BIJENDRA PUBLIC SCHOOL

Class : 7   **Subject : Science**

Chapter 13 MOTION AND TIME

A.   Very Short Answer Questions (Answer in one word)

1.   What is the device containing a metallic bob suspended with the help of string called?

Ans.   Simple pendulum

2.   What is the maximum displacement of the bob from its mean position called?

Ans.   The maximum displacement of the bob from its mean position is called amplitude of the pendulum.

3.   What is SI unit of speed?

Ans.   Meter per second.

4.   Which physical quantity is measured by odometer?

Ans.   Odometer records the distance moved by the vehicle.

5.   What is the graph drawn on the Cartesian axes called?

Ans.`   The graph drawn on the Cartesian axes is called as coordinate plane or also referred to as a map (Commonly called the x-axis and y-axis respectively) or, line graph.

B.   Short - Answer Questions:

1.   When a body can said to be in motion? Can any body be at absolute rest?

Ans.   The objects which change their positions with time are said to be in motion. Nothing is at absolute rest or in absolute motion in the universe.

2.   Name the device that is used for measuring time interval. Name the agency which provides time - keeping services in India.

Ans.   Time interval can be measure by a device called stopwatch.
Tthe time - keeping services in India are provided by the National Physical Laboratory, New Delhi.

3.   Under what condition, the time period of a pendulum does not depend upon the amplitude of oscillation?

Ans.   As long as the amplitude of the oscillations is small the time period of a pendulum does not depend on the amplitude of the oscillation.

4.   Define speed. What is its SI unit?

Ans.   The distance travelled by an object in unit time is called its speed. The speed of a moving body can be expressed by the relation.

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

$$\text{The S. I. unit of speed} = \frac{\text{meter (m)}}{\text{second (s)}}$$

$$= \text{meter / second}$$

5. Define nonuniform motion. Give one example.

Ans. A body is said to have nonuniform motion when it travels unequal distances in equal intervals of time.

For example : A body falling freely from certain height above the earth's surface has nonuniform motion.

C. Long Answer Questions :

1. When is an object said to be in motion?

Ans. The objects which change their positions with respect of time are said to be in motion.

For example the motion of a car from one position to another position.

2. Classify motion of the following as linear, circular and oscillatory motion.

    a.   a cyclist on a straight plane road.

    b.   a plucked string of a sitar.

    c.   tip of hand of a clock.

    d.   earth moving around the sun

    e.   a stone falling from certain height

    f.   a swing

Ans.   a.   a cyclist on a straight plane road :- rectilinear motion

    b.   a plucked strong of a sitar :- vibratory motion

    c.   tip of hand of a clock :- the tip of hand of a clock performs circular motion

    d.   earth moving around the sun :- revolution motion

    e.   a stone falling from a certain height :- linear motion

    f.   a swing :- oscillatory motion

3. Describe (a) the time period and (b) amplitude of a simple pendulum.

Ans. (a) Time period :- The time taken by the bob of a pendulum to complete one oscillation is called the time period of the pendulum. It is denoted by T.

(b) amplitude of a simple pendulum :- The maximum displacement of the bob from its mean position is called amplitude of the simple pendulum.

4. Define average speed. What are its units?

How can it be measured?

Ans. Average speed: When the speed of an object is variable that means during the journey its speed may be fast, slow or even zero then such type of motion of an object is called average speed.

It's unit may be expressed as : meter/second, meter/minute or kilometer/hour.

When are have to calculate the average speed, we usually measure the total distance covered by the vehicle and the total time taken.

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

5. What is meant by uniform motion? Plot distance against time graph for a body having uniform motion on a graph paper.

Ans. Uniform motion: When a body travels equal distances in equal intervals of time called uniform motion. Let us a data for distance - time graph as given below.

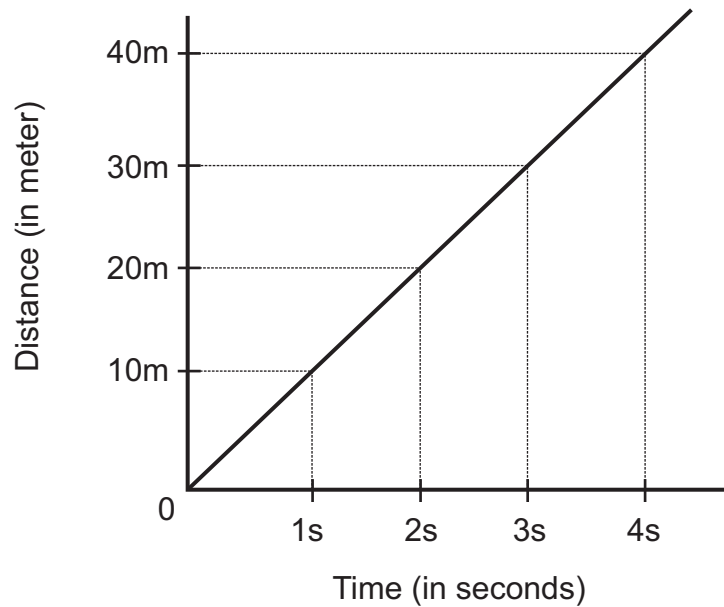| Time (in seconds)	-	0 s	1 s	2 s	3 s	4 s
Distance (in meter)	-	0 m	10 m	20 m	30 m	40 m

Fig : Distance - time relation for a body in uniform motion

D.   Tick (✓) the odd-one out giving reasons:

1.   Periodic motion, Oscillatory motion, Vibratory motion, Random motion.

Ans.   Random motion : has no specific path but undergoes sudden change in its motion and rest three has a specific path to perform motion.

2.   Sundial, Water clock, Stop watch, Table clock.

Ans.   Stopwatch :- It is used for measuring time interval and rest three is not use for this purpose.

3.   Simple pendulum, Bob, Mean position of the bob, Balance wheel.

Ans.   Balance Wheel : It is the part of wrist watches and rest three are related to simple pendulum.

4.   Speed, Meter per second, Speedometer, Odometer
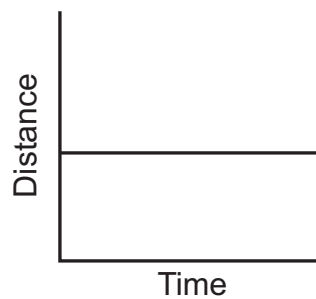
       Meter per second - This one is the unit, but rest three are not the units, they are related to each - other.
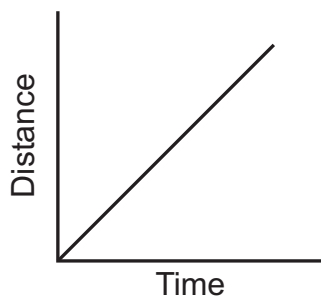
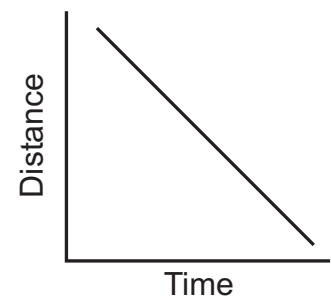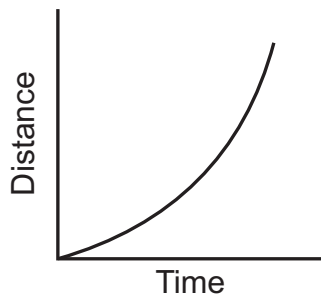5.   a.   b.   c.
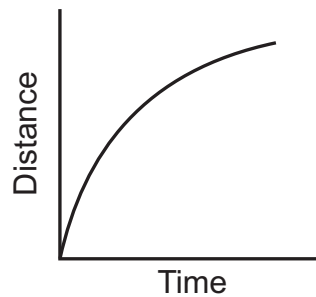

d.   e.

Ans.   b.   In the graph (b), body is in rest condition and after that in all conditions body is in motion.

E. Define the following terms:

1. State of motion:

Ans. A change in either the speed of a moving body or its direction or both is referred to as a change in its state of motion.

For example: motion of car, motion of ball etc.

2. Uniform and non uniform motion.

Ans. When an object covers equal distance in a straight line in equal intervals of time are called uniform motion.

For example : A car moving at 20 km/h in a straight line.

When an object covers unequal distance in equal intervals of time in a straight line is called Non-uniform motion.

For example : The motion of a train.

3. Speed and average speed.

Ans. Speed : The distance covered by a body in unit time is called its speed.

It can be expressed as:

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

Average speed : Average speed is defined as the total distance covered by an object by the total time taken. It can be expressed as

$$\text{Average Speed} = \frac{\text{Total Distance covered}}{\text{Total time taken}}$$

4. The amplitude of a simple pendulum

Ans. The maximum displacement of the bob from its mean position is called the amplitude of the pendulum.

The displacement AB or AC is called amplitude of the pendulum.
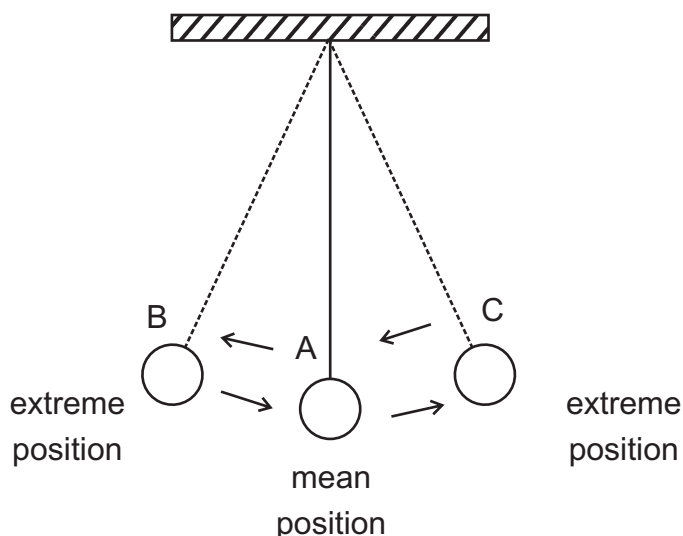

5. Time period of a simple pendulum.

Ans. The time taken to complete one oscillation is known as the time period of the pendulum.

It can be expressed as :

$$\text{Time period} = \frac{\text{Total time taken}}{\text{No. of oscillation}}$$

F.   HOTS - Higher Order Thinking Skills:

1.   The distance time graphs of two cars A and B are shown in fig. given along side. Which of the two is moving at higher speed? Justify your answer.
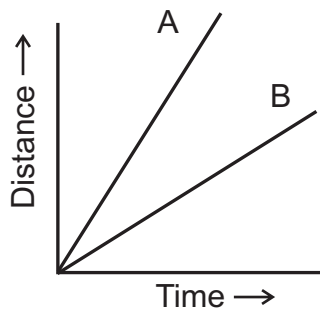
Ans.   According to the graph vehicle A is moving faster than vehicle B. Speed is given by the relation.

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

This relation shows that speed of a vehicle is greater if it covers maximum distance in a given interval of time.

2.   The bob of a simple, pendulum takes 0.25 s to go from one extreme position to the mean position. What is the time period of oscillation?

Ans.   According to the question, the movement of the bob from one extreme position to the mean position corresponds to one - fourth of an oscillation.

So, Time taken by one oscillation   = 4 x 0.25 s = 1.0 s

Therefore time period of the pendulum = 1.0 s.

3.   Draw the distance time graph for a honeybee moving around a flower at a speed of 1 m/min. Calculate the distance travelled by it in 0.50 min.

Ans.   Distance = ?

Speed of honeybee = 1m/min

Time taken = 0.50 min

from formula of speed,

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

Distance = Speed x Time taken

$$= \frac{1 \text{ m X } 0.50 \text{ min}}{\text{min x } 100 \text{ 2}}$$

$$= \frac{1}{2} \text{ m} = 0.5 \text{ m}$$