

**ICSE Board**  
**Class IX Physics**  
**Gold Series**  
**Sample Paper – 3**

**Time: 2 hrs**

**Total Marks: 80**

**General Instructions:**

1. Answers to this paper must be written on the paper provided separately.
2. You will **not** be allowed to write during the first **15** minutes.  
*This time is to be spent in reading the question paper.*
3. The time given at the head of the paper is the time allotted for writing the answers.
4. Attempt **all** questions from **Section I** and **any four** questions from **Section II**.
5. The intended marks of questions or parts of questions are given in brackets [ ].

**SECTION I (40 Marks)**

**Attempt all Questions from this Section**

**Question 1**

- (a) What is the approximate diameter of the orbit of the Earth around the sun
  - i. in AU
  - ii. in SI unit? [2]
- (b) Two simple pendulums A and B have equal lengths but their bob masses are 75 g and 125 g respectively. What would be the ratio of their time periods? Give reason for your answer. [2]
- (c) Name two substances which expand on heating. [2]
- (d) A body starts moving with uniform acceleration from its state of rest. If it covers distance 'x' in the first 2 s and distance 'y' in next 2 s, obtain the relation between 'x' and 'y'. [2]
- (e) What is the source of tension in a string on an atomic scale? [2]

**Question 2**

- (a) A block of wood floats in brine solution of density  $1.15 \text{ g cm}^{-3}$  such that three-fifth of its volume is immersed into the brine. Calculate the density of wood. [2]
- (b) Write the value of universal gravitational constant in SI unit. [2]
- (c) Why does an athlete run some distance before taking a jump? [2]
- (d) A long metal rod is bent to form a ring with a small gap. If this is heated, will this gap increase or decrease? [2]
- (e) Why do birds puff up their feathers in winter? [2]

**Question 3**

- (a) What is the role of ozone layer in the stratosphere? [2]
- (b) At what temperature, will the reading of the Fahrenheit and the absolute scale be the same? [2]
- (c) Define renewable resources with an example. [2]
- (d) If a person holds a lighted candle in front of a thick glass mirror and views it obliquely, he sees a number of images of the candle. Why are these multiple images observed? [2]
- (e) Three plane mirrors are fixed in a vertical plane mutually normal to each other to form three consecutive sides of a cube like  $\Pi$ . A ray of light is incident in the horizontal plane on the mirror on the left side at its centre at an angle of incidence of  $60^\circ$ . Draw a ray diagram to show the path of the ray reflected from the three mirrors successively. [2]

**Question 4**

- (a) What are the effects of changes in temperature and pressure on the velocity of sound? [2]
- (b) The distance between the 5th and the 15th crest is 0.4 m. What is the wavelength of sound? [2]
- (c) A negatively charged ebonite rod attracts a suspended ball of straw. Does it indicate that the ball is positively charged? [2]
- (d) A polythene piece is rubbed with wool as a result of which it acquires a negative charge. Will there be any exchange of mass between the wool and the polythene? [2]
- (e) Which type of cell would you like to use if your device requires (i) a current of 70 A for 20 s and (ii) a current of 2 mA occasionally? [2]

**SECTION II (40 Marks)**

**Attempt any four Questions from this Section**

**Question 5**

- (a) A Vernier scale has 40 divisions and its main scale is divided in millimeters. It has an error of +0.0125 cm. While measuring the length of a cylinder, the reading on the main scale is 75 mm and the 12th Vernier scale division coincides with the main scale. Calculate the corrected length. [4]
- (b) Draw a graph between effective length 'l' and square of time period 'T<sup>2</sup>' of a simple pendulum. How will you obtain the value of acceleration due to gravity from the graph? [3]
- (c) The mass of a block is 1.35 kg and its volume is  $1.5 \times 10^{-3} \text{ m}^3$ . Find the density of the block. Will this block float in water? Give reason. [3]

**Question 6**

- (a) An athlete runs around a circular track of circumference 360 m in  $(1/60)$  h and reaches the starting point. Calculate, [4]
- The distance covered by athlete
  - The displacement
  - The average speed and
  - The average velocity.
- (b) The table shows the velocity of a two-wheeler at various intervals of time. [3]

t(s)	0	5	7	10	15
V(m/s)	10	10	7	10	0

- Plot the velocity-time graph.
  - Calculate the rate of change of velocity between 5s - 7s, 7s - 10 s and 10s - 15 s.
- (c) Derive  $v^2 = u^2 + 2as$  where symbols have their usual meaning. [3]

**Question 7**

- (a) Show that Newton's first law of motion can be obtained from the second law. [4]
- (b) [3]
- The velocity of a body is continuously changing. Can its speed remain constant?
  - If the speed is changing, can the velocity of a body remain constant?
  - Is it possible for a body to have a constant speed in accelerated motion?
- (c) [3]
- The earth attracts a ball with a force of 1 N. If this is the force of action, what would be the force of reaction and who exerts this force?
  - State two circumstances under which your weight would become zero?

**Question 8**

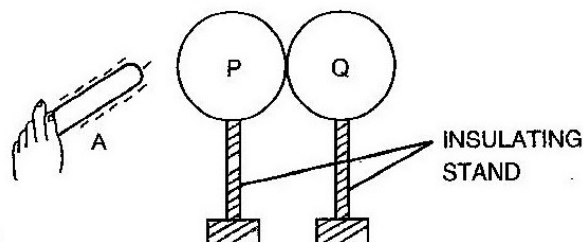
- (a) [4]
- What is second's pendulum? What is its approximate effective length?
  - A second's pendulum is set up on the surface of the moon, where acceleration due to gravity is  $\frac{1}{6}$ th of that of the earth. How is the time period of the pendulum affected? Give a reason in support of your answer.
- (b) Indicate on a graph how the density of water at (0°C) changes when it is gradually heated upto 10°C. [3]
- (c) Why is ice box made from two iron sheets with space in between filled with glass wool? [3]

**Question 9**

- (a) The angle between the incident ray and the mirror is 30°. [3]
- What is the angle of incidence?
- What is the angle of reflection?
- What is the total angle turned by the ray of light?
- (b) Where will the image form if the object is placed at the centre of curvature in front of the concave mirror? Also, state the nature of the image. [3]
- (c) [4]
- Obtain a relation between the velocity, the wavelength and the frequency of the wave.
  - Distance between the third and the eighth rarefaction is 50 cm. Calculate the wavelength of the wave.

**Question 10**

- (a) The figure shows a negatively charged ebonite rod A which is brought near an uncharged metal sphere P touching the other uncharged metal sphere Q. Both the spheres stand on separate insulating stands. [3]



- i. If keeping the rod A in position, the sphere Q is removed by holding the insulating stand of it, state the kind of charge on them and give reason to support your answer.
  - ii. If the rod A is removed first and then the sphere Q is removed by holding the insulating stand of it, what kind of charges will be on the spheres P and Q? Explain. [3]
- (b) State three factors on which the resistance of a wire depends. Explain how the resistance depends on the factors stated by you. [4]
- (c)
- i. Why will heating the magnet strongly remove its magnetism?
  - ii. What are neutral points? [3]