

Balika Vidyapith, Lakhisarai

Class 11Sc Sub Physics (Unit 03) Date 31 08 2020

Physics Notes Class 11 CHAPTER 3 MOTION IN A STRAIGHT LINE

Motion

If an object changes its position with respect to its surroundings with time, then it is called in motion.

Rest

If an object does not change its position with respect to its surroundings with time, then it is called at rest.

[Rest and motion are relative states. It means an object which is at rest in one frame of reference can be in motion in another frame of reference at the same time.]

Point Mass Object An object can be considered as a point mass object, if the distance travelled by it in motion is very large in comparison to its dimensions.

Types of Motion

1. One Dimensional Motion

If only one out of three coordinates specifying the position of the object changes with respect to time, then the motion is called one dimensional motion.

For instance, motion of a block in a straight line motion of a train along a straight track a man walking on a level and narrow road and object falling under gravity etc.

2. Two Dimensional Motion

If only two out of three coordinates specifying the position of the object changes with respect to time, then the motion is called two dimensional motion.

A circular motion is an instance of two dimensional motion.

3. Three Dimensional Motion

If all the three coordinates specifying the position of the object changes with respect to time, then the motion is called three dimensional motion.

A few instances of three dimension are flying bird, a flying kite, a flying aeroplane, the random motion of gas molecule etc.

Distance

The length of the actual path traversed by an object is called the distance.

It is a scalar quantity and it can never be zero or negative during the motion of an object.

Its unit is metre.

Displacement

The shortest distance between the initial and final positions of any object during motion is called displacement. The displacement of an object in a given time can be positive, zero or negative.

It is a vector quantity.

Its unit is metre.

Speed

The time rate of change of position of the object in any direction is called speed of the object.

Speed (v) = Distance travelled (s) / Time taken (t)

Its unit is m/s.

It is a scalar quantity.

Its dimensional formula is $[M^0T^{-1}]$.

Uniform Speed

If an object covers equal distances in equal intervals of time, then its speed is called uniform speed.

Non-uniform or Variable Speed

If an object covers unequal distances in equal intervals of time, then its speed is called non-uniform or variable speed.

Average Speed

The ratio of the total distance travelled by the object to the total time taken is called average speed of the object.

Average speed = Total distance travelled / Total time taken

Note:- dimensional formula of speed- LT^{-1} .