

# Physics Exam Answer Key

Grade: VII

Duration: 2 hours

Maximum Marks: 80

## SECTION A (Objective & Short Answer)

Q1. Choose the correct answers from the given options: [10]

1. The SI unit of density is:  
(i)  $\text{kg/m}^3$
2. The volume of a cuboid of length 3 cm, breadth 4 cm, and height 5 cm is:  
(iii)  $60 \text{ cm}^3$
3. Which of the following is an example of a good conductor of heat?  
(iii) Copper
4. The speed of light in air is approximately:  
(i)  $3 \times 10^8 \text{ m/s}$
5. The phenomenon of light bouncing back from a surface is called:  
(iii) Reflection
6. Which of the following is used to measure electric current?  
(i) Ammeter
7. The freezing point of water in Kelvin scale is:  
(i) 273 K
8. Which law states that "Angle of incidence is equal to the angle of reflection"?  
(iii) Laws of Reflection
9. The force of attraction between like poles of a magnet is:  
(ii) Repulsion
10. The process in which solid changes directly into gas is called:  
(ii) Sublimation

Q2. Fill in the blanks with appropriate terms: [5]

1. Volume is a \_\_\_\_ (fundamental/derived) physical quantity.  
Answer: Derived

2. The SI unit of power is \_\_\_\_.

Answer: Watt (W)

3. Heat always flows from \_\_\_\_ object to \_\_\_\_ object.

Answer: Hot, cold

4. A real image can be \_\_\_\_ on a screen.

Answer: Captured

5. The magnetic field around a current-carrying wire was discovered by \_\_\_\_.

Answer: Hans Oersted

Q3. State whether the following statements are True or False: [5]

1. Non-uniform motion has uniform velocity.

Answer: False

2. A convex mirror always forms a real image.

Answer: False

3. Electricity is generated by electromagnetic induction.

Answer: True

4. The SI unit of temperature is Fahrenheit.

Answer: False

5. Water expands on freezing.

Answer: True

Q4. Name the following: [5]

1. The unit used to measure electric current.

Answer: Ammeter

2. The process in which heat travels through solids.

Answer: Conduction

3. The phenomenon where light bends when passing from one medium to another.

Answer: Refraction

4. The device used to measure temperature.

Answer: Thermometer

5. The scientist who discovered the laws of electromagnetic induction.

Answer: Michael Faraday

Q5. Match the following: [5]

Column A	Column B
The force between like poles	Repulsion
Device to measure current	Galvanometer
The SI unit of heat energy	Joule
Process of changing gas into liquid	Condensation
The bending of light rays in a new medium	Refraction

**Q6. Give reasons for the following: [5]**

1. Why does a black surface absorb more heat than a white surface?

Answer: A black surface absorbs all wavelengths of light, converting them into heat, while white reflects most of the light.

2. Why does a plane mirror always form a virtual image?

Answer: A plane mirror always forms a virtual image because the reflected rays appear to diverge from behind the mirror but do not actually meet.

3. Why is it difficult to walk on ice compared to a rough surface?

Answer: Ice has a lower coefficient of friction, leading to less grip and increased chances of slipping.

4. Why do metals expand when heated?

Answer: Metals expand when heated because the particles gain energy and move apart, increasing the material's overall size.

5. Why is repulsion considered a sure test for magnetism?

Answer: Repulsion is considered a sure test for magnetism because only like poles repel, confirming that an object is a magnet.

## SECTION B (Descriptive & Numerical)

**Q7. Answer all the following questions: [10]**

1. Define density and write its formula.

Answer: Density is defined as the mass per unit volume of a substance.

Formula:  $\rho = m/V$

2. Explain lateral inversion with an example.

Answer: Lateral inversion is the phenomenon where the left side of an object

appears as the right side in its mirror image. Example: The word "AMBULANCE" is written in reverse on ambulances so that it appears correctly in a rear-view mirror.

3. State the laws of reflection.

Answer:

- The incident ray, reflected ray, and the normal lie in the same plane.
- The angle of incidence is equal to the angle of reflection.

4. What is an electromagnet? List two uses of electromagnets.

Answer: An electromagnet is a temporary magnet created by passing electric current through a coil of wire around an iron core.

Uses: Electric bells, MRI machines.

5. Explain the working of a simple electric bell.

Answer: A simple electric bell works using an electromagnet that attracts a metal arm when current flows, striking the bell and breaking the circuit repeatedly to produce sound.

6. Convert 35°C to Kelvin and Fahrenheit.

Answer:

- Kelvin:  $K = 35 + 273 = 308 \text{ K}$
- Fahrenheit:  $F = (9/5 \times 35) + 32 = 95^\circ\text{F}$

7. Define potential difference and state its SI unit.

Answer: Potential difference is the work done per unit charge to move a charge between two points.

SI unit: Volt (V)

Q8. Distinguish between the following: [10]

1. Reflection vs. Refraction

Answer:

- Reflection: Bouncing back of light.
- Refraction: Bending of light when passing between media.

2. Real Image vs. Virtual Image

Answer:

- Real: Formed by actual intersection of rays, can be captured.
- Virtual: Formed by apparent intersection, cannot be captured.

3. Conductors vs. Insulators

Answer:

- Conductors: Allow heat/electricity (e.g., Copper).
- Insulators: Do not allow heat/electricity (e.g., Rubber).

#### 4. Regular Reflection vs. Irregular Reflection

**Answer:**

- Regular: Light reflects at equal angles on a smooth surface.
- Irregular: Light scatters in different directions on a rough surface.

#### 5. Series Circuit vs. Parallel Circuit

**Answer:**

- Series: Single path for current.
- Parallel: Multiple paths for current.

### Q9. Answer the following questions (Numerical & Theoretical): [20]

1. (a) A cuboid has dimensions 6 cm × 4 cm × 3 cm. Find its volume.

**Answer:**

- Volume = Length × Breadth × Height
- = 6 × 4 × 3 = **72 cm<sup>3</sup>**

(b) A piece of metal has a mass of 200 g and a volume of 50 cm<sup>3</sup>. Find its density.

**Answer:**

- Density = Mass / Volume
- = 200 g / 50 cm<sup>3</sup> = **4 g/cm<sup>3</sup>**

2. (a) Define speed and write its formula.

**Answer:**

- Speed is the distance traveled per unit time.
  - Formula: Speed = Distance / Time
- (b) A car covers 240 km in 4 hours. Find its speed in m/s.

**Answer:**

- Speed = 240 km / 4 hr = **60 km/hr = 16.67 m/s**

3. (a) Explain the process of electromagnetic induction.

**Answer:**

- Electromagnetic induction is the process where a changing magnetic field induces an electric current in a conductor.

(b) A voltage of 12V is applied across a resistor of 6Ω. Find the current.

**Answer:**

- Using Ohm's Law:  $V = IR$
- $12V = I \times 6\Omega$
- $I = 12 / 6 = \mathbf{2\ A}$

4. (a) Explain with an experiment how the displacement method is used to measure the volume of an irregular solid.

**Answer:**

- Displacement method: Submerging an irregular solid in water and measuring the rise in water level to find volume.

**(b)** Convert 50 J of energy into calories. (1 calorie = 4.18 J)

**Answer:**

- Conversion: 50 J to calories
- $= 50 / 4.18 = 11.96 \text{ cal}$

**End of the Answer Key**