CBSE Test Paper 05

Chapter 08 Motion

1. A man walks at 1 m/s for 60 minutes. He takes rest for 20 minutes and then walks at a speed of 1 m/s for 60 minutes. Find his average speed. **(1)**

   a. 0.85 m/s.
   b. 0.95 m/s
   c. 0.96 m/s
   d. 0.86 m/s

2. Two cars A and B race each other. The Car A ran for 2 min at a speed of 7.5 km/h, slept for 56 min and again ran for 2 min at a speed of 7.5 km/h. The average speed of the car A in the race is **(1)**

   a. 10 km/hr
   b. 5 km/hr
   c. 0.5 km/hr
   d. 50 km/hr

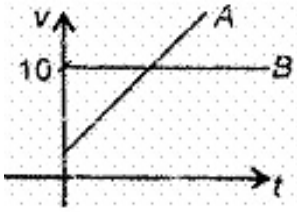
3. For a uniformly accelerated body with initial and final velocities as u and v ms^{-1}, the average velocity is **(1)**

   a. $\frac{u-v}{2}$
   b. $\frac{v}{2}$
   c. $\frac{u+v}{2}$
   d. $\frac{u}{2}$

4. The displacement of a body is proportional to the cube of the time lapsed. The magnitude of the acceleration is **(1)**

   a. decreasing with time
   b. increasing with time
   c. constant
   d. zero

5. The v-t graph shown here depicts the motion of A and B such that **(1)**



   a. they collide when their velocity is 10 ms-1
   b. both A and B have zero acceleration
   c. both A and B have non-zero acceleration
   d. velocity of A exceeds beyond 10 ms-1

6. Can the speed of a body be negative? **(1)**

7. What do you mean by positive acceleration? **(1)**

8. What is the quantity which is measured by the area occupied below the velocity time graph? **(1)**

9. What is the simplest type of motion? **(1)**

10. What do you understand by a uniform velocity? **(1)**

11. Find the initial velocity of a car if it can be stopped in 10 sec by applying brakes which provide it a retardation of 2.5 ms^{-2}. **(3)**

12. Draw a velocity versus time graph of a stone thrown vertically upward and then coming downwards after attaining the maximum height. **(3)**

13. An aeroplane accelerates down a runway at 3.20 m/s^2 for 32.8 s until is finally lifted off the ground. Determine the distance travelled before take off. **(3)**

14. Distance travelled by train and the time taken by it is shown in the following table? **(5)**

   i. Plot distance-time graph.
   ii. What is the average speed of the train?
   iii. When is the train travelling at the highest speed?
   iv. At what distance does the train slow down?

v. Calculate the speed of the train between 10:40 AM to 11:00 AM.

Time	Distance (in km)
10 : 00 AM	0
10 : 30 AM	25
10 : 40 AM	28
11 : 00 AM	40
11 : 15 AM	42
11 : 30 AM	50

15. Joseph jogs from one end A to the other end B of a straight 300 m road in 2 minutes 30 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What is Joseph's average speed and velocity in jogging (a) from A to B and (b) from A to C? **(5)**

CBSE Test Paper 05

Chapter 08 Motion

Answers

1. d. 0.86 m/s

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

   distance= $1\ m/s \times 3600$ sec = 3600 m,

   Average speed = (3600 +3600)m/(3600 + 3600 +1200)sec = 7200 m/8400 sec = 0.86 m/s.

   It can be also represented in km/h.

   In km/h,the average speed of the man is 0.0516 km/h

2. c. 0.5 km/hr

   Explanation: Distance = speed × time

   Distance travelled in first 2 min = 7.5 × $\frac{2}{60}$ = 0.25 km

   Distance travelled in last 2 min = 7.5 × $\frac{2}{60}$ = 0.25 km

   Total distance =0.25 + 0.25 = 0.5 km

   Total time = 2 + 2 + 56 = 60min = 1 hr

   Average speed = $\frac{0.5}{1}$ = 0.5 km/hr

3. c. $\frac{u+v}{2}$

   Explanation: Average velocity is the ratio of total displacement or total distance travelled by a body in a given interval of time .

4. b. increasing with time

   Explanation: Acceleration is directly proportion to time, it varies linearly with time and increases with respect to time.

5. d. velocity of A exceeds beyond 10 ms^{-1}

   Explanation: Distance = Velocity $\times$ Time = 10 $\times$ Time

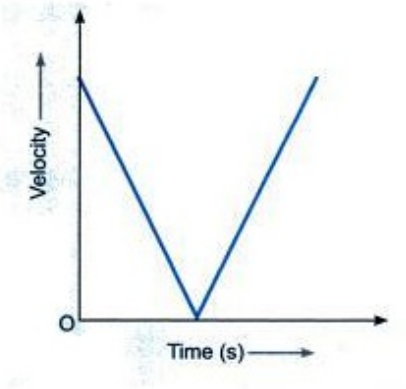
   The v-t graph shown here depicts the motion of A and B such that velocity of A exceeds beyond 10ms^{-1}.

6. No, because the speed of a body is the ratio of distance and time and distance travelled is never negative.

7. When the change in velocity of a body takes place in the direction of motion of the body, then the acceleration is positive.
8. Displacement is the quantity which is measured by the area under velocity time graph.
9. Motion in a straight line.
10. Velocity of an object is uniform if it travels equal displacement in equal intervals of time.
11. Given u = ?, v = 0, t = 10 s, a = -2.5 ms $^{-2}$

    Using v = u + at

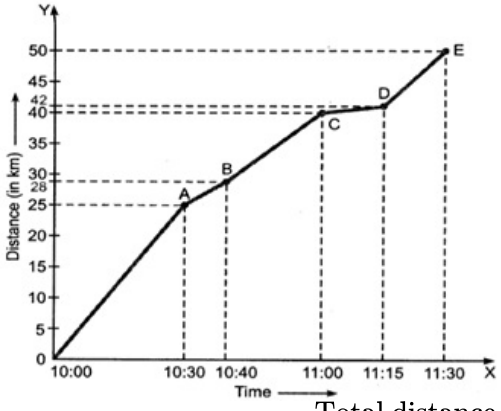
    We have 0 = u – 2.5 × 10

    Therefore u = 25 ms^{-1}
12. 

13. Given, the initial velocity = 0 m/s acceleration = 3.20 m/s^2. t = 32.8 s.

    This is quite a basic question of 2nd equation of motion s = $s = ut + \frac{1}{2}at^2$

    s = 1/2at^2

    s = (.5)(3.20)(32.8)^2 = 1721.344m
14. 

    i. Average speed = $\frac{\text{Total distance travelled}}{\text{Total time taken}}$ In this problem, the total distance travelled = 50 km. Total time took 10:00 AM to 11: 30 AM

    = 1 hour 30 minutes = $1\frac{1}{2}h$ = $\frac{3}{2}h$

    Therefore, Now average speed = $\frac{50\,km}{\frac{3}{2}h}$

= $\frac{100}{3} km/h$ = 33.33 km h^{-1}

ii. We, know, speed = slope of the distance-time graph. The greater the slope the greater is the speed.

From the graph, it is clear that slope of the distance-time graph is maximum between 10:00 AM to 10:30 AM, so the train was travelling at the highest speed during this interval of time.

iii. The part CD of the graph has a minimum slope, so the train had a minimum speed between 11:00 AM and 11:15 AM. Thus, the train had slowed down between 40 km and 42 km.

iv. Speed between 10:40 AM to 11:00 AM = $\frac{\text{Distance}}{\text{Time}}$

= $\frac{(40-28)km}{20\,\text{min}}$ = $\frac{12}{\frac{20}{60}}$ = 36 km/h

15. a. Total distance covered by Joseph in 2 min and 30 seconds = AB

Displacement of Joseph in 2 min and 30 seconds = AB = 300 m

Total time taken = 2 min 30 s

= 2 x 60 s + 30 s = 150 s

Average speed = $\frac{\text{Total distance covered}}{\text{Total time taken}}$

= $\frac{300m}{150s}$ = 2 ms^{-1}

Average velocity = $\frac{\text{Displacement}}{\text{Total time taken}}$

= $\frac{300m}{150s}$ = 2 ms^{-1}

Thus, average speed = average velocity = 2 ms^{-1}

b. Total distance covered by Joseph = AB + BC

= 300 m + 100 m = 400 m

Displacement of Joseph = AC,

the shortest distances between initial and final position = 200 m

Total time taken = 2 minutes 30 seconds + 1 min

= 3 min 30 s = 3 x 60 min + 30 s = 210 s

Average speed = $\frac{\text{Total distance covered}}{\text{Total time taken}}$

= $\frac{400m}{210s}$ = 1.90ms^{-1}

Average velocity = $\frac{\text{Displacement}}{\text{Total time taken}}$

= $\frac{200m}{210s}$ = 0.952 ms^{-1}