



STEPPING STONE SCHOOL (HIGH)

CLASS – IX

PHYSICS

WORKSHEET- 7

Date – 01/06/2020, (Day- 7)

Chapter- MOTION IN ONE DIMENTION (Pt. I)

Topic- Terms related to motion

Time limit: 30 minutes.

Please read the notes carefully and on the basis of it copy down the questions and solve them on a sheet of paper date wise. Keep the worksheet ready in a file to be submitted on the opening day.

Scalar quantities and Vector Quantities:

Scalar quantities-

These are physical quantities which are expressed only by their magnitude.

For example- Mass Length, Time, Distance, Speed, Temperature etc.

Vector quantities:

These physical quantities require the magnitude as well as the direction to express them.

For example- Displacement, Velocity, Acceleration, Weight, Force etc. The numerical value of a vector quantity along with its unit gives us the

magnitude of that quantity. It is always positive. The negative sign with a vector quantity implies the reverse direction.

e.g. the forces F and $-F$ are in opposite directions.

Rest and Motion:

A body is said to be at rest if it does not change its position with respect to its immediate surroundings, while a body is said to be in motion if it changes its position with respect to its immediate surroundings.

One dimensional motion:

When a body moves along a straight line path, its motion is said to be one dimensional motion. It is also called motion in a straight line or rectilinear motion.

Distance and Displacement:

Distance- It is the length of the path traversed by the object in a certain time. It is a scalar quantity generally represented by the letter S . SI unit is metre (m) and CGS unit is centimetre (cm)

Displacement-

It is the shortest distance travelled by the object in a specified direction in a certain time. It is a vector quantity represented by the symbol S

Distance travelled by the object

= length between A and B (along continuous path)

Displacement of the object

= length between A and B

(along the discontinuous line)

N.B:

(1) The magnitude of displacement can never be greater than the distance travelled by the body

(2) The displacement can be zero even if the distance is not zero- if an object after travelling, comes back to its starting point.

Speed and velocity:

Speed – It is the rate of change of distance with time.

It is a scalar quantity.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

SI unit is m/s and CGS unit is cm/s.

Different Types:

(1) *Uniform speed*- if an object covers equal distances in equal intervals of time throughout its motion.

e.g. motion of a ball on a frictionless plane surface.

(2) *Non uniform or variable speed*- if an object covers unequal distances in equal intervals of time.

e.g. motion of a ball on a rough surface.

Instantaneous speed- the speed at any instant of a time.

The speedometer of a vehicle measures the instantaneous speed.

Average speed- The ratio of the total distance travelled by the body to the total time of journey.

Velocity- It is the distance travelled per second by the body in a specified direction.

It is a vector quantity.

SI unit is m/s and CGS unit is cm/s.

Different Types:

(1) *Uniform velocity*- If a body travels equal distances in equal intervals of time in a particular direction.

e.g. motion of a particle in plane surface in a specific direction.

(2) *Non uniform or variable velocity*- If a body moves unequal distances in equal intervals of time in a particular direction.

e.g. motion of a freely falling body.

(3) *Instantaneous velocity*- The body moving with a variable velocity, the velocity of the body at any instant of time.

(4) *Average velocity*- The ratio of displacement to the time taken in entire journey.

Acceleration:

It is the rate of change of increasing velocity with time. It is a vector quantity.

Acceleration = $\frac{\text{change in increasing velocity}}{\text{Time interval}}$

Time interval

SI unit is ms^{-2} and CGS unit is cms^{-2}

Acceleration due to gravity:

When a body falls freely under gravity, the acceleration produced in the body due to earth's gravitational attraction is called acceleration due to gravity.

Exercise:

Answer the following questions:

1. When is a body said to be at rest or to be in motion?
2. Differentiate between the scalar and vector quantities, giving two examples of each.
3. What do you mean by motion in one direction?
4. When is the magnitude of displacement equal to the distance?
5. Distinguish between speed and velocity.
6. Give an example of motion of a body moving with a constant speed but with a variable velocity.
7. Differentiate between acceleration and retardation.
8. Which of the quantity, velocity or acceleration determines the direction of motion.
9. 'The value of g remains same at all places on the earth surface'. Is this statement true? Give reason.
10. If a stone and a rubber are dropped simultaneously in vacuum from the top of a building, which of the two will reach the ground first? Give reason.

Please tap on the hyperlink below to watch the video content of the topic **Terms related to motion**

<https://www.youtube.com/watch?v=vxFYfumAAIY>

<https://www.youtube.com/watch?v=21BwUNDOQno>

<https://www.youtube.com/watch?v=Pj8Zh0A-uLU>

