PHYSICS

SpeedLabs
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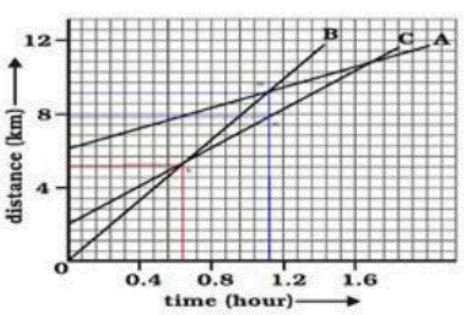
Board – CBSE	Class – 9th	Topic – Motion

1. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station? The signal travels at the speed of light, that is, 3×10^8m s^{-1}.
2. A bus decreases its speed from 80km h^{-1} to 60 km h^{-1} in 5 s. Find the acceleration of the bus.
3. A car travels at a speed of 40km/hr. for two hours and then at 60km/hr. for three hours. What is the average speed of the car during the entire journey?
4. A train starting from a railway station and moving with uniform acceleration attains a speed 40 km h^{-1} in 10 minutes. Find its acceleration.
5. Derive the second equation of motion $S = ut + \frac{1}{2} at^2$ graphically?
6. A ball starts from rest and rolls down 16m down an inclined plane in 4 s.
   a) What is the acceleration of the ball?
   b) What is the velocity of the ball at the bottom of the incline?
7. A boy throws a stone upward with a velocity of 60m/s.
   a) How long will it take to reach the maximum height?
   b) What is the maximum height reached by the ball?
   c) How long will it take to reach the ground?
8. Joseph jogs from one end A to the other end B of a straight 300 m road in 2 minutes 50 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging?
   a) from A to B and
   b) from A to C?
9. Abdul, while driving to school, computes the average speed for his trip to be 20 km h^{-1}. On his return trip along the same route, there is less traffic and the average speed is 40 km h^{-1}. What is the average speed for Abdul's trip?
10. A driver of a car travelling at 52 km h^{-1} applies the brakes and accelerates uniformly in the opposite direction. The car stops in 5 s. Another driver going at 3 km h^{-1} in another car applies is brakes slowly and stops in 10 s. On the same graph paper, plot the speed versus time graphs for the two cars. Which of the two cars travelled farther after the brakes were applied?

11. Fig shows the distance-time graph of three objects A, B and C. Study the graph and answer the following questions:



    a) Which of the three is travelling the fastest?
    b) Are all three ever at the same point on the road?
    c) How far has C travelled when B passes A?
    d) How far has B travelled by the time it passes C?

12. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m s^{-2} , with what velocity will it strike the ground? After what time will it strike the ground?

13. State which of the following situations are possible and give an example for each of these:
    a) An object with a constant acceleration but with zero velocity
    b) An object moving in a certain direction with an acceleration in the perpendicular direction.

14. An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed if it takes 24 hours to revolve around the earth.

15. . The position of a body at different times are recorded in the table given below:

Time (s)	0	1	2	3	4	5	6	7	8
Displacement (m)	0	6	12	18	24	30	36	42	48

    a) Draw the displacement time graph for the above data?
    b) What is the slope of graph?
    c) What is the speed of the motion?