Physics Exam Answer Key - 2

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 force is:**
   (i) Newton
2. **Which of the following materials has the highest thermal conductivity?**
   (ii) Copper
3. **The resistance of a wire depends on:**
   (iv) All of the above
4. **The image formed by a convex mirror is always:**
   (iii) Virtual and upright
5. **Which of the following phenomena is responsible for the twinkling of stars?**
   (ii) Refraction
6. **What happens when an object is placed at the center of curvature of a concave mirror?**
   (ii) The image is real and of the same size as the object
7. **Which of the following factors affects the speed of sound?**
   (iv) All of the above
8. **A positively charged rod is brought near a neutral conductor. What happens?**
   (ii) The near end of the conductor acquires a negative charge
9. **Which of the following devices converts electrical energy into mechanical energy?**
   (ii) Motor
10. **The first law of thermodynamics is based on the principle of:**
    (iii) Conservation of energy

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

1. **A voltmeter** is a device that measures the potential difference across a component.

2. **Mass** per unit volume defines the density of an object.
3. The rate of change of velocity of an object is called **acceleration**.
4. In an electrical circuit, the unit of resistance is **ohm (Ω)**.
5. The phenomenon responsible for the blue color of the sky is **Rayleigh scattering**.

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

1. **False**
2. **True**
3. **False**
4. **False**
5. **True**

Q4. Name the following: [5]

1. **Michael Faraday** discovered electromagnetic induction.
2. **Speed (or Angular speed)** remains unchanged in uniform circular motion.
3. The SI unit of pressure is **Pascal (Pa)**.
4. **Radiation** is the process by which heat is transferred in a vacuum.
5. The **pupil** controls the amount of light entering the human eye.

Q5. Match the following: [5]

Column A	Column B
Unit of work	**Joule**
Speed of light in vacuum	**3×10^8 m/s**
Device used to measure current	**Ammeter**
Law of inertia	**Newton's First Law**
Process of heat transfer through a liquid	**Convection**

SECTION B (Descriptive & Numerical)

Q6. Answer all the following questions: [10]

1. **Work is defined as the force applied on an object that causes displacement in the direction of the applied force.**
   - **SI Unit:** Joule (J)
2. **Atmospheric pressure is the pressure exerted by the air in the atmosphere on all objects.**
   - **Example:** The collapsing of an empty tin when the air inside is removed.
3. **The sky appears blue during the day due to Rayleigh scattering.** During sunrise and sunset, the sunlight has to pass through a longer atmospheric path, scattering shorter wavelengths and allowing red and orange hues to be visible.
4. **Ohm's law states that the current through a conductor is directly proportional to the voltage across it and inversely proportional to the resistance.**
   - **Formula:** V = IR
5. **Concave vs. Convex lenses:** Concave lenses diverge light rays, forming virtual images. Convex lenses converge light rays, forming real or virtual images.
6. **Temperature conversions:**
   - **Kelvin:** K = 45 + 273 = **318 K**
   - **Fahrenheit:** F = (9/5 × 45) + 32 = **113°F**
7. **Power is the rate at which work is done.**
   - **Formula:** P = VI

Q7. Distinguish between the following: [10]

1. **Mass vs. Weight:** Mass is the amount of matter in an object (kg). Weight is the force due to gravity (N).
2. **Series vs. Parallel circuits:** In a series circuit, current remains the same; in a parallel circuit, voltage remains the same.
3. **AC vs. DC current:** AC changes direction periodically; DC flows in one direction.
4. **Renewable vs. Non-renewable energy:** Renewable energy sources are replenishable (e.g., solar). Non-renewable sources deplete over time (e.g., coal).
5. **Evaporation vs. Boiling:** Evaporation occurs at all temperatures; boiling occurs at a fixed temperature.

Q8. Solve the following numerical problems: [20]

1. **(a)** Work done = Force × Distance

- W = 50 N × 5 m = **250 J**
  (b) Force = Mass × Acceleration
- F = 2 kg × 3 m/s² = **6 N**

2. **(a)** Acceleration is the rate of change of velocity.
   - Formula: a = (v - u) / t
     (b) Final velocity: v = u + at
   - v = 10 + (2 × 5) = **20 m/s**
3. **(a)** Electromagnetic induction occurs when a changing magnetic field induces an electric current in a conductor.
   (b) Ohm's law: V = IR
   - I = V / R = 10V / 5Ω = **2 A**
4. **(a)** Power of a lens: P = 100 / f
   - P = 100 / 20 = **5 D**
     (b) Energy conversion:
   - 100 J = 100 / 4.18 = **23.92 cal**

End of the Answer Key