ICSE Board
Class IX Physics
Paper – 4

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) Calculate the number of seconds in a year. Take 1 year = 365 days.   [2]

(b) Calculate the frequency of oscillation of Second's pendulum. Does it depend upon amplitude of oscillation?   [2]

(c) Under what condition, the balance is in equilibrium?   [2]

(d) Ratio of the velocities of two bodies thrown in upward direction is 2:5. Prove that the ratio of their height attained will be $h_1:h_2 = 4:25$.   [2]

(e) Name two green house gases. Will these gases increase or decrease the average temperature of the earth?   [2]

Question 2

(a) A bullet fired vertically upward falls at the same place after sometime. What is the displacement of the bullet?   [2]

(b) Calculate the mass of air in a room of dimensions 4.5 m × 3.5 m × 2.5 m if the density of air at N.T.P. is 1.3 kg/m³.   [2]

(c) In rocket propulsion, due to liquid fuel burning inside the rocket, a jet of hot gases ejects from its tail. Is it responsible for its propulsion? If yes, how?   [2]

(d) In riveting boiler plates, red hot rivets are used. Why?   [2]

(e) The given diagram shows a steel washer. Explain how the following are affected when the washer is heated to 100⁰C.   [2]

   1. Internal diameter
     2. Mass
     3. Density
     4. Volume
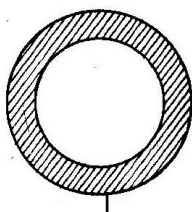
Question 3

(a) What will be the effect on the focal length of a spherical mirror if it is placed in water? [2]

(b) Oxygen gas freezes at -362°F. What will be its value on Celsius scale? [2]

(c) A person is standing on ice at a place A in a frozen pond. He has a pistol and two bullets. How can he move from place A to another distant place B and stop there? [2]

(d) The walls of a barber shop are covered with a plane mirror and two movie films are made - one recording the movements of the barber and the other of his mirror image. From viewing the films later, can an observer differentiate between the object and the image? [2]

(e) A ray of light is incident on a plane mirror at an angle of incidence of 50°. What is the angle (i) of reflection (ii) between the incident ray and the mirror (iii) between the reflected ray and the mirror (iv) of deviation (angle between the directions of the incident ray and the reflected ray)? [2]

Question 4

(a) In which medium, the speed of sound is more: humid air or dry air? Why? [2]

(b) An object is placed between two mirrors inclined at 30° to each other. How many images will you see? [2]

(c) The given figure shows the shape of a part of a long string in which transverse waves are produced by attaching one end of the string to a tuning fork of frequency 250 Hz. What is the velocity of the wave? [2]
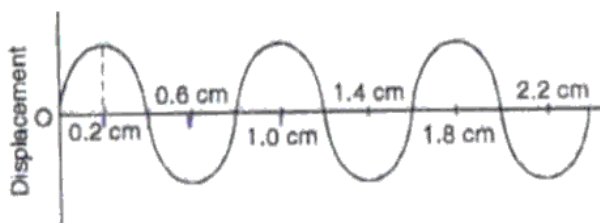
(d) Can two similarly charged bodies attract each other? [2]

(e) What happens to a bar magnet, if it is cut into two equal pieces: [2]
  i. transverse to the length
  ii. along the length.

SECTION II (40 Marks)
Attempt *any four* Questions from this Section

Question 5
(a) Define pitch of a screw gauge.
   The thimble of a screw gauge has 50 divisions for one revolution. The spindle advances 1 mm when the screw is turned through two revolutions. What is the least count of the screw gauge? When the screw gauge is used to measure the diameter of the wire, the reading on the sleeve is found to be 0.05 cm and the reading on the thimble is found to be 27 divisions. What is the diameter of the wire in CGS unit? [4]
(b) Ram throws a stone in the pond. It displaced 1.5 kg of water. Calculate the buoyant force acting on the stone. (g = 9.8 m/s^2) [3]
(c) A glass slab of dimensions 10 cm $\times$ 10 cm $\times$ 4 cm and weight 8 N rests with its sides 10 cm $\times$ 10 cm in contact with the top of the table. Calculate the pressure exerted. If the slab is tilted and allowed to rest on the surface on side 10 cm $\times$ 4 cm, will the pressure increase, decreases or remain the same? [3]

Question 6
(a) A body covers a distance 's' in time 't' as follows:

t(s)	0	2	5	10	12	15	20
s(m)	0	4	10	10	8	5	0

   Plot s-t graph. Determine the displacement of the body at time
   (i) 7 s and (ii) 13 s. [3]
(b) A scooter initially at rest picks up a velocity of 20 m/s over a distance of 40 m. Calculate acceleration and time in which it attains the velocity of 20 m/s. [3]
(c) A person takes 4 minutes to go straight to a certain point which is 10 m from his starting point. He stays there for 2 minutes and again comes back to his reference point in 6 minutes. Draw distance-time graph. What is total displacement? [4]

Question 7
(a) Two bodies P and Q are of the same mass but are moving with velocities of v and 5v respectively. Compare their inertia and momentum. [4]
(b) Calculate hydrostatic pressure at a depth of 1500 cm in sea water of density 1030 kg/m^3. Take g = 10 m/s^2. Express your answer in SI unit and also in bar. [3]
(c) Draw a diagram for a spring balance and explain how it is used to measure the weight of a body. [3]

Question 8
  (a) What do you mean by a freezing mixture? Explain. [3]
  (b) Write two differences between renewable and non-renewable resources. [3]
  (c) [4]
     i. Describe briefly two adverse consequences of anomalous expansion of water.
    ii. A tiles-floor feels very cold to bare feet in winter but a carpet in the same room feels comfortably warm. Why is this?

Question 9
  (a) A ray of light AB is inclined on a plane mirror M_1M_2 at an angle of $70°$ from the mirror. The mirror turns through an angle of $10°$ in the clockwise direction. Draw the ray diagram showing the new reflected ray and determine the angle between the incident ray and the final reflected ray. [3]
  (b) If you hold a concave mirror in your hand and direct the reflected sunlight continuously on a piece of paper, [3]
     i. What will you observe after sometime?
    ii. Can you perform this activity with a convex mirror?
    iii. What is the relation between the radius of curvature and the focal length of this mirror?
  (c) [4]
     i. Write any two uses of convex mirrors.
   ii. Define wave motion. Give its characteristics.

Question 10
  (a) The given diagram shows a metal rod mounted on an insulated stand. The cap of an uncharged electroscope touches one end B of the metal rod. A negatively charged polythene rod is brought near the other end A of the metal rod. [3]
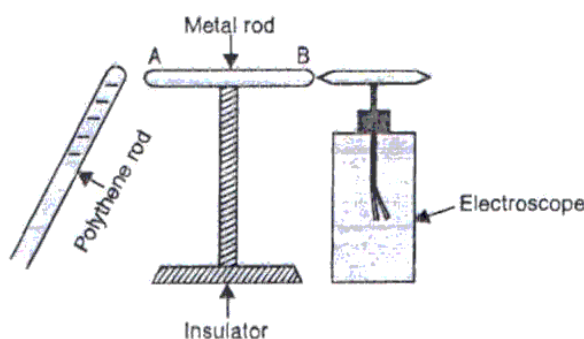

     i. What charge will the end A have?
    ii. What charge will the end B have?
    iii. What charge will the cap of the electroscope have?
    iv. What charge will the gold leaves have?
    v. Will the leaves diverge or collapse? Give reasons.
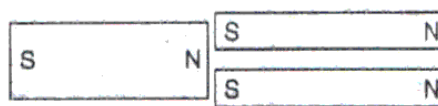   vi. If the electroscope is now earthed, what charge will the metal rod have?

(b) In the given electric circuit diagram, labeling of different parts as A, B, C, D, E and F is
done. State the name of each part. [3]
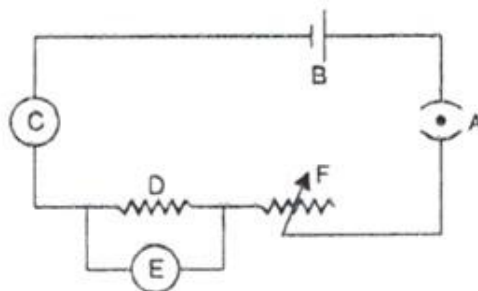
(c) [4]

i. If a magnet is carefully broken into two pieces as shown in diagram (1), how hoes
the magnetic strength of each piece compare with that of the original magnet?
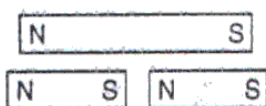
(1)   (2)

ii. If another magnet is carefully broken in half along its long axis, as shown in
diagram (2), how would the strength of each piece be compared with that of the
original magnet?

iii. Since every iron atom is a tiny magnet, why are not all iron bars magnets?