

# QUESTION BANK (FA-1)

**Class-7**

**Subject-Physics**

## **CHAPTER 1: AREA AND ITS MEASUREMENT**

### **A. MCQ (8)**

**1. Area is the measure of:**

- a) Length
- b) Surface covered by an object
- c) Weight
- d) Speed

**Answer: b) Surface covered by an object**

**2. The SI unit of area is:**

- a) cm
- b) m
- c)  $m^2$
- d)  $cm^3$

**Answer: c)  $m^2$**

**3. Area of a square is:**

- a)  $l \times b$
- b) side  $\times$  side
- c)  $2(l+b)$
- d)  $4 \times$  side

**Answer: b) Side  $\times$  Side**

**4. Area of a rectangle is:**

- a)  $l+b$
- b)  $l \times b$
- c)  $2(l+b)$
- d)  $b^2$

**Answer: b) Length  $\times$  Breadth ( $l \times b$ )**

**5. Which of the following is a square unit?**

- a) cm
- b) m
- c) cm<sup>2</sup>
- d) litre

**Answer: c) cm<sup>2</sup>**

**6. A square has:**

- a) Two equal sides
- b) Four equal sides
- c) Three sides
- d) No sides

**Answer: b) Four equal sides**

**7. Graph paper is useful for measuring:**

- a) Regular surfaces
- b) Irregular surfaces
- c) Temperature
- d) Weight

**Answer: b) Irregular surfaces**

**8. Area of a square of side 6 cm is:**

- a) 12 cm<sup>2</sup>
- b) 24 cm<sup>2</sup>
- c) 36 cm<sup>2</sup>
- d) 48 cm<sup>2</sup>

**Answer: c) 36 cm<sup>2</sup>**

**B. Fill in the Blanks (8)**

**1. Area is measured in \_\_\_\_\_ units.**

**Answer: Square**

**2. The SI unit of area is \_\_\_\_\_.**

**Answer: Square metre (m<sup>2</sup>)**

**3. Area of a rectangle = \_\_\_\_\_ × \_\_\_\_\_.**

**Answer: Length × Breadth**

4. Area of a square = \_\_\_\_\_ × \_\_\_\_\_.

Answer: Side × Side

5. A square has \_\_\_\_\_ equal sides.

Answer: Four

6. Area measures the \_\_\_\_\_ covered by a surface.

Answer: Surface

7. Graph paper helps measure \_\_\_\_\_ figures.

Answer: Irregular

8. Area of a square of side 10 cm is \_\_\_\_\_ cm<sup>2</sup>.

Answer: 100

## C. Define the Following (6)

### 1. Area

Answer:

Area is the amount of **surface covered by an object or figure**. It tells us how much space is enclosed within the boundary of a flat surface. Area is measured in **square units**, such as **cm<sup>2</sup>** and **m<sup>2</sup>**.

### 2. Measurement

Answer:

Measurement is the process of **finding the size, length, area, volume, or quantity of an object using standard units**. It helps us compare different objects accurately.

### 3. Square Centimetre

Answer:

A **square centimetre (cm<sup>2</sup>)** is the area of a square whose each side is **1 centimetre** long. It is used to measure the area of small objects.

### 4. Square Metre

Answer:

A **square metre (m<sup>2</sup>)** is the area of a square whose each side is **1 metre** long. It is the SI unit of area and is used to measure larger surfaces.

### 5. Rectangle

**Answer:**

A rectangle is a **four-sided plane figure** with opposite sides equal and parallel. All four angles are **90°**. The area of a rectangle is calculated by multiplying its length by its breadth.

## 6. Square

**Answer:**

A square is a **four-sided plane figure** in which **all four sides are equal** and each angle is **90°**. The area of a square is calculated by multiplying its side by itself.

## D. Differentiate Between (6)

### 1. Rectangle and Square

**Answer:**

Rectangle	Square
Opposite sides are equal.	All four sides are equal.
Length and breadth are usually different.	All four sides are of equal length.
Area = Length × Breadth	Area = Side × Side

### 2. Regular Surface and Irregular Surface

**Answer:**

Regular Surface	Irregular Surface
Has a fixed geometric shape.	Does not have a fixed geometric shape.
Area is calculated using formulas.	Area is measured using graph paper.
Examples: Square, Rectangle	Examples: Leaf, Map

### 3. cm and cm<sup>2</sup>

**Answer:**

cm	cm <sup>2</sup>
Unit of length.	Unit of area.
Measures one dimension.	Measures two-dimensional surfaces.

**cm**

**cm<sup>2</sup>**

Example: Length of a pencil. Example: Area of a notebook.

#### **4. Length and Area**

**Answer:**

**Length**

**Area**

Distance from one end to another. Surface covered by an object.

Measured in cm or m.

Measured in cm<sup>2</sup> or m<sup>2</sup>.

One-dimensional quantity.

Two-dimensional quantity.

#### **5. Area and Volume**

**Answer:**

**Area**

**Volume**

Measures the surface covered. Measures the space occupied.

Two-dimensional quantity.

Three-dimensional quantity.

Unit: m<sup>2</sup>

Unit: m<sup>3</sup>

#### **6. Square Metre and Square Centimetre**

**Answer:**

**Square Metre (m<sup>2</sup>)**

**Square Centimetre (cm<sup>2</sup>)**

SI unit of area.

Smaller unit of area.

Used for measuring large surfaces. Used for measuring small surfaces.

Example: Playground.

Example: Book cover.

### **E. Numericals (8)**

**1. Find the area of a rectangle of length 8 cm and breadth 5 cm.**

**Answer:**

**Given:**

- Length (l) = 8 cm
- Breadth (b) = 5 cm

**Formula:**

$$\text{Area} = \text{Length} \times \text{Breadth}$$

**Calculation:**

$$\text{Area} = 8 \times 5 = 40$$

**Answer: 40 cm<sup>2</sup>**

**2. Find the area of a square of side 7 cm.**

**Answer:**

**Given:**

- Side = 7 cm

**Formula:**

$$\text{Area} = \text{Side} \times \text{Side}$$

**Calculation:**

$$\text{Area} = 7 \times 7 = 49$$

**Answer: 49 cm<sup>2</sup>**

**3. Find the area of a rectangle of length 12 cm and breadth 4 cm.**

**Answer:**

**Given:**

- Length = 12 cm
- Breadth = 4 cm

**Formula:**

$$\text{Area} = \text{Length} \times \text{Breadth}$$

**Calculation:**

$$\text{Area} = 12 \times 4 = 48$$

**Answer: 48 cm<sup>2</sup>**

**4. Find the area of a square of side 9 cm.**

**Answer:**

**Given:**

- Side = 9 cm

**Formula:**

$$\text{Area} = \text{Side} \times \text{Side}$$

**Calculation:**

$$\text{Area} = 9 \times 9 = 81$$

**Answer: 81 cm<sup>2</sup>**

**5. A playground is 20 m long and 15 m wide. Find its area.**

**Answer:**

**Given:**

- Length = 20 m
- Breadth = 15 m

**Formula:**

$$\text{Area} = \text{Length} \times \text{Breadth}$$

**Calculation:**

$$\text{Area} = 20 \times 15 = 300$$

**Answer: 300 m<sup>2</sup>**

**6. Find the area of a square field of side 25 m.**

**Answer:**

**Given:**

- Side = 25 m

**Formula:**

$$\text{Area} = \text{Side} \times \text{Side}$$

**Calculation:**

$$\text{Area} = 25 \times 25 = 625$$

**Answer: 625 m<sup>2</sup>**

**7. Length = 18 cm, Breadth = 7 cm. Find area.**

**Answer:**

**Given:**

- Length = 18 cm
- Breadth = 7 cm

**Formula:**

$$\text{Area} = \text{Length} \times \text{Breadth}$$

**Calculation:**

$$\text{Area} = 18 \times 7 = 126$$

**Answer: 126 cm<sup>2</sup>**

**8. Find the area of a square whose side is 11 cm.**

**Answer:**

**Given:**

- Side = 11 cm

**Formula:**

$$\text{Area} = \text{Side} \times \text{Side}$$

**Calculation:**

$$\text{Area} = 11 \times 11 = 121$$

**Answer: 121 cm<sup>2</sup>**

## **F. Give Reasons (6)**

**1. Why is area measured in square units?**

**Answer:**

Area measures the surface covered by an object, which has two dimensions—length and breadth. Therefore, it is expressed in **square units** such as cm<sup>2</sup> or m<sup>2</sup>.

**2. Why do we use formulas to calculate area?**

**Answer:**

Formulas help us calculate the area quickly and accurately without counting every small part of a regular shape.

**3. Why is graph paper useful for irregular figures?**

**Answer:**

Irregular figures do not have fixed formulas. Graph paper helps us find their area by counting complete and partial squares.

**4. Why is the area of a square found by side × side?**

**Answer:**

All four sides of a square are equal. Therefore, multiplying one side by itself gives the total surface area of the square.

**5. Why is area different from perimeter?**

**Answer:**

Area measures the **surface enclosed** by a shape, while perimeter measures the **total length of its boundary**.

**6. Why should units always be written in answers?**

**Answer:**

Units tell us **what quantity has been measured** and make the answer clear and meaningful. Without units, the answer is incomplete.

## **G. Answer the Following (8)**

**1. What is area?**

**Answer:**

Area is the **amount of surface covered by an object or figure**. It tells us how much space is enclosed within the boundary of a flat surface. Area is measured in **square units** such as **cm<sup>2</sup>, m<sup>2</sup>, mm<sup>2</sup>, and km<sup>2</sup>**. It is used to measure the size of surfaces like books, floors, fields, and walls.

**2. State the SI unit of area.**

**Answer:**

The **SI unit of area is the square metre (m<sup>2</sup>)**. It is the area of a square whose each side is **1 metre** long. Smaller areas are measured in **square centimetres (cm<sup>2</sup>)**, while very large areas are measured in **square kilometres (km<sup>2</sup>)**.

**3. How do you calculate the area of a rectangle?**

**Answer:**

The area of a rectangle is calculated by multiplying its **length** by its **breadth (width)**.

**Formula:**

**Area = Length × Breadth (A = l × b)**

**Example:**

If the length is **8 cm** and the breadth is **5 cm**,

$$\text{Area} = 8 \times 5 = \mathbf{40 \text{ cm}^2}$$

The answer is always written in **square units**.

**4. How do you calculate the area of a square?****Answer:**

The area of a square is calculated by multiplying the **side** by itself because all four sides of a square are equal.

**Formula:**

$$\text{Area} = \text{Side} \times \text{Side} \text{ (A} = s^2\text{)}$$

**Example:**

If the side of a square is **6 cm**,

$$\text{Area} = 6 \times 6 = \mathbf{36 \text{ cm}^2}$$

The answer is written in **square units**.

**5. What is a regular surface?****Answer:**

A **regular surface** is a surface that has a **fixed geometric shape** and definite measurements. Its area can be calculated easily by using a mathematical formula.

**Examples:**

- Square
- Rectangle
- Triangle

Regular surfaces are commonly found in books, tiles, windows, and notebooks.

**6. What is an irregular surface?****Answer:**

An **irregular surface** is a surface that does **not have a fixed geometric shape**. Since it has no standard formula, its area is usually measured using **graph paper** by counting the complete and partial squares.

**Examples:**

- Leaf
- Map of a country
- Cloud

---

## 7. How can the area of an irregular figure be measured?

**Answer:**

The area of an irregular figure can be measured using **graph paper**.

**Steps:**

1. Draw the figure on graph paper.
2. Count all the complete squares inside the figure.
3. Estimate the partly covered squares by combining them.
4. Add all the squares to get the approximate area.

This method gives a fairly accurate measurement of irregular shapes.

## 8. Mention any four units of area.

**Answer:**

The commonly used units of area are:

1. Square millimetre (**mm<sup>2</sup>**)
2. Square centimetre (**cm<sup>2</sup>**)
3. Square metre (**m<sup>2</sup>**)
4. Square kilometre (**km<sup>2</sup>**)

# **CHAPTER 2: VOLUME AND ITS MEASUREMENT**

## **A. MCQ (8)**

**1. Volume is the amount of \_\_\_\_\_ occupied by an object.**

- a) mass
- b) space
- c) weight
- d) density

**Answer: b) Space**

**2. The SI unit of volume is:**

- a)  $m^2$
- b)  $cm^2$
- c)  $m^3$
- d) litre

**Answer: c)  $m^3$**

**3. Volume of a cuboid is:**

- a)  $l \times b$
- b)  $l \times b \times h$
- c)  $2(l+b)$
- d) side  $\times$  side

**Answer: b)  $l \times b \times h$**

**4. Volume of a cube is:**

- a) side<sup>3</sup>
- b) side<sup>2</sup>
- c)  $4 \times$  side
- d)  $l \times b$

**Answer: a) Side<sup>3</sup>**

**5. Which is a unit of volume?**

- a) cm
- b)  $cm^2$
- c)  $cm^3$
- d) kg

**Answer: c) cm<sup>3</sup>**

**6. 1 litre = \_\_\_\_\_ mL**

- a) 10
- b) 100
- c) 1000
- d) 10000

**Answer: c) 1000 mL**

**7. A measuring cylinder is used to measure:**

- a) mass
- b) volume
- c) temperature
- d) speed

**Answer: b) Volume**

**8. Which shape has equal length, breadth and height?**

- a) Cuboid
- b) Cube
- c) Cylinder
- d) Rectangle

**Answer: b) Cube**

## **B. Fill in the Blanks (8)**

**1. Volume is measured in \_\_\_\_\_ units.**

**Answer: Cubic**

**2. SI unit of volume is \_\_\_\_\_.**

**Answer: Cubic metre (m<sup>3</sup>)**

**3. Volume of cuboid = \_\_\_\_\_ × \_\_\_\_\_ × \_\_\_\_\_.**

**Answer: Length × Breadth × Height**

**4. Volume of cube = \_\_\_\_\_ × \_\_\_\_\_ × \_\_\_\_\_.**

**Answer: Side × Side × Side**

**5. One litre = \_\_\_\_\_ mL.**

**Answer:** 1000

**6. A measuring cylinder measures \_\_\_\_\_.**

**Answer:** Volume of liquids

**7. Volume measures the \_\_\_\_\_ occupied by an object.**

**Answer:** Space

**8. One cubic metre is written as \_\_\_\_\_.**

**Answer:** m<sup>3</sup>

## **C. Define the Following (8)**

### **1. Volume**

**Answer:**

Volume is the **amount of space occupied by an object**. It is a three-dimensional quantity and is measured in **cubic units**. The SI unit of volume is the **cubic metre (m<sup>3</sup>)**.

### **2. Cuboid**

**Answer:**

A **cuboid** is a three-dimensional solid having **length, breadth, and height**. It has six rectangular faces, twelve edges, and eight corners.

**Examples:** Book, brick, matchbox.

### **3. Cube**

**Answer:**

A **cube** is a three-dimensional solid in which **all the edges are equal**. It has six square faces, twelve equal edges, and eight corners.

**Examples:** Dice, ice cube, Rubik's Cube.

### **4. Measuring Cylinder**

**Answer:**

A **measuring cylinder** is a graduated glass or plastic container used to **measure the volume of liquids** accurately. Its readings are usually marked in **millilitres (mL)** and **litres (L)**.

### **5. Litre**

**Answer:**

A **litre (L)** is a unit used to measure the **volume or capacity of liquids**. It is commonly used for measuring milk, water, juice, and petrol.

$$1 \text{ L} = 1000 \text{ mL}$$

## 6. Millilitre

**Answer:**

A **millilitre (mL)** is a smaller unit used to measure the volume of liquids.

$$1000 \text{ mL} = 1 \text{ L}$$

It is used for measuring small quantities such as medicines and perfumes.

## 7. Cubic Centimetre

**Answer:**

A **cubic centimetre (cm<sup>3</sup>)** is the volume of a cube whose each side is **1 centimetre** long. It is used to measure the volume of small objects.

## 8. Cubic Metre

**Answer:**

A **cubic metre (m<sup>3</sup>)** is the volume of a cube whose each side is **1 metre** long. It is the **SI unit of volume** and is used to measure the volume of large objects and spaces.

# D. Differentiate Between (8)

## 1. Area and Volume

**Answer:**

Area	Volume
Area is the surface covered by an object.	Volume is the space occupied by an object.
It is a two-dimensional quantity.	It is a three-dimensional quantity.
SI unit: m <sup>2</sup>	SI unit: m <sup>3</sup>

## 2. Cube and Cuboid

**Answer:**

**Cube****Cuboid**

All edges are equal. Length, breadth and height may be different.

All faces are squares. All faces are rectangles.

Volume = Side<sup>3</sup>      Volume = Length × Breadth × Height

**3. Litre and Millilitre**

**Answer:**

**Litre (L)****Millilitre (mL)**

Larger unit of volume.

Smaller unit of volume.

Used for larger quantities of liquids. Used for smaller quantities of liquids.

1 L = 1000 mL

1000 mL = 1 L

**4. Square Unit and Cubic Unit**

**Answer:**

**Square Unit****Cubic Unit**

Used to measure area. Used to measure volume.

Example: cm<sup>2</sup>, m<sup>2</sup>      Example: cm<sup>3</sup>, m<sup>3</sup>

**5. Rectangle and Cuboid**

**Answer:**

**Rectangle****Cuboid**

Two-dimensional figure. Three-dimensional solid.

Has length and breadth. Has length, breadth and height.

Area is calculated.      Volume is calculated.

**6. Square and Cube**

**Answer:**

**Square**

**Cube**

Two-dimensional figure. Three-dimensional solid.

Has four equal sides. Has six equal square faces.

Area = Side  $\times$  Side      Volume = Side<sup>3</sup>

## 7. Volume and Capacity

**Answer:**

**Volume**

**Capacity**

Space occupied by an object. Amount a container can hold.

Measured in cubic units. Usually measured in litres or millilitres.

## 8. cm<sup>2</sup> and cm<sup>3</sup>

**Answer:**

**cm<sup>2</sup>**

**cm<sup>3</sup>**

Unit of area.

Unit of volume.

Two-dimensional measurement. Three-dimensional measurement.

## E. Numericals (8)

**1. Find the volume of a cuboid of length 5 cm, breadth 4 cm and height 3 cm.**

**Answer:**

**Given:**

- Length = 5 cm
- Breadth = 4 cm
- Height = 3 cm

**Formula:**

Volume = Length  $\times$  Breadth  $\times$  Height

**Calculation:**

$$= 5 \times 4 \times 3$$
$$= 60$$

**Answer: 60 cm<sup>3</sup>**

**2. Find the volume of a cube of side 4 cm.**

**Answer:**

**Given:**

$$\text{Side} = 4 \text{ cm}$$

**Formula:**

$$\text{Volume} = \text{Side} \times \text{Side} \times \text{Side}$$

**Calculation:**

$$= 4 \times 4 \times 4$$
$$= 64$$

**Answer: 64 cm<sup>3</sup>**

**3. Find the volume of a cuboid of dimensions 8 cm × 5 cm × 2 cm.**

**Answer:**

$$\text{Volume} = 8 \times 5 \times 2$$

$$= 80$$

**Answer: 80 cm<sup>3</sup>**

**4. Find the volume of a cube whose side is 6 cm.**

**Answer:**

$$\text{Volume} = 6 \times 6 \times 6$$

$$= 216$$

**Answer: 216 cm<sup>3</sup>**

**5. Convert 5 litres into millilitres.**

**Answer:**

$$1 \text{ L} = 1000 \text{ mL}$$

$$5 \text{ L} = 5 \times 1000$$

**Answer: 5000 mL**

**6. Convert 2500 mL into litres.**

**Answer:**

$$1000 \text{ mL} = 1 \text{ L}$$

$$2500 \text{ mL} = 2500 \div 1000$$

**Answer: 2.5 L**

**7. A box is 10 cm long, 4 cm broad and 3 cm high. Find its volume.**

**Answer:**

$$\text{Volume} = 10 \times 4 \times 3$$

$$= 120$$

**Answer: 120 cm<sup>3</sup>**

**8. Find the volume of a cube of side 10 cm.**

**Answer:**

$$\text{Volume} = 10 \times 10 \times 10$$

$$= 1000$$

**Answer: 1000 cm<sup>3</sup>**

## **F. Give Reasons (8)**

**1. Why is volume measured in cubic units?**

**Answer:**

Volume measures the **space occupied by a three-dimensional object**. Since it involves **length, breadth, and height**, it is measured in **cubic units** such as cm<sup>3</sup> and m<sup>3</sup>.

**2. Why is a measuring cylinder used for liquids?**

**Answer:**

A measuring cylinder is used because it is marked with graduations that help us **measure the volume of liquids accurately**. It is commonly used in laboratories and science experiments.

**3. Why is volume different from area?**

**Answer:**

Volume measures the **space occupied by an object**, while area measures the **surface covered by an object**. Volume is a **three-dimensional quantity**, whereas area is a **two-dimensional quantity**.

#### **4. Why does a cube have the same length, breadth and height?**

**Answer:**

A cube has all its **edges equal in length**. Therefore, its **length, breadth, and height are the same**, making all six faces equal squares.

#### **5. Why is litre used for measuring liquids?**

**Answer:**

A litre is a convenient unit for measuring the **volume or capacity of liquids** such as water, milk, and oil. It makes measuring and comparing liquid quantities easy.

#### **6. Why are cubic units used instead of square units for volume?**

**Answer:**

Volume depends on **three dimensions—length, breadth, and height**. Therefore, cubic units ( $\text{cm}^3$ ,  $\text{m}^3$ ) are used. Square units are used only for measuring area.

#### **7. Why is volume important in daily life?**

**Answer:**

Volume helps us know **how much space an object occupies or how much liquid a container can hold**. It is useful in cooking, construction, packaging, storage, and scientific experiments.

#### **8. Why is a cuboid considered a three-dimensional shape?**

**Answer:**

A cuboid has **length, breadth, and height**, which are the three dimensions of a solid. Therefore, it occupies space and is called a **three-dimensional (3D) shape**.

### **G. Answer the Following (8)**

#### **1. What is volume?**

**Answer:**

Volume is the **amount of space occupied by an object**. It is a **three-dimensional quantity** because it depends on length, breadth, and height. The SI unit of volume is the **cubic metre ( $\text{m}^3$ )**, while  $\text{cm}^3$  is commonly used for smaller objects.

#### **2. State the SI unit of volume.**

**Answer:**

The SI unit of volume is the cubic metre ( $\text{m}^3$ ). It is the volume of a cube whose **length, breadth, and height** are each 1 metre. Smaller objects are usually measured in **cubic centimetres** ( $\text{cm}^3$ ).

**3. Write the formula for volume of a cuboid.**

**Answer:**

The volume of a cuboid is found by multiplying its **length, breadth, and height**.

**Formula:**

$$\text{Volume} = \text{Length} \times \text{Breadth} \times \text{Height}$$

or

$$V = l \times b \times h$$

The answer is expressed in **cubic units** such as  $\text{cm}^3$  or  $\text{m}^3$ .

**4. Write the formula for volume of a cube.**

**Answer:**

Since all the edges of a cube are equal, its volume is found by multiplying the side by itself three times.

**Formula:**

$$\text{Volume} = \text{Side} \times \text{Side} \times \text{Side} = \text{Side}^3$$

The answer is written in **cubic units**.

**5. What is a measuring cylinder?**

**Answer:**

A **measuring cylinder** is a graduated glass or plastic container used to **measure the volume of liquids accurately**. It has markings in **millilitres (mL)** and sometimes **litres (L)**. It is commonly used in science laboratories.

**6. How is the volume of a liquid measured?**

**Answer:**

The volume of a liquid is measured using a **measuring cylinder**.

**Steps:**

1. Pour the liquid into the measuring cylinder.
2. Place the cylinder on a flat surface.
3. Keep your eye at the same level as the liquid.

4. Read the volume at the **lower meniscus** (the curved surface of the liquid).

This gives an accurate measurement of the liquid's volume.

## 7. What is the relation between litre and millilitre?

**Answer:**

The litre and millilitre are units used to measure the volume of liquids.

**Relation:**

- 1 Litre (L) = 1000 Millilitres (mL)
- 1000 mL = 1 L

This relation is used to convert litres into millilitres and vice versa.

## 8. Name any four units of volume.

**Answer:**

The common units of volume are:

1. Cubic centimetre ( $\text{cm}^3$ )
2. Cubic metre ( $\text{m}^3$ )
3. Litre (L)
4. Millilitre (mL)

These units are used for measuring the volume of solids and liquids depending on their size.

# **CHAPTER 3: MEASUREMENT OF DENSITY AND SPEED**

## **A. MCQ (8)**

### **1. Density is:**

- a) Mass  $\times$  Volume
- b) Mass  $\div$  Volume
- c) Volume  $\div$  Mass
- d) Distance  $\div$  Time

**Answer: b) Mass  $\div$  Volume**

### **2. SI unit of density is:**

- a)  $\text{kg/m}^3$
- b) m/s

- c) kg
- d) litre

**Answer: a)  $\text{kg/m}^3$**

### **3. Speed is:**

- a) Distance  $\div$  Time
- b) Time  $\div$  Distance
- c) Mass  $\div$  Volume
- d) Distance  $\times$  Time

**Answer: a) Distance  $\div$  Time**

### **4. Which instrument measures distance?**

- a) Thermometer
- b) Metre scale
- c) Clock
- d) Balance

**Answer: b) Metre scale**

### **5. Density depends on:**

- a) Mass and volume
- b) Time and distance
- c) Length and breadth
- d) Temperature only

**Answer: a) Mass and volume**

### **6. SI unit of speed is:**

- a) km
- b) m/s
- c) kg
- d)  $\text{m}^2$

**Answer: b) m/s**

### **7. An object with greater density than water will:**

- a) Float
- b) Sink
- c) Evaporate
- d) Melt

**Answer: b) Sink**

## 8. Speed tells us:

- a) How heavy an object is
- b) How fast an object moves
- c) How large an object is
- d) How hot an object is

**Answer:** b) How fast an object moves

## B. Fill in the Blanks (8)

1. Density = \_\_\_\_\_ ÷ Volume.

**Answer:** Mass

---

2. Speed = Distance ÷ \_\_\_\_\_.

**Answer:** Time

3. SI unit of speed is \_\_\_\_\_.

**Answer:** m/s (metre per second)

4. SI unit of density is \_\_\_\_\_.

**Answer:** kg/m<sup>3</sup> (kilogram per cubic metre)

5. A clock measures \_\_\_\_\_.

**Answer:** Time

6. A balance measures \_\_\_\_\_.

**Answer:** Mass

7. Iron sinks in water because it is more \_\_\_\_\_.

**Answer:** Dense

8. Distance is measured in \_\_\_\_\_.

**Answer:** Metres (m)

## C. Define the Following (8)

### 1. Density

**Answer:**

Density is the **mass of a substance present in a unit volume**. It tells us how closely the particles of a substance are packed together.

**Formula:**

$$\text{Density} = \text{Mass} \div \text{Volume}$$

**SI Unit:** kg/m<sup>3</sup>

### 2. Speed

**Answer:**

Speed is the **distance travelled by an object in unit time**. It tells us how fast or slow an object is moving.

**Formula:**

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

**SI Unit:** metre per second (m/s)

### 3. Mass

**Answer:**

Mass is the **amount of matter present in an object**. It is measured using a **balance** and expressed in **grams (g)** or **kilograms (kg)**.

### 4. Volume

**Answer:**

Volume is the **space occupied by an object**. It is measured in **cubic units** such as cm<sup>3</sup> and m<sup>3</sup>.

### 5. Distance

**Answer:**

Distance is the **total length of the path travelled by an object** from one place to another. Its SI unit is the **metre (m)**.

### 6. Time

**Answer:**

Time is the **duration taken to complete an activity or travel a certain distance**. It is measured using a **clock or stopwatch**. Its SI unit is the **second (s)**.

## 7. Balance

### Answer:

A **balance** is an instrument used to **measure the mass of an object** accurately. It is commonly used in laboratories.

## 8. Measuring Cylinder

### Answer:

A **measuring cylinder** is a graduated container used to **measure the volume of liquids**. It can also be used to find the volume of irregular solids by the **water displacement method**.

# D. Differentiate Between (8)

## 1. Density and Speed

### Answer:

#### Density

#### Speed

Density is the mass per unit volume of a substance. Speed is the distance travelled per unit time.

Formula: Density = Mass  $\div$  Volume

Formula: Speed = Distance  $\div$  Time

SI unit: kg/m<sup>3</sup>

SI unit: m/s

## 2. Mass and Volume

### Answer:

#### Mass

#### Volume

Mass is the amount of matter in an object. Volume is the space occupied by an object.

Measured using a balance.

Measured using a measuring cylinder or by calculation.

Unit: kg or g

Unit: m<sup>3</sup> or cm<sup>3</sup>

## 3. Distance and Time

### Answer:

### **Distance**

Total length of the path travelled.

Unit: metre (m)

Measured by metre scale or measuring tape.

### **Time**

Duration taken to complete a journey.

Unit: second (s)

Measured by clock or stopwatch.

## **4. Balance and Measuring Cylinder**

**Answer:**

### **Balance**

Measures mass.

Reading is in grams or kilograms.

### **Measuring Cylinder**

Measures volume of liquids.

Reading is in millilitres or litres.

## **5. Solid and Liquid**

**Answer:**

### **Solid**

Has a fixed shape and fixed volume.

Particles are closely packed.

### **Liquid**

Has no fixed shape but has a fixed volume.

Particles can move more freely.

## **6. Float and Sink**

**Answer:**

### **Float**

Object remains on the surface of water.

Density is less than water.

### **Sink**

Object goes to the bottom of water.

Density is greater than water.

## **7. Speed and Motion**

**Answer:**

### **Speed**

Rate at which an object moves. Change in the position of an object with time.

Measured in m/s.

### **Motion**

Motion may be slow or fast.

## **8. Mass and Weight**

**Answer:**

### **Mass**

Amount of matter in an object. Force with which Earth attracts an object.

Remains constant everywhere. Changes from place to place depending on gravity.

Unit: kilogram (kg).

### **Weight**

Unit: newton (N).

## **E. Numericals (8)**

**1. Find density if mass = 100 g and volume = 20 cm<sup>3</sup>.**

**Answer:**

**Given:**

- Mass = 100 g
- Volume = 20 cm<sup>3</sup>

**Formula:**

Density = Mass ÷ Volume

**Calculation:**

Density = 100 ÷ 20 = 5

**Answer: 5 g/cm<sup>3</sup>**

**2. Find density if mass = 200 g and volume = 50 cm<sup>3</sup>.**

**Answer:**

**Given:**

- Mass = 200 g
- Volume = 50 cm<sup>3</sup>

**Calculation:**

$$\text{Density} = 200 \div 50 = 4$$

**Answer: 4 g/cm<sup>3</sup>**

**3. A car travels 100 km in 2 hours. Find speed.**

**Answer:**

**Given:**

- Distance = 100 km
- Time = 2 h

**Formula:**

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

**Calculation:**

$$\text{Speed} = 100 \div 2 = 50$$

**Answer: 50 km/h**

**4. A train covers 240 km in 4 hours. Find speed.**

**Answer:**

**Given:**

- Distance = 240 km
- Time = 4 h

**Calculation:**

$$\text{Speed} = 240 \div 4 = 60$$

**Answer: 60 km/h**

**5. A cyclist travels 60 km in 3 hours. Find speed.**

**Answer:**

**Given:**

- Distance = 60 km
- Time = 3 h

**Calculation:**

$$\text{Speed} = 60 \div 3 = 20$$

**Answer: 20 km/h**

**6. Find density if mass = 90 g and volume = 30 cm<sup>3</sup>.**

**Answer:**

**Given:**

- Mass = 90 g
- Volume = 30 cm<sup>3</sup>

**Calculation:**

$$\text{Density} = 90 \div 30 = 3$$

**Answer: 3 g/cm<sup>3</sup>**

**7. A bus travels 150 km in 5 hours. Find speed.**

**Answer:**

**Given:**

- Distance = 150 km
- Time = 5 h

**Calculation:**

$$\text{Speed} = 150 \div 5 = 30$$

**Answer: 30 km/h**

**8. Find density if mass = 160 g and volume = 40 cm<sup>3</sup>.**

**Answer:**

**Given:**

- Mass = 160 g
- Volume = 40 cm<sup>3</sup>

**Calculation:**

$$\text{Density} = 160 \div 40 = 4$$

**Answer: 4 g/cm<sup>3</sup>**

## **F. Give Reasons (8)**

**1. Why is density measured in kg/m<sup>3</sup>?**

**Answer:**

Density is measured in **kg/m<sup>3</sup>** because it is the **mass present in one cubic metre of a**

**substance.** Since mass is measured in kilograms (kg) and volume in cubic metres (m<sup>3</sup>), the SI unit of density is **kg/m<sup>3</sup>**.

---

## **2. Why is a measuring cylinder used for liquids?**

**Answer:**

A measuring cylinder is used because it is marked with graduations that help us **measure the volume of liquids accurately**. It is commonly used in laboratories and science experiments.

---

## **3. Why is volume different from area?**

**Answer:**

Volume measures the **space occupied by an object**, while area measures the **surface covered by an object**. Volume has **three dimensions (length, breadth, and height)**, whereas area has only **two dimensions (length and breadth)**.

---

## **4. Why does a cube have the same length, breadth and height?**

**Answer:**

A cube has **all its edges equal in length**. Therefore, its **length, breadth, and height are equal**, giving it six equal square faces.

---

## **5. Why is litre used for measuring liquids?**

**Answer:**

The litre is a convenient unit for measuring the **volume or capacity of liquids** such as water, milk, and oil. It is easy to use for everyday measurements.

---

## **6. Why are cubic units used instead of square units for volume?**

**Answer:**

Volume is calculated using **length × breadth × height**, which involves **three dimensions**. Therefore, it is measured in **cubic units** like cm<sup>3</sup> and m<sup>3</sup>, not square units.

---

## **7. Why is volume important in daily life?**

**Answer:**

Volume helps us know **how much space an object occupies or how much liquid a container can hold**. It is useful in cooking, storage, construction, packaging, and science experiments.

---

**8. Why is a cuboid considered a three-dimensional shape?**

**Answer:**

A cuboid has **length, breadth, and height**, which are the three dimensions of a solid. Therefore, it occupies space and is called a **three-dimensional (3D) shape**.

---

**G. Answer the Following (8)**

**1. What is density?**

**Answer:**

Density is the **mass of a substance present in a unit volume**. It tells us how closely the particles of a substance are packed together. Density is calculated using the formula:

$$\text{Density} = \text{Mass} \div \text{Volume}$$

The SI unit of density is **kilogram per cubic metre (kg/m<sup>3</sup>)**.

---

**2. State the SI unit of density.**

**Answer:**

The **SI unit of density is kilogram per cubic metre (kg/m<sup>3</sup>)**. It means the mass present in **one cubic metre** of a substance. For small objects, density is also expressed in **grams per cubic centimetre (g/cm<sup>3</sup>)**.

---

**3. What is speed?**

**Answer:**

Speed is the **distance travelled by an object in unit time**. It tells us how fast or slow an object is moving.

**Formula:**

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

The SI unit of speed is **metre per second (m/s)**.

---

#### 4. State the SI unit of speed.

**Answer:**

The **SI unit of speed is metre per second (m/s)**. It shows the distance travelled by an object in **one second**. Another commonly used unit is **kilometre per hour (km/h)**.

---

#### 5. What is a clock?

**Answer:**

A **clock** is an instrument used to **measure time**. It helps us determine the time taken to complete an activity or travel a certain distance. Accurate measurement of time is necessary for calculating speed.

---

#### 6. What is a balance?

**Answer:**

A **balance** is an instrument used to **measure the mass of an object** accurately. Mass is measured in **grams (g)** or **kilograms (kg)**. A balance is commonly used in laboratories and schools.

---

#### 7. Why does iron sink in water?

**Answer:**

Iron sinks in water because its **density is greater than the density of water**. Objects with a density greater than water sink, while objects with a lower density float.

---

#### 8. Name the instruments used to measure mass, volume, distance and time.

**Answer:**

<b>Quantity</b>	<b>Instrument</b>
Mass	Balance
Volume	Measuring cylinder
Distance	Metre scale or measuring tape
Time	Clock or stopwatch

# **CHAPTER 4: REST AND MOTION – KINDS OF MOTION**

## **A. MCQ (8)**

**1. An object is said to be at rest when it:**

- a) Changes position
- b) Does not change position
- c) Moves fast
- d) Rotates

**Answer: b) Does not change position**

---

**2. Motion means:**

- a) No movement
- b) Change in position with time
- c) Increase in size
- d) Decrease in weight

**Answer: b) Change in position with time**

---

**3. Motion of a ceiling fan is:**

- a) Linear
- b) Circular
- c) Oscillatory
- d) Random

**Answer: b) Circular**

---

**4. Motion of a pendulum is:**

- a) Circular
- b) Oscillatory
- c) Rotatory
- d) Linear

**Answer: b) Oscillatory**

---

**5. Motion of a train on a straight track is:**

- a) Circular
- b) Linear
- c) Oscillatory
- d) Random

**Answer: b) Linear**

---

**6. Earth rotates about its axis showing:**

- a) Linear motion
- b) Circular motion
- c) Rotatory motion
- d) Random motion

**Answer: c) Rotatory motion**

---

**7. Which is an example of oscillatory motion?**

- a) Moving car
- b) Swing
- c) Spinning top
- d) Earth

**Answer: b) Swing**

---

**8. A spinning top shows:**

- a) Rotatory motion
- b) Linear motion
- c) Oscillatory motion
- d) Random motion

**Answer: a) Rotatory motion**

---

## **B. Fill in the Blanks (8)**

1. A body that does not change its position is at \_\_\_\_\_.

**Answer:** Rest

---

**2. Motion means change in \_\_\_\_\_.**

**Answer:** Position

---

**3. Motion of a pendulum is \_\_\_\_\_ motion.**

**Answer:** Oscillatory

---

**4. Motion of a wheel is \_\_\_\_\_ motion.**

**Answer:** Circular

---

**5. Motion along a straight line is called \_\_\_\_\_ motion.**

**Answer:** Linear

---

**6. A swing shows \_\_\_\_\_ motion.**

**Answer:** Oscillatory

---

**7. Earth rotates on its \_\_\_\_\_.**

**Answer:** Axis

---

**8. A fan exhibits \_\_\_\_\_ motion.**

**Answer:** Circular

---

## **C. Define the Following (8)**

**1. Rest**

**Answer:**

A body is said to be **at rest** if it does **not change its position** with respect to its surroundings over a period of time.

**Example:** A book kept on a table.

---

## 2. Motion

**Answer:**

Motion is the **change in the position of an object with time** relative to a reference point.

**Example:** A moving car or a flying bird.

---

## 3. Linear Motion

**Answer:**

Linear motion is the motion of an object **along a straight line**.

**Examples:** A train moving on a straight track, a car moving on a straight road.

---

## 4. Circular Motion

**Answer:**

Circular motion is the motion of an object **along a circular path around a fixed point**.

**Examples:** Ceiling fan blades, hands of a clock.

---

## 5. Rotatory Motion

**Answer:**

Rotatory motion is the motion in which an object **rotates about its own axis**.

**Examples:** Spinning top, Earth rotating on its axis.

---

## 6. Oscillatory Motion

**Answer:**

Oscillatory motion is the **to-and-fro motion** of an object about its **mean position**.

**Examples:** Swing, pendulum.

---

## 7. Periodic Motion

**Answer:**

Periodic motion is the motion that **repeats itself at equal intervals of time.**

**Examples:** Motion of a pendulum, Earth's revolution around the Sun.

---

## 8. Random Motion

**Answer:**

Random motion is the motion **without a fixed path or direction.**

**Examples:** Flying butterfly, movement of dust particles in air.

# D. Differentiate Between (8)

## 1. Rest and Motion

**Answer:**

<b>Rest</b>	<b>Motion</b>
An object does not change its position.	An object changes its position with time.
The object remains stationary.	The object keeps moving.
Example: A book on a table.	Example: A moving car.

---

## 2. Linear Motion and Circular Motion

**Answer:**

<b>Linear Motion</b>	<b>Circular Motion</b>
Motion along a straight line.	Motion along a circular path.
Direction remains the same.	Direction changes continuously.
Example: Train on a straight track.	Example: Ceiling fan.

### 3. Circular Motion and Rotatory Motion

**Answer:**

<b>Circular Motion</b>	<b>Rotatory Motion</b>
Object moves around a fixed point.	Object rotates about its own axis.
The centre remains fixed.	Every part rotates around the axis.
Example: Stone tied to a string.	Example: Spinning top.

---

### 4. Oscillatory Motion and Periodic Motion

**Answer:**

<b>Oscillatory Motion</b>	<b>Periodic Motion</b>
To-and-fro motion about a mean position.	Motion that repeats after equal intervals of time.
Every oscillatory motion is periodic.	Periodic motion may or may not be oscillatory.
Example: Swing.	Example: Earth's revolution.

---

### 5. Linear Motion and Random Motion

**Answer:**

<b>Linear Motion</b>	<b>Random Motion</b>
Motion along a fixed straight path.	Motion with no fixed path or direction.
Easy to predict.	Difficult to predict.
Example: Train.	Example: Butterfly.

---

### 6. Motion and Speed

**Answer:**

<b>Motion</b>	<b>Speed</b>
Change in position with time. Rate at which an object moves.	

### **Motion**

May be slow or fast.

### **Speed**

Measured by distance travelled in unit time.

---

## **7. Rest and Stability**

**Answer:**

### **Rest**

Object is not moving. Ability of an object to remain balanced.

Depends on position. Depends on the shape and base of the object.

---

### **Stability**

## **8. Rotatory Motion and Oscillatory Motion**

**Answer:**

### **Rotatory Motion**

Rotation about an axis.

Moves in one direction around the axis.

Example: Fan.

### **Oscillatory Motion**

To-and-fro motion about a mean position.

Moves back and forth repeatedly.

Example: Pendulum.

---

## **E. Numericals (8)**

**Formula:**

**Speed = Distance ÷ Time**

---

**1. A car travels 120 km in 3 h. Find its speed.**

**Answer:**

**Given:**

- Distance = 120 km
- Time = 3 h

**Calculation:**

$$\text{Speed} = 120 \div 3 = 40 \text{ km/h}$$

**Answer: 40 km/h**

---

**2. A bus travels 240 km in 4 h. Find its speed.**

**Answer:**

$$\text{Speed} = 240 \div 4 = 60 \text{ km/h}$$

---

**3. A train covers 300 km in 5 h. Find its speed.**

**Answer:**

$$\text{Speed} = 300 \div 5 = 60 \text{ km/h}$$

---

**4. A cyclist covers 45 km in 3 h. Find speed.**

**Answer:**

$$\text{Speed} = 45 \div 3 = 15 \text{ km/h}$$

---

**5. A runner covers 100 m in 20 s. Find speed.**

**Answer:**

$$\text{Speed} = 100 \div 20 = 5 \text{ m/s}$$

---

**6. A scooter covers 150 km in 5 h. Find speed.**

**Answer:**

$$\text{Speed} = 150 \div 5 = 30 \text{ km/h}$$

---

**7. A boat travels 80 km in 4 h. Find speed.**

**Answer:**

$$\text{Speed} = 80 \div 4 = 20 \text{ km/h}$$

---

**8. A student walks 2 km in 30 min. Find speed in km/h.**

**Answer:**

**Given:**

- Distance = 2 km
- Time = 30 min = 0.5 h

**Calculation:**

$$\text{Speed} = 2 \div 0.5 = 4 \text{ km/h}$$

**Answer: 4 km/h**

## **F. Give Reasons (8)**

**1. Why is a stationary book said to be at rest?**

**Answer:**

A stationary book is said to be at rest because **it does not change its position with respect to its surroundings over a period of time.**

---

**2. Why is a moving train said to be in motion?**

**Answer:**

A moving train is said to be in motion because **its position changes continuously with time** relative to its surroundings.

---

**3. Why is pendulum motion called oscillatory motion?**

**Answer:**

The motion of a pendulum is called **oscillatory motion** because it moves **to and fro about its mean (central) position** repeatedly at equal intervals of time.

---

**4. Why is motion of a fan circular?**

**Answer:**

The blades of a fan move **along a circular path around a fixed centre**. Therefore, the motion of a fan is called **circular motion**.

---

**5. Why is Earth's motion periodic?**

**Answer:**

Earth's rotation on its axis and revolution around the Sun **repeat after fixed intervals of time**. Therefore, Earth's motion is called **periodic motion**.

---

**6. Why is a swing an example of oscillatory motion?**

**Answer:**

A swing moves **backward and forward repeatedly about its mean position**. Hence, it is an example of **oscillatory motion**.

---

**7. Why is a spinning top said to have rotatory motion?**

**Answer:**

A spinning top rotates **about its own axis**. Since it spins around a fixed axis, it shows **rotatory motion**.

---

**8. Why can an object be at rest for one observer and in motion for another?**

**Answer:**

Motion depends on the **reference point (observer)**. The same object may appear at rest to one observer but in motion to another. For example, a person sitting in a moving bus is at rest relative to the bus but in motion relative to a person standing on the road.

---

**G. Answer the Following (8)**

**1. What is rest?**

**Answer:**

Rest is the state of an object that **does not change its position with respect to its surroundings over a period of time**.

**Example:** A book placed on a table is at rest.

---

## 2. What is motion?

### Answer:

Motion is the **change in the position of an object with time** with respect to a reference point. An object is said to be in motion if its position changes continuously.

**Examples:** A moving car, a flying bird, and a running person.

---

## 3. Give two examples of linear motion.

### Answer:

Linear motion is the motion of an object along a **straight line**.

### Examples:

1. A train moving on a straight railway track.
  2. A car moving on a straight road.
- 

## 4. Give two examples of circular motion.

### Answer:

Circular motion is the motion of an object along a **circular path** around a fixed point.

### Examples:

1. The blades of a ceiling fan.
  2. The hands of a clock.
- 

## 5. What is oscillatory motion?

### Answer:

Oscillatory motion is the **to-and-fro motion of an object about its mean position**. It repeats after equal intervals of time.

**Examples:** A pendulum and a swing.

---

## 6. What is rotatory motion?

**Answer:**

Rotatory motion is the motion in which an object **rotates about its own axis**. Every point of the object moves in a circular path around the axis.

**Examples:** A spinning top, a ceiling fan, and the Earth rotating on its axis.

---

## **7. What is periodic motion?**

**Answer:**

Periodic motion is the motion that **repeats itself after equal intervals of time**. Many natural and man-made motions are periodic.

**Examples:** Motion of a pendulum, Earth's revolution around the Sun, and the movement of clock hands.

---

## **8. Name and explain any four types of motion.**

**Answer:**

**1. Linear Motion:**

Motion along a straight line.

**Example:** A train moving on a straight track.

**2. Circular Motion:**

Motion along a circular path around a fixed point.

**Example:** The blades of a ceiling fan.

**3. Rotatory Motion:**

Motion in which an object rotates about its own axis.

**Example:** A spinning top.

**4. Oscillatory Motion:**

To-and-fro motion about a mean position.

**Example:** A swing or a pendulum.

# **CHAPTER 5: SPEED AND VELOCITY**

## **A. MCQ (8)**

**1. Speed is:**

- a) Distance  $\times$  Time
- b) Distance  $\div$  Time
- c) Time  $\div$  Distance
- d) Mass  $\div$  Volume

**Answer: b) Distance  $\div$  Time**

---

## **2. Velocity is:**

- a) Speed with direction
- b) Distance without time
- c) Mass with direction
- d) Area with direction

**Answer: a) Speed with direction**

---

## **3. SI unit of speed is:**

- a) km
- b) m/s
- c) kg
- d) m<sup>2</sup>

**Answer: b) m/s**

---

## **4. Velocity is a:**

- a) Scalar quantity
- b) Vector quantity
- c) Unit
- d) Measurement

**Answer: b) Vector quantity**

---

## **5. Which quantity has direction?**

- a) Speed
- b) Velocity
- c) Distance
- d) Time

**Answer: b) Velocity**

---

**6. A car moving 60 km/h east has:**

- a) Speed only
- b) Velocity
- c) Mass
- d) Density

**Answer: b) Velocity**

---

**7. Average speed is:**

- a) Total distance  $\div$  Total time
- b) Distance  $\times$  Time
- c) Time  $\div$  Distance
- d) Mass  $\div$  Volume

**Answer: a) Total distance  $\div$  Total time**

---

**8. Which is a scalar quantity?**

- a) Velocity
- b) Speed
- c) Displacement
- d) Force

**Answer: b) Speed**

---

## **B. Fill in the Blanks (8)**

**1. Speed = \_\_\_\_\_  $\div$  Time.**

**Answer: Distance**

---

**2. Velocity is speed with \_\_\_\_\_.**

**Answer: Direction**

---

**3. SI unit of velocity is \_\_\_\_\_.**

**Answer:** m/s (metre per second)

---

**4. Speed is a \_\_\_\_\_ quantity.**

**Answer:** Scalar

---

**5. Velocity is a \_\_\_\_\_ quantity.**

**Answer:** Vector

---

**6. Average speed = Total distance ÷ \_\_\_\_\_.**

**Answer:** Total Time

---

**7. Speed tells how \_\_\_\_\_ an object moves.**

**Answer:** Fast

---

**8. Velocity includes speed and \_\_\_\_\_.**

**Answer:** Direction

---

## **C. Define the Following (8)**

### **1. Speed**

**Answer:**

Speed is the **distance travelled by an object in unit time**. It tells us how fast or slow an object is moving.

**Formula:**

**Speed = Distance ÷ Time**

**SI Unit:** metre per second (m/s)

---

## 2. Velocity

**Answer:**

Velocity is the **speed of an object in a particular direction**. Since it has both magnitude and direction, it is called a **vector quantity**.

**SI Unit:** metre per second (m/s)

---

## 3. Average Speed

**Answer:**

Average speed is the **total distance travelled divided by the total time taken** for the journey.

**Formula:**

**Average Speed = Total Distance ÷ Total Time**

---

## 4. Distance

**Answer:**

Distance is the **total length of the path travelled** by an object from one place to another. It is a **scalar quantity**.

**SI Unit:** metre (m)

---

## 5. Displacement

**Answer:**

Displacement is the **shortest distance between the initial and final positions of an object in a particular direction**. It is a **vector quantity** because it has both magnitude and direction.

---

## 6. Scalar Quantity

**Answer:**

A scalar quantity is a physical quantity that has **only magnitude and no direction**.

**Examples:** Mass, Time, Distance, Speed.

---

## 7. Vector Quantity

**Answer:**

A vector quantity is a physical quantity that has **both magnitude and direction**.

**Examples:** Velocity, Force, Displacement.

---

## 8. Uniform Speed

**Answer:**

Uniform speed is the speed at which an object **covers equal distances in equal intervals of time**. The speed remains constant throughout the journey.

**Example:** A train moving at a constant speed of **60 km/h**.

# D. Differentiate Between (8)

## 1. Speed and Velocity

**Answer:**

### Speed

### Velocity

Speed is the distance travelled per unit time. Velocity is the speed in a particular direction.

It is a scalar quantity.

It is a vector quantity.

Direction is not required.

Direction is essential.

---

## 2. Distance and Displacement

**Answer:**

### Distance

### Displacement

Total length of the path travelled. Shortest distance between the initial and final positions.

Scalar quantity.

Vector quantity.

Depends on the path taken.

Depends only on the initial and final positions.

---

### 3. Scalar and Vector Quantities

**Answer:**

<b>Scalar Quantity</b>	<b>Vector Quantity</b>
Has only magnitude.	Has both magnitude and direction.
Direction is not needed.	Direction is necessary.
Examples: Speed, Mass.	Examples: Velocity, Force.

---

### 4. Uniform Speed and Non-uniform Speed

**Answer:**

<b>Uniform Speed</b>	<b>Non-uniform Speed</b>
Covers equal distances in equal intervals of time.	Covers unequal distances in equal intervals of time.
Speed remains constant.	Speed changes during motion.

---

### 5. Speed and Motion

**Answer:**

<b>Speed</b>	<b>Motion</b>
Rate of movement of an object.	Change in the position of an object with time.
Measured in m/s.	Describes whether an object is moving or at rest.

---

### 6. Distance and Direction

**Answer:**

<b>Distance</b>	<b>Direction</b>
Total path travelled by an object.	The course or path along which an object moves.
Scalar quantity.	Helps determine velocity.

---

## 7. Average Speed and Instantaneous Speed

**Answer:**

### Average Speed

Total distance  $\div$  Total time.

Calculated for the whole journey. Measured at a specific moment.

### Instantaneous Speed

Speed at a particular instant of time.

---

## 8. Velocity and Acceleration

**Answer:**

### Velocity

Rate of change of displacement.

Unit: m/s

### Acceleration

Rate of change of velocity.

Unit: m/s<sup>2</sup>

---

## F. Give Reasons (8)

### 1. Why is velocity a vector quantity?

**Answer:**

Velocity is called a **vector quantity** because it has **both magnitude (speed) and direction**.

If the direction changes, the velocity also changes, even if the speed remains the same.

---

### 2. Why is speed a scalar quantity?

**Answer:**

Speed is a **scalar quantity** because it has **only magnitude** and no direction. It tells us how fast an object is moving but not the direction of motion.

---

### 3. Why can two objects have the same speed but different velocities?

**Answer:**

Two objects can have the same speed but different velocities if they are **moving in different directions**. Velocity depends on both **speed and direction**.

**Example:** Two cars moving at **60 km/h**, one towards the north and the other towards the south, have the same speed but different velocities.

---

#### 4. Why is direction important in velocity?

**Answer:**

Direction is important because **velocity describes not only how fast an object moves but also the direction in which it moves**. Without direction, velocity cannot be determined.

---

#### 5. Why is average speed used in long journeys?

**Answer:**

During a long journey, the speed of a vehicle may change many times. Therefore, **average speed** is used to find the overall speed for the entire journey.

---

#### 6. Why is speed always positive?

**Answer:**

Speed is always positive because it is based on **distance travelled**, and distance can never be negative.

---

#### 7. Why can velocity change even when speed remains constant?

**Answer:**

Velocity can change if the **direction of motion changes**, even though the speed remains the same.

**Example:** A car moving at a constant speed around a circular track has changing velocity because its direction keeps changing.

---

#### 8. Why is displacement used while calculating velocity?

**Answer:**

Velocity is based on **displacement**, not distance, because displacement gives the **shortest distance along with the direction** from the starting point to the ending point.

---

## G. Answer the Following (8)

### 1. What is speed?

**Answer:**

Speed is the **distance travelled by an object in unit time**. It tells us how fast or slow an object is moving.

**Formula:**

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

The **SI unit of speed is metre per second (m/s)**.

---

### 2. What is velocity?

**Answer:**

Velocity is the **speed of an object in a particular direction**. It tells us both the **magnitude and direction** of motion, so it is called a **vector quantity**.

**Formula:**

$$\text{Velocity} = \text{Displacement} \div \text{Time}$$

The **SI unit of velocity is metre per second (m/s)**.

---

### 3. State the SI unit of speed.

**Answer:**

The **SI unit of speed is metre per second (m/s)**. It means the distance travelled by an object in **one second**. Another commonly used unit is **kilometre per hour (km/h)**.

---

### 4. State the SI unit of velocity.

**Answer:**

The **SI unit of velocity is metre per second (m/s)**. Since velocity includes direction, it is written with a direction, such as **10 m/s east** or **5 m/s north**.

---

### 5. What is average speed?

**Answer:**

Average speed is the **total distance travelled divided by the total time taken** during the whole journey.

**Formula:**

$$\text{Average Speed} = \text{Total Distance} \div \text{Total Time}$$

It is useful when an object moves at different speeds during a journey.

---

**6. Why is velocity called a vector quantity?**

**Answer:**

Velocity is called a **vector quantity** because it has **both magnitude (speed) and direction**. A change in either speed or direction changes the velocity of the object.

---

**7. Give two differences between speed and velocity.**

**Answer:**

<b>Speed</b>	<b>Velocity</b>
Speed is the distance travelled per unit time.	Velocity is the displacement travelled per unit time in a particular direction.
It is a scalar quantity.	It is a vector quantity.

---

**8. Explain average speed with an example.**

**Answer:**

Average speed is the **total distance travelled divided by the total time taken**.

**Formula:**

$$\text{Average Speed} = \text{Total Distance} \div \text{Total Time}$$

**Example:**

A car travels **120 km in 2 hours**.

$$\text{Average Speed} = 120 \div 2 = \mathbf{60 \text{ km/h}}$$

This means the car travelled **60 kilometres every hour on average**.

**Formula:**

$$\text{Speed/Velocity} = \text{Distance} \div \text{Time}$$

---

**1. A car travels 180 km in 3 h. Find speed.**

**Answer:**

**Given:**

- Distance = 180 km
- Time = 3 h

**Formula:**

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

**Calculation:**

$$\text{Speed} = 180 \div 3 = 60 \text{ km/h}$$

**Answer: 60 km/h**

---

**2. A train covers 360 km in 6 h. Find speed.**

**Answer:**

$$\text{Speed} = 360 \div 6 = 60 \text{ km/h}$$

---

**3. A cyclist travels 90 km in 3 h. Find speed.**

**Answer:**

$$\text{Speed} = 90 \div 3 = 30 \text{ km/h}$$

---

**4. A runner covers 200 m in 25 s. Find speed.**

**Answer:**

$$\text{Speed} = 200 \div 25 = 8 \text{ m/s}$$

---

**5. A bus travels 250 km in 5 h. Find speed.**

**Answer:**

$$\text{Speed} = 250 \div 5 = 50 \text{ km/h}$$

---

**6. A body moves 100 m east in 20 s. Find velocity.**

**Answer:**

**Given:**

- Distance = 100 m
- Time = 20 s
- Direction = East

**Formula:**

Velocity = Distance  $\div$  Time

**Calculation:**

Velocity =  $100 \div 20 = 5$  m/s

**Answer: 5 m/s East**

---

**7. A person walks 600 m north in 10 min. Find velocity.**

**Answer:**

**Given:**

- Distance = 600 m
- Time = 10 min = 600 s
- Direction = North

**Calculation:**

Velocity =  $600 \div 600 = 1$  m/s

**Answer: 1 m/s North**

---

**8. A car covers 240 km in 4 h towards west. Find velocity.**

**Answer:**

Velocity =  $240 \div 4 = 60$  km/h West