

# **NOTES**

---

## **CLASS 7**

---

## **SCIENCE**

aglasem.com  
Study Material

**DOWNLOAD PDF**

## **MOTION AND TIME**

### **Distance**

- Distance is the total path covered by the object in the given interval of time.
- Displacement is the shortest path covered by the moving object in the given interval of time.
- Distance=Speed  $\times$  Time.
- Unit of distance is generally measured in units of length like meters, kilometers etc.

### **Introduction to motion**

- An object is said to be in **motion** if it changes its position with respect to time. Eg: A car moving on a road.
- An object is said to be at **rest** if the object does not change its position with time. Eg: A person standing on the ground.

### **Units and their standardization**

- The standard unit of distance is in meters.
- The standard unit of time is in seconds (s).
- The standard unit of speed is in meter per second (m/s).

### **Basics of Motion and Its Types**

#### **Types of motion**

Types of motion are generally divided into 3. They are:

1. **Rectilinear / translator motion:** When a body is moving in a straight line, without changing its direction, then the body is said to possess translator /rectilinear motion.

Eg: A car moving on a straight road.

2. **Circular motion:** When a body moves in the shape of a circle about a fixed point and a fixed radius, then the body is said to be in circular motion.

Eg: Motion of planets around the sun.

3. **Period / Oscillatory motion:** When the motion of a body repeats after fixed intervals of time, then the body is said to be in the periodic/oscillatory motion.

Eg: To and fro motion of a simple pendulum.

#### **Periodic or oscillatory motion**

- Periodic or oscillatory motion is the motion in which a body repeats its motion after fixed intervals of time.
- Eg: To and fro motion of a simple pendulum, Motion of a car in a circular path, Motion of planets around the sun.

#### **Oscillations of a simple pendulum**

- When the bob of a simple pendulum moves from its mean position B to A and back to B again, then from B to C and back to B again, the pendulum is said to complete 1 oscillation.
- In the case of the simple pendulum, the time period is the total time taken by the pendulum to complete one oscillation.

### **Time and Speed**

#### **Speed (Average Speed)**

- Speed is the total distance travelled by the object in a given interval of time.



- Speed = Distance travelled / time taken
- Unit of speed is generally measured in meter per second (m/s), kilometer per hour (km/h).

### **Uniform and Non-Uniform Motion**

**1. Uniform motion:** When an object moving along a straight line moves with a constant speed, then the object is said to be in uniform motion.

Eg: A car moving in a straight line with a constant speed.

**2. Non-uniform motion:** When an object moving along a straight line changes its speed with respect to time, then the object is said to be in non-uniform motion.

Eg: The motion of a train.

### **Measurement of Time**

- Unit of time is generally measured in seconds, minutes, hours.
- The time period is the total time taken by an object to complete one oscillation.

### **Units of Time**

Unit of time is generally measured in seconds, minutes, hours.

### **Units of Speed**

- Speed = Distance travelled in the total time interval.
- Unit of speed is generally measured in meter per second (m/s) and km/h (kilometer per hour).

### **Speedometer and Odometer**

- Speedometer records the speed of the vehicle directly in kilometer per hour (km/h).
- An odometer measures the distance moved by the vehicle directly in kilometers (km).

### **Distance-time graph**

- Distance-time graph is the graph plotted between the distance ( in y-axis) and time ( in x-axis).
- The slope of a distance-time graph gives the speed of an object.



## **SOME IMPORTANT QUESTIONS**

**1. Classify the following as motion along a straight line, circular or oscillatory motion:**

- (i) Motion of your hands while running.**
- (ii) Motion of a horse pulling a cart on a straight road.**
- (iii) Motion of a child in a merry-go-round.**
- (iv) Motion of a child on a see-saw.**
- (v) Motion of the hammer of an electric bell.**
- (vi) Motion of a train on a straight bridge.**

**Solution:**

- i) Oscillatory ii) Motion along a straight line iii) Circular motion iv) Oscillatory motion  
v) Oscillatory motion vi) Motion along a straight line.

**2. Which of the following are not correct?**

- (i) The basic unit of time is second.**
- (ii) Every object moves with a constant speed.**
- (iii) Distances between two cities are measured in kilometres.**

(iv) The time period of a given pendulum is constant.

(v) The speed of a train is expressed in m/h.

**Solution:**

Incorrect statements are:

(ii) Every object moves with a constant speed.

(iv) The time period of a given pendulum is constant.

(v) The speed of a train is expressed in m/h.

**3. A simple pendulum takes 32 s to complete 20 oscillations. What is the time period of the pendulum?**

**Solution:**

Number of oscillations = 20

Total time taken to complete 20 oscillations = 32 s

$$\text{Time period} = \frac{\text{Total time taken}}{\text{Number of oscillations}}$$

$$= \frac{32}{20} = 1.6 \text{ s}$$

**4. The distance between two stations is 240 km. A train takes 4 hours to cover this distance. Calculate the speed of the train.**

**Solution:**

Distance between two stations = 240 kms

Total time take = 4 hrs/240 minutes

$$\begin{aligned}\text{Speed} &= \frac{\text{Distance}}{\text{Time}} \\ &= \frac{240}{4}\end{aligned}$$

= 60 km/h

**5. The odometer of a car reads 57321.0 km when the clock shows the time 08:30 AM. What is the distance moved by the car, if at 08:50 AM, the odometer reading has changed to 57336.0 km? Calculate the speed of the car in km/min during this time. Express the speed in km/h also.**

**Solution:**

Initial reading of the odometer = 57321.0

Final reading of the odometer = 57336.0

Distance covered by the car = Final reading of the odometer – Initial reading of the odometer  
= 57336.0 – 57321.0 = 15 kms

Starting time of car is 8:30 and it stops at 8:50

Hence, time taken by car = 20 mins



$$\begin{aligned}
 \text{Speed} &= \frac{\text{Distance}}{\text{Time}} \\
 &= \frac{15}{20} \\
 &= 0.75 \text{ km/min} \\
 20 \text{ min} &= \frac{1}{60} \times 20 \\
 &= \frac{1}{3} \text{ h} \\
 \text{Speed} &= \frac{\text{Distance covered}}{\text{Time take}} = \frac{15}{1/3}
 \end{aligned}$$

$$= 45 \text{ km/h}$$

**6. Salma takes 15 minutes from her house to reach her school on a bicycle. If the bicycle has a speed of 2 m/s, calculate the distance between her house and the school.**

**Solution:**

Time taken by Salma to reach her school by bicycle = 15 mins =  $15 \times 60 = 90 \text{ s}$

Speed of Salma's bicycle = 2m/s

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

Distance covered = speed x time taken

$$= 2 \times 900 = 1800 \text{ m}$$

$$1000\text{m} = 1 \text{ km}$$

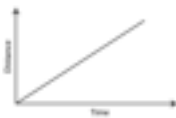
$$1800 \text{ m} = \frac{1}{1000} \times 1800$$

$$= 1.8 \text{ kms}$$

**7. Show the shape of the distance-time graph for the motion in the following cases:**

**(i) A car moving with a constant speed.**

**(ii) A car parked on a side road.**



**Solution:**



**8. Which of the following relations is correct?**

**(i)** Speed = Distance  $\times$  Time **(ii)** Speed = Distance/Time **(iii)** Speed = Time/Distance

**(iv)** Speed = 1/Distance  $\times$  Time

**Solution:** Answer is **(ii)** Speed = Distance/Time



**9. The basic unit of speed is:**

**(i) km/min (ii) m/min (iii) km/h (iv) m/s**

**Solution:**

Answer is (iv) m/s

**10. A car moves with a speed of 40 km/h for 15 minutes and then with a speed of 60 km/h for the next 15 minutes. The total distance covered by the car is:**

**(i) 100 km (ii) 25 km (iii) 15 km (iv) 10 km**

**Solution:**

The answer is (ii) 25 km

Calculation:

**When the speed of the car is 40 km/h**

Time taken = 15 min =  $15/60 = 0.25$  h

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

Distance covered  $d_1 = \text{speed} \times \text{time taken}$

$$= 40 \times 0.25 = 10 \text{ kms}$$

When the speed of the car is 60 km/h

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

Distance covered  $d_2 = \text{speed} \times \text{time taken}$

$$= 60 \times 0.25 = 15 \text{ kms}$$

Total distance covered by the car =  $d_1 + d_2$

$$= 10 + 15$$

$$= 25 \text{ kms}$$



## CHAPTER-10

### **ELECTRIC CURRENT AND ITS EFFECTS**

- The flow of electrons across a conductor is known as electric current.
- The use of symbols to represent electric components is convenient. A circuit diagram can be used to represent an electric circuit using these.
- When an electric current is passed via a wire, it heats up. It's the current's heating impact. This effect can be used in a variety of ways.
- When enormous electric currents are pushed through wires constructed of specific materials, they melt quickly and shatter. Electric fuses, which prevent fires and damage to electrical appliances, are made from these materials.

# Study Materials

[aglasem.com](https://aglasem.com)

## Model Papers

Sample Papers

Half Yearly Sample Papers

## Important Resources

Periodic Table

Writing Skills / Formats

Maps of India / World

## Notes

☐ [Class 6 Notes](#)

☐ [Class 7 Notes](#)

☐ [Class 8 Notes](#)

☐ [Class 9 Notes](#)

☐ [Class 10 Notes](#)

☐ [Class 11 Notes](#)

☐ [Class 12 Notes](#)

## Books and Solutions

NCERT Books

NCERT Book Solutions

HC Verma Chapter Wise Solutions

RD Sharma Solutions

CGBSE Solutions

