

Speed, Time and Distance: Concepts, Solved Examples, & Preparation Strategies

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The basic concept of speed, time and distance is the relation between three variables. The speed of a body is distance covered by the body per unit time. That is $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Questions related to speed, time and distance include various categories such as straight line, relative motion, circular motion, trains, boats, clocks, races, etc.

In this article, we are going to cover the key concepts of Speed, Time and Distance along with the various types of questions, and tips and tricks. We have also added a few solved examples, which candidates will find beneficial in their exam preparation. Read the article thoroughly to clear all the doubts regarding the same.

If you've learned Speed, Time and Distance, you can move on to learn about [Time and Work](#) concepts here!

What is Speed, Time and Distance?

(a) Speed

It refers to the rate at which a particular distance is covered by an object in motion. The unit of speed may be m/s, km/h, m/min, km/min, or km/day.

(b) Time

It refers to an interval separating two events. The unit of time may be second (sec or s), minutes (min), hours, days etc.

(c) Distance

It refers to the extent of space between two points. The unit of distance may be metres (m), kilometres (km), centimeters (cm), inches (in) etc.

Concept of Motion

It is said that an object attains motion or movement when it changes its position with respect to any external stationary point. Speed, Time and Distance are the three variables that represent the mathematical model of motion as, $s \times t = d$

- Speed is directly proportional to distance. It means that time remains constant, if we have two vehicles moving two distances at two different speeds respectively.
- Speed is inversely proportional to time. It means that distance remains constant if we have two vehicles moving at two different speeds and taking times respectively.

Types of Questions from Speed, Time and Distance

There are some specific types of questions from Speed, time and distance that usually come in exams. Some of the important types of questions from speed, time and distance are as follows.

(a) Problems related to Trains

Please note that, in the case of the train problems, the distance to be covered when crossing an object is equal to,
 Distance to be covered = Length of train + Length of object.

Remember that, in case the object under consideration is a pole or a person or a point, we can consider them to be point objects with zero length. It means that we will not consider the lengths of these objects. However, if the object under consideration is a platform (non point object), then its length will be added to the formula of the distance to be covered.

(b) Boats and Streams

In such problems boats travel either in the direction of stream or in the opposite direction of stream. The direction of boat along the stream is called downstream and the direction of boat against the stream is called upstream.

If the speed of a boat in still water is u km/hr and the speed of the stream is v km/hr, then:

$$1) \text{ Speed downstream} = (u + v) \text{ km/hr}$$

$$2) \text{ Speed upstream} = (u - v) \text{ km/hr}$$

Once you've mastered Speed, Time and Distance, Also, learn more about [Ratio and Proportion](#) concepts in depth!

How to Solve Question Based on Speed, Time and Speed- Know all Tips and Tricks

Candidates can find different tips and tricks from below for solving the questions related to speed, time and distance.

Tip # 1: Relative speed is defined as the speed of a moving body with respect to another body. The possible cases of relative motion are, same direction, when two bodies are moving in the same direction, the relative speed is the difference between their speeds and is always expressed as a positive value. On the other hand, the opposite

Tip # 3: When train crossing a moving body,

When a train passes a moving man/point object, the distance travelled by the train while passing it will be equal to the length of the train and relative speed will be taken as

- 1) If both are moving in same direction then relative speed = Difference of both speeds
- 2) If both are moving in opposite direction then relative speed = Addition of both speeds

Tip # 4: Train Passing a long object or platform, when a train passes a platform or a long object, the distance travelled by the train, while crossing that object will be equal to the sum of the length of the train and length of that object.

Tip # 5: Train passing a man or point object, when a train passes a man/object, the distance travelled by the train while passing that object, will be equal to the length of the train.

When you've finished with Speed, Time and Distance, you can read about [Algebraic Identities](#) concepts in depth here!

Speed, Time and Distance Solved Sample Questions

Question 1: The speed of three cars are in the ratio $5 : 4 : 6$. The ratio between the time taken by them to travel the same distance is

Solution: Ratio of time taken = $\frac{1}{5} : \frac{1}{4} : \frac{1}{6} = 12 : 15 : 10$

Question 2: A truck covers a distance of 1200 km in 40 hours. What is the average speed of the truck?

Solution: Average speed = Total distance travelled/Total time taken

$$\Rightarrow \text{Average speed} = 1200/40$$

$$\therefore \text{Average speed} = 30 \text{ km/hr}$$

Question 3: A man travelled 12 km at a speed of 4 km/h and further 10 km at a speed of 5 km/hr. What was his average speed?

Solution: Total time taken = Time taken at a speed of 4 km/h + Time taken at a speed of 5 km/h

$$\Rightarrow 12/4 + 10/5 = 5 \text{ hours} [\because \text{Time} = \text{Distance}/\text{Speed}] \text{ Average speed} = \text{Total distance}/\text{Total time}$$

$$\Rightarrow (12 + 10)/5 = 22/5 = 4.4 \text{ km/h}$$

Question 4: Rahul goes Delhi to Pune at a speed of 50 km/h and comes back at a speed of 75 km/h. Find his average speed of the journey.

Question 5: Determine the length of train A if it crosses a pole at 60km/h in 30 sec.

Solution: Given, speed of the train = 60 km/h

$$\Rightarrow \text{Speed} = 60 \times \frac{5}{18} \text{ m/s} = \frac{50}{3} \text{ m/s}$$

Given, time taken by train A to cross the pole = 30 s

The distance covered in crossing the pole will be equal to the length of the train.

$$\Rightarrow \text{Distance} = \text{Speed} \times \text{Time}$$

$$\Rightarrow \text{Distance} = \frac{50}{3} \times 30 = 500 \text{ m}$$

Question 6: A 150 m long train crosses a 270 m long platform in 15 sec. How much time will it take to cross a platform of 186 m?

Solution: In crossing a 270 m long platform,

$$\text{Total distance covered by train} = 150 + 270 = 420 \text{ m}$$

$$\text{Speed of train} = \text{total distance covered}/\text{time taken} = 420/15 = 28 \text{ m/sec}$$

$$\text{In crossing a 186 m long platform,}$$

$$\text{Total distance covered by train} = 150 + 186 = 336 \text{ m}$$

$$\therefore \text{Time taken by train} = \text{distance covered}/\text{speed of train} = 336/28 = 12 \text{ sec.}$$

Question 7: Two trains are moving in the same directions at speeds of 43 km/h and 51 km/h respectively. The time taken by the faster train to cross a man sitting in the slower train is 72 seconds. What is the length (in metres) of the faster train?

Solution: Given: The speed of 2 trains = 43 km/hr and 51 km/hr Relative velocity of both trains = $(51 - 43)$ km/hr = 8 km/hr Relative velocity in m/s = $8 \times (5/18)$ m/s

$$\Rightarrow \text{Distance covered by the train in 72 sec} = 8 \times (5/18) \times 72 = 160 \text{ Hence, the length of faster train} = 160 \text{ m}$$

Question 8: How long will a train 100m long travelling at 72km/h take to overtake another train 200m long travelling at 54km/h in the same direction?

Solution: Relative speed = $72 - 54$ km/h (as both are travelling in same direction)

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

Also, distance covered by the train to overtake the train = $100 \text{ m} + 200 \text{ m} = 300 \text{ m}$ Hence,

$$\text{Time taken} = \text{distance}/\text{speed} = 300/5 = 60 \text{ sec}$$

Solution: Time taken downstream = 40 min = $40/60 = 2/3$ hrs. Downstream speed = $20 / (2/3) = 30$ km/hr.

As we know, speed of stream = $1/2 \times (\text{Downstream speed} - \text{Upstream speed})$

$\Rightarrow \text{Upstream speed} = 30 - 2 \times 2.5 = 30 - 5 = 25$ km/hr.

Time taken to return back = $20/25 = 0.8$ hrs. = $0.8 \times 60 = 48$ min.

\therefore The boat will take = $48 - 40 = 8$ min. more to return back

Exams where Speed, Time and Distance is Part of Syllabus

Questions based on Speed, Time and Distance come up often in various prestigious government exams some of them are as follows.

- [SBI PO](#), [SBI Clerk](#), [IBPS PO](#), [IBPS Clerk](#)
- [SSC CGL](#), [SSC CHSL](#), [SSC MTS](#)
- [LIC AAO](#), [LIC ADO](#)
- [RRB NTPC](#), [RRB ALP](#)
- [UPSC](#)
- [MPSC](#)
- [KPSC](#)
- [BPSC](#)
- [WBPSC](#)
- Other State Level Recruitment Examinations

We hope you found this article regarding Speed, Time and Distance was informative and helpful, and please do not hesitate to contact us for any doubts or queries regarding the same. You can also download the [Testbook App](#), which is absolutely free and start preparing for any government competitive examination by taking the mock tests before the examination to boost your preparation.

If you are checking Speed, Time and Distance article, also check the related maths articles in the table below:

Mathematics	X Axis and Y Axis
Bar Line Graph	Double Line Graph
Compound Bar Graph	Types of Bar Graph

Ans.1 Details regarding the speed, time and distance can be found above in the article. Kindly go through the article for the same.

Q.2 Where can I find the important rules related to the speed, time and distance?

Ans.2 Important rules related to the speed, time and distance can be found above in the article.

Q.3 How to solve the problem related to speed, time and distance?

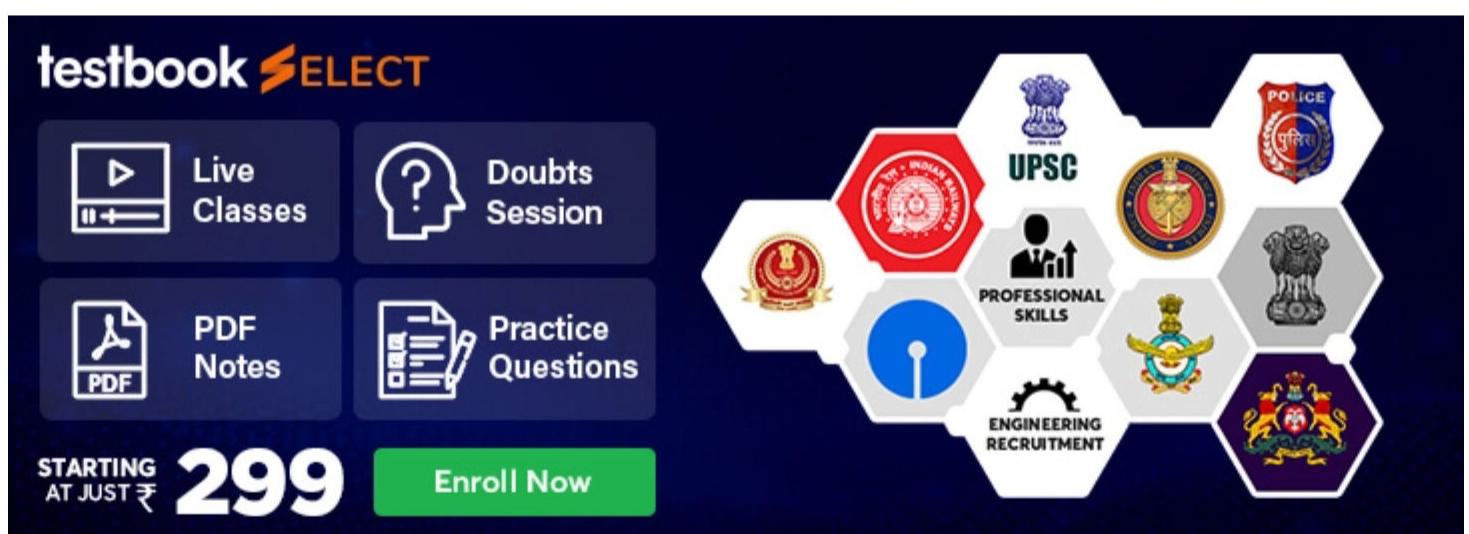
Ans.3 Tips and tricks to solve the problems related to speed, time and distance are given above in the article. Kindly go through the article for the same.

Q.4 Where I will find some of the sample questions related to speed, time and distance?

Ans.4 Various example questions along with their solutions are given above in the article. Kindly go through the article for the same.

Q.5 In which exam questions from speed, time and distance come up?

Ans.5 Speed, time and distance based questions come in various government competitive examinations on a regular basis. The names of such examinations are given above in the article.



A screenshot of the Testbook mobile application. On the left, there is a smartphone icon displaying the app's home screen with a search bar and a list of popular exams like SBI Clerk Mains, SBI PO, UPSC NDA, UPPSC PCS Prelims, SSC CHSL Tier II (2019), UGC NET, UPSC Civil Services, and CTET. On the right, the main landing page features the 'testbook' logo and the tagline 'The Complete Exam Preparation Platform'. Below this, there are three main service offerings: 'Free 20000+ Practice Questions', '15000+ MockTest & Quizzes', and 'Free 2000+ Video Lessons & PDF Notes'. A large green 'START LEARNING' button is centered at the bottom. In the bottom right corner, there is a 'Trusted by 1.5 Crore Students' badge, a 'Download the App From' link, and a 'GET IT ON Google Play' button.