation | Distance covered by the thief in one hour = 15 km Now this distance is to be covered by the relative speed of (25−15)=10km/hr  Hence, time required to cover this distance at a speed of 10km/hr: 15/10  = **1.5 hr** |

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| Question | Walking at 3/4 of his usual place, a man reaches his office 20 minute late. Find his usual time? |
| Option A | 2 hr |
| Option B | 1 hr |
| Option C | 3 hr |
| Option D | 3.5 hr |
| Answer | Option **B** |
| Explanation | Let the original speed be S and time be T If new speed=S X (3/4), then new time would be T X (4/3) (D = ST = Constant)  Given, (3T/4) – T = 20T/3  ⇒ T=60 minutes = **1 hour** |

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| Question | A train traveling at 100 kmph overtakes a motorbike traveling at 64 kmph in 40 seconds. What is the length of the train in meters? |
| Option A | 1777 meter |
| Option B | 1822 meter |
| Option C | 400 meter |
| Option D | 1100 meter |
| Answer | Option **C** |
| Explanation | When a train overtakes another object such as a motorbike, whose length is negligible compared to the length of the train, then the distance traveled by the train while overtaking the motorbike is the same as the length of the train.  The length of the train = distance traveled by the train while overtaking the motorbike  = relative speed between the train and the motorbike \* time taken  In this case, as both the objects i.e., the train and the motorbike are moving in the same direction, the relative speed between them = difference between their respective speeds = 100 - 64 = 36 kmph.  Distance traveled by the train while overtaking the motorbike = 36 kmph \* 40 seconds.  The final answer is given in meters and the speed is given in kmph and the time in seconds.   So let us convert the given speed from kmph to m/sec.  1 kmph = (5/18) m/sec  Therefore, 36 kmph = 36 \* (5 /18) = 10 m/sec.  Relative speed = 10 m/sec. Time taken = 40 seconds.  Therefore, distance traveled = 10 \* 40 = 400 meters. |

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| Question | The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 km in 4 hours, then the speed of the first train is: |
| Option A | 70 kmph |
| Option B | 75 kmph |
| Option C | 84 kmph |
| Option D | 87.5 kmph |
| Answer | Option **D** |
| Explanation | Let the speed of two trains be 7*x* and 8*x* km/hr.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Then, 8*x* = |  |  |  | (400/4) = 100 | |  |  |  |  |  |  | | --- | --- | --- | --- | | http://www.indiabix.com/_files/images/aptitude/1-sym-imp.gif *x* = |  |  | (100/8) =12.5 | |  |   http://www.indiabix.com/_files/images/aptitude/1-sym-tfr.gif Speed of first train = (7 x 12.5) km/hr = 87.5 km/hr. |