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 [ ].

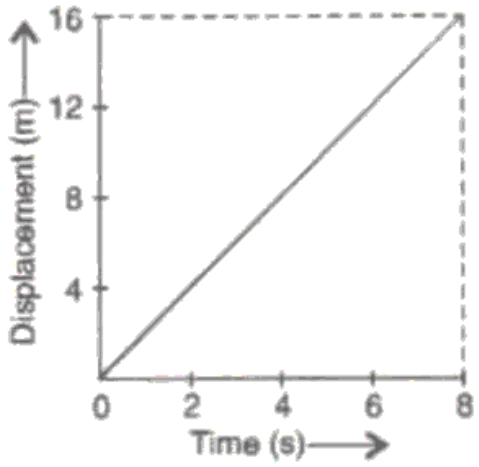
SECTION I (40 Marks)
Attempt *all* Questions from this Section

Question 1

(a) State the essential properties of a unit. [2]

(b) Which phenomenon is used to measure time? Give two examples. [2]

(c) Draw the velocity-time graph for the displacement-time graph shown in the figure. [2]



(d) The rate of change of momentum of a body is 3 kg ms^{-2}. What is the force acting on the body? [2]

(e) How will you forecast the gradual and sudden rise in the atmospheric pressure with the help of a barometer? [2]

Question 2

(a) Define gravity. [2]

(b) One atmospheric pressure is equal to how many Pascals? [2]

(c) You are given a body of mass 12 kg. Calculate the:

i. force exerted by the Earth on the body and

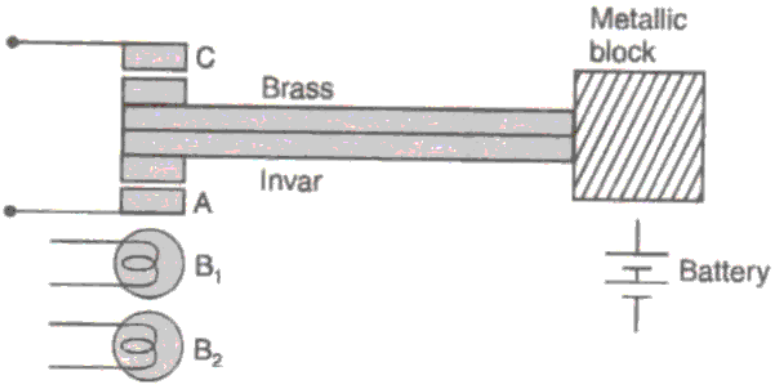
ii. force exerted by the body on the Earth. Take g = 10 N/kg. [2]

(d) A brass cork is fitted in the hole of an iron plate. To loosen the cork, will you heat it or cool it? [2]

(e) If an electric fan is switched on in a closed room, will the air of the room be cooled? If not, why do we feel cold? [2]

Question 3

(a) Copy the given diagram of bimetallic strip, battery and two bulbs- B_1 and B_2. Complete the electric circuit such that B_1 glows when temperature falls 20°C below the room temperature and B_2 glows when temperate rises 50° C above the room temperature. [2]



(b) Why is a vessel containing liquid heated from the bottom and not from its upper surface? [2]

(c) In the given figure three arrows are targeted towards a deer. Will they hit the deer? If yes, where is the deer? [2]

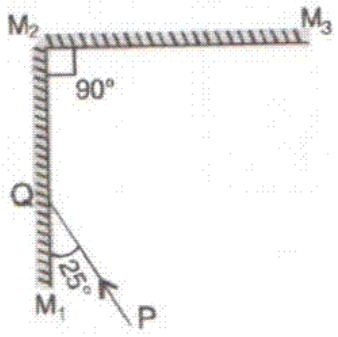
(d) You are able to read a book because of the light that it reflects but you are not able to see even a faint image of yourself in the book. Explain why? [2]

(e) Which mirror is used as a reflector in street lamps? Explain why. [2]

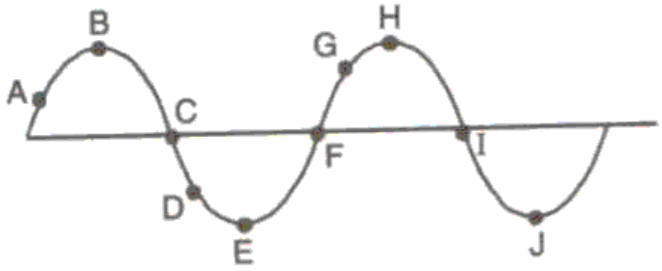
Question 4

(a) Mention the necessary conditions for a transverse wave to travel in a medium. [2]

(b) Two plane mirrors are kept at 90° to each other as shown in the figure. The ray PQ is incident on the mirror M_1 M_2 at an angle of 25°. Draw the path of reflected ray. [2]



(c) Waves are produced in a long string by attaching its free end to a vibrating tuning fork. From the figure given below, name the pair of points which are in the same phase. [2]



(d) It is known that the Earth's core contains iron; yet, it cannot be regarded as the source of Earth's magnetism. Why? [2]

(e) Why is copper used for manufacturing of wires which are used for electrical purposes? [2]

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

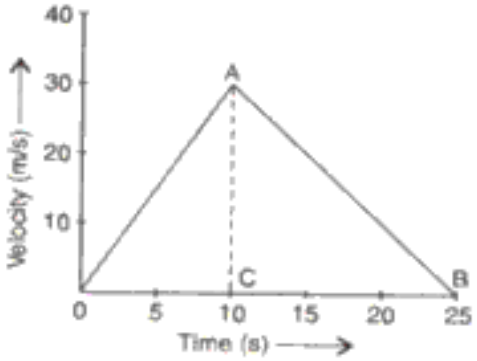
Question 5

(a) A piece of brass (an alloy of copper and zinc) weighs 12.9 g in air. When completely immersed in water, it weighs 11.3 g. What is the volume of copper contained in the alloy?
R.D. of copper and zinc are 8.9 and 7.1 respectively. [4]

(b) What do you mean by the least count of a vernier caliper? When does a vernier caliper have positive and negative zero error? [3]

(c) What is second's pendulum? Two pendulums P and Q have lengths 200 cm and 50 cm respectively. Which pendulum will make more oscillations per minute and why? [3]

Question 6



(a) Given figure shows velocity-time graph of a car moving along a straight line from 0 to 25 s. Calculate the [4]

i. acceleration of the car.
ii. retardation of the car.
iii. maximum velocity of the car.
iv. initial velocity of the car.
v. final velocity of the car.
vi. distance covered by the car in first 10 s.
vii. distance covered by the car in last 15 s.
viii. average velocity of the car.

(b) A body starts from rest and moves with a constant acceleration 'a'. Prove that the distance travelled by the body in a certain time varies directly with the square of the time. [3]

(c) Define speed and velocity.
Can a body be at rest as well as in motion at the same time? [3]

Question 7

(a) Two bodies P and Q are of mass m and 5m and velocity 5v and v respectively. Assuming bodies are moving with uniform velocities, compare their inertia, momentum and the force required to stop them. [3]

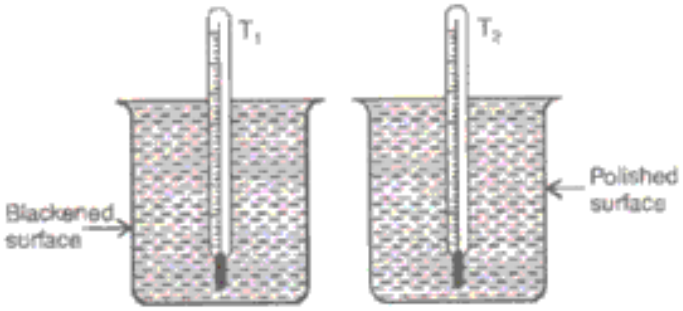
(b) Why can a horse not pull a cart and run in empty space? [3]

(c) In the news, you are hearing about dying of polar bears and melting of ice. How real is the threat of climate change in Polar Regions? [4]

Question 8

(a) Two identical cans containing equal quantities of water are placed in the sun. One can is blackened but the other has a bright polished surface. Which thermometer will record a higher temperature and why?

The cans are then shifted in a room. Which thermometer will record a lower reading after 15 minutes and why? [4]



(b) Mention three characteristics of heat radiations. [3]

(c) Energy flow in the ecosystem is governed by the laws of thermodynamics. State the laws of thermodynamics. [3]

Question 9

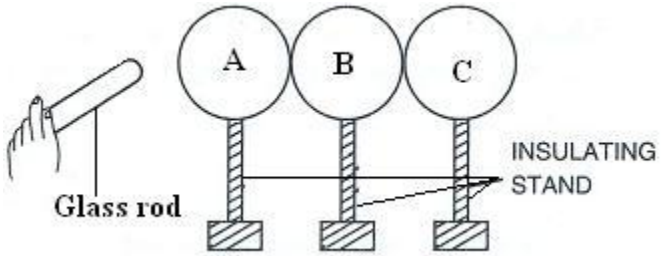
(a) Define radius of curvature. Show that radius of curvature of a concave mirror is twice its focal length. [3]

(b) Two plane mirrors are placed at right angles to each other. A ray strikes one mirror at an angle of incidence θ such that, it is reflected from the second mirror. Show that for any value of θ, the ray reflected from the second mirror is parallel to that incident on the first mirror, but opposite in direction. [4]

(c) Define wavelength of a wave in three different ways. [3]

Question 10

(a) Three identical metal spheres A, B and C are supported on insulated stands and placed in contact as shown in the figure. A glass rod G is rubbed with silk and it is kept near the sphere A. [4]



i. With the help of a proof plane, the charge on A, B and C is tested. What charge will there be on A, B and C?

ii. The sphere C is earthed momentarily and then the glass rod is removed. What charge will there be on each sphere?

iii. In the presence of glass rod, sphere C is moved away; so, its contact from B is broken and then, B is also moved away. What charge will there be on each sphere?

iv. If the glass rod is made to touch the sphere A in the above cases, how will each of the above observations change?

(b) [3]

i. Draw a labeled diagram of a simple voltaic cell.

ii. Name two major defects in the above cell.

iii. What is the e.m.f. of the above cell?

(c) Metal bars are brought near each pole of a compass needle in turn. Complete the following table: [3]

Nature of bar	Action on compass needle	
	North pole	South pole
Non-magnetic	No action	No action
……..	Attracted	Attracted
North pole of a bar magnet	……	……
……..	Attracted	Repelled