WORKSHEET 2

CHAPTER 2 – MOTION IN ONE DIMENSION

A. Tick (✓) the correct option.

1. What does area under a velocity–time graph represent?
   a. Speed b. Acceleration c. Distance covered d. None of these
2. A car accelerates uniformly from 18 km/h to 36 km/h within a distance of 15 m. What is the uniform acceleration of the car?
   a. 2.5 m s^{-2} b. 5 m s^{-2} c. 1.5 m s^{-2} d. 3.0 m s^{-2}
3. What does the slope of a velocity–time graph represent?
   a. Distance b. Displacement c. Acceleration d. Speed
4. A scooter is running at a velocity of 72 km/h. On applying brakes, it is brought to rest in 2 s. What is the distance covered by the scooter before coming to rest? Assume that acceleration produced by brakes is uniform throughout.
   a. 40 m b. 20 m c. 10 m d. 5 m
5. A van driver driving at a speed of 90 km/h applies brakes and brings the van to rest in 20 s. What is the acceleration of the van?
   a. +1 m s^{-2} b. –1.5 m s^{-2} c. –1.25 m s^{-2} d. +2.5 m s^{-2}

B. Fill in the blanks.

1. The value of '*g*' on earth is _____ at the poles and _____ at the equator.
2. The slope of the distance–time graph for a body at rest is _____
3. Speed–time graph for a uniformly retarded motion is a _____
4. _____ of distance–time graph gives the speed of a moving object.
5. The position–time relation for uniformly accelerated motion is _____

C. State whether the following statements are true or false.

1. When a body covers unequal distances in equal intervals of time, it is said to have a uniform speed.
2. When the speed of a body increases with time, the distance covered by it per unit time, also increases with time.
3. The speed of a body is the distance travelled by it per unit time.
4. There are five equations for the motion of a body moving with a uniform acceleration.
5. The value of '*g*' decreases as we go away from the surface of the earth.

D. Match the following.

1. Speed	displacement/total time
2. Average speed	change in velocity/time
3. Average velocity	distance/time
4. Acceleration	speed × time
5. Distance	total distance/total time

Name: ..... Teacher's signature: .....

Class: IX Date: .....

E. Answer the following questions.

Very short answer questions

1. Pick out only the vector quantity from the following list:

   Temperature, pressure, time, power, energy, total path length, electric charge, displacement

2. Pick out only the scalar quantity from the following list:

   Force, work, retardation, average velocity, instantaneous velocity

Short answer questions

1. Which of the following is true for displacement? Justify your answer for the true statement. (a) It can be zero, (b) Its magnitude is greater than the distance travelled by the object.

2. Distinguish between acceleration and velocity.

Long answer questions

1. Can an object have constant speed and still be accelerating? Give two examples.

2. State two applications of plotting (a) distance–time graph, and (b) velocity–time graph.

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. c 2. a 3. c 4. b 5. c

B. Fill in the blanks.

1. Maximum, minimum
2. zero
3. straight line having negative slope
4. Slope
5. $s = ut + \frac{1}{2}at^2$

C. State whether the following statements are true or false.

1. F 2. T 3. T 4. F 5. T

D. Match the following.

1. Speed	distance/time
2. Average speed	total distance/total time
3. Average velocity	displacement/total time
4. Acceleration	change in velocity/time
5. Distance	speed × time

E. Answer the following questions.

Very short answer questions

1. Only displacement is a vector quantity given in the list.
2. Only work is a scalar quantity given in the list.

Short answer questions

1. a. True, the displacement can be zero if the final position of a moving object coincides with its initial position. As an example, a girl starting from a particular position in a garden, takes a round of the garden and reaches the starting point again, then her displacement will be zero.

   b. False, the magnitude of displacement can never be greater than the distance travelled by the object.

2. Difference between velocity and acceleration:

Velocity	Acceleration
1. Velocity is the rate of change of displacement.	1. Acceleration is the rate of change of velocity.
2. The SI unit of velocity is m/s.	2. The SI unit of acceleration is m/s^2.

Long answer questions

1. Acceleration is defined as the rate of change of velocity and velocity has both direction as well as magnitude. If any of the two changes, then motion is accelerated. When an object has constant speed, the magnitude of velocity is constant but direction may change and cause an acceleration. Uniform circular motion is an example of accelerated motion of an object having constant speed.

   Other example is movement of moon around the earth. The speed of moon is constant but direction is changing all the time.

2. a. Two applications of plotting distance–time graph:

      i. It tells us whether the given object is at rest or in motion. If in motion, it also tells us whether that motion is uniform on non-uniform.

      ii. The velocity of an object can be calculated by finding the slope of distance–time graph.

   b. Two applications of plotting velocity–time graph:

      i. It tells us variation of velocity of object with time.

      ii. We can determine the acceleration of the object by finding slope of velocity–time graph. Similarly, area under velocity–time graph gives the value of distance covered by the object during a given time interval.