ST. JOSEPH'S COLLEGE, PRAYAGRAJ
FINAL EXAMINATION 2024
CLASS – IX

Time: 2 Hrs **SUBJECT- PHYSICS** **Max. Marks: 80**

Instructions: *You will not be allowed to write during first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this Paper is the time allowed for writing the answers.* ***Section A*** *is compulsory. Attempt* ***any four*** *questions from* ***Section B****. The intended marks for questions or parts of questions are given in brackets. [ ]*

SECTION 'A' [40 marks]
[Attempt all questions from this Section]

Question 1

Choose the correct answer to the questions from the given options: **[15]**

(i) The slope of a displacement-time graph represents:
(a) uniform speed (b) non-uniform speed
(c) uniform velocity (d) uniform acceleration

(ii) A force acts on a body of mass 3 kg such that its velocity changes from 4 ms^{-1} to 10 ms^{-1}. The change in momentum of the body is:
(a) 42 $kgms^{-1}$ (b) 2 $kgms^{-1}$ (c) 14 $kgms^{-1}$ (d) 18 $kgms^{-1}$

(iii) The pressure exerted by 50 kg ($g = 10\ ms^{-2}$) on an area of cross-section of 2 m^2 is:
(a) 50 Pa (b) 200 Pa (c) 250 Pa (d) 1000 Pa

(iv) The ratio between the mass of a certain volume of a substance and the mass of an equal volume of water at 4^0C is called:
(a) relative density (b) density (c) weight (d) pressure

(v) A ray of light is incident on a concave mirror. If it is parallel to principal axis, the reflected ray will:
(a) pass through its principal focus (b) pass through its centre of curvature
(c) pass through its pole (d) retraces its path

(vi) If the frequency of a wave is 25 Hz, the total number of compressions and rarefactions passing through a point in 1 second is:
(a) 25 (b) 50 (c) 100 (d) none of these

(vii) The force between the two charges is _____ when they are at an infinite separation.
(a) finite (b) infinite (c) zero (d) none of these

(viii) Select the best insulator among the following:
(a) Pure water (b) Human body (c) Aluminium (d) Mercury

(ix) The place around a magnet where its influence can be detected is called:
(a) magnetic lines of force (b) magnetic pole
(c) magnetic field (d) magnetic space

(x) The fundamental unit is:
(a) Newton (b) Pascal (c) Hertz (d) second

(xi) A simple pendulum is made by suspending a bob of mass 1 kg by a string of length l. Now if the length of this pendulum is increased to 4 l, then its time period T will:

(a) remain the same (b) become twice
(c) become four times (d) become half

(xii) An athlete often runs before taking a long jump. This is an example of:

(a) Newton's first law (b) inertia of rest
(c) inertia of motion (d) both (a) and (c)

(xiii) For relation $F = m\frac{\Delta v}{\Delta t}$ to hold true, the condition(s) necessary is/are :

(a) velocities are equal to the velocity of light.
(b) velocities are much smaller than the velocity of light.
(c) mass remains constant.
(d) both (b) and (c).

(xiv) **Assertion**: When a body is immersed fully or partially immersed in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it.

Reason: The magnitude of the buoyant force is depending on the density of the fluid.

(a) Both assertion and reason are correct, and reason is the correct explanation for assertion.
(b) Both assertion and reason are correct, and reason is not the correct explanation for assertion.
(c) Assertion is true but reason is false.
(d) Both assertion and reason are false.

(xv) The most non-polluting and efficient lighting device is:

(a) CFL (b) Fluorescent light (c) LED (d) Electric bulb

Question 2

(i) (a) A boy stands 4m away from plane mirror. If the boy moves $\frac{1}{2}$ m towards mirror, what is now the distance between the boy and his image? Give a reason for your answer. [3]

(b) State the laws of reflection.

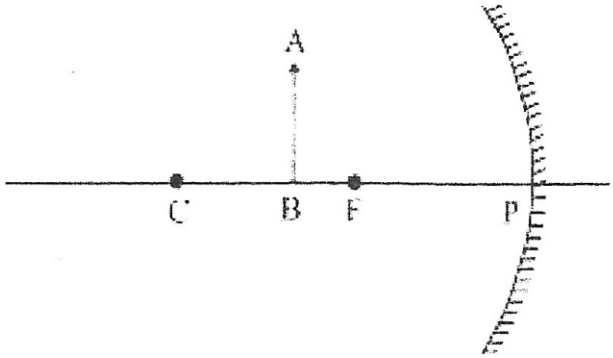
(ii) An electric tuning fork completes one oscillation in 0.000125 s. Calculate the frequency of tuning fork. Will the sound emitted by tuning fork be audible? Give a reason. [2]

(iii) State and define the S.I. unit of electric current. [2]

(iv) Draw diagrams showing the arrangement of the lines of force for: [2]

(a) a single magnet.
(b) two magnets in line, with unlike poles facing one another.

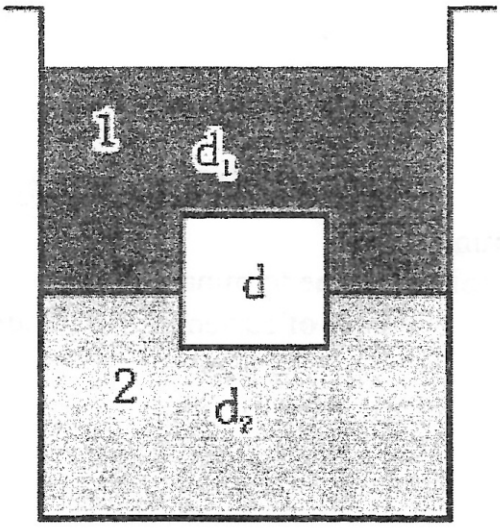
(v) Copy the figure given below. By taking two rays from point A, show the formation of image. State the characteristics of the image formed. [2]



(vi) (a) What do you mean by anomalous expansion of water? [2]
(b) Name the radiations which are absorbed by the green house gases.
(vii) (a) What physical quantity is measured in bar? [2]
(b) How is the unit bar related to the S.I. unit pascal?

Question 3

(i)'The resistance of a wire is 1 ohm'. Explain the meaning of this statement. [2]
(ii) A metal piece weighs 200 gf in air and 150 gf when completely immersed in water. Calculate the relative density of the metal piece. [2]
(iii) If d_1, d_2 and d are the densities of liquid1, liquid 2 and solid respectively. Compare: (a) the densities of d_1 and d_2 (b) the densities d_2 and d [2]

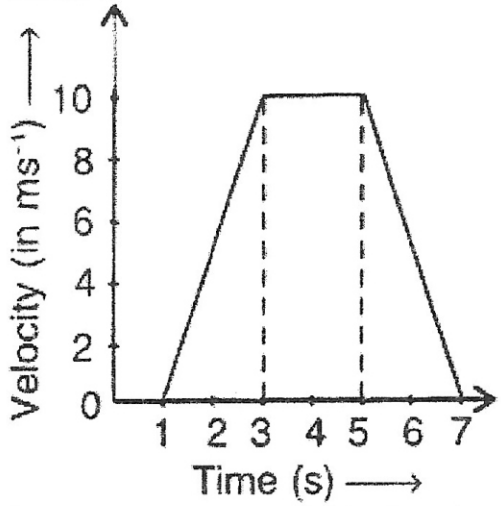


(iv) State two ways through which the strength of an electromagnet can be increased. [2]
(v) At what distance in front of a concave mirror of focal length 10 cm, an object be placed so that its real image of size five times that of the object is obtained? [2]

SECTION 'B' [40 MARKS]
(Attempt any four questions from this Section)

Question 4

(i) In the velocity-time graph shown below, find the ratio of the distance travelled by the object in the last 2 s and the distance travelled in 7 s. [3]



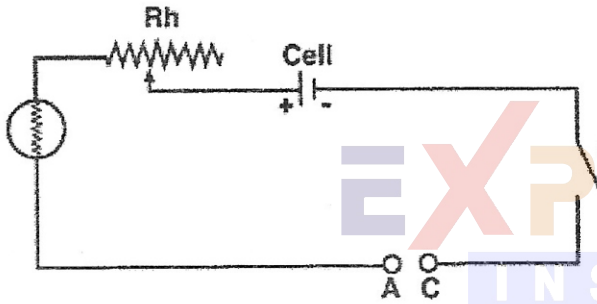
(ii) Define: (a) Density (b) Radius of curvature (c) Induced magnetism [3]

(iii) (a) A wave has amplitude equal to 8 cm and the wavelength of 2 m. The frequency of the wave is 150 Hz. [4]
(i) Draw the graph of the wave representing displacement and distance.
(ii) Calculate its velocity.
(b) What energy transformation takes place in an electric bell?

Question 5

(i) (a) What is an artificial magnet? State two reasons why do we need artificial magnets. [3]
(b) Can two magnetic field lines intersect each other? Give reason to your answer.

(ii) (a) Complete the circuit given in figure below by inserting between the terminals A and C, an ammeter. [3]
(b) In the diagram mark the polarity at the terminals of ammeter and indicate clearly the direction of flow of current in the circuit, when the circuit is complete.
(c) Name and state the purpose of **Rh** in the circuit.



(iii) An object is placed at a distance of 15 cm in front of a convex mirror of radius of curvature 10 cm. [4]
(a) Where will the image form?
(b) Find the magnification m.
(c) What will be the nature of image, real or virtual?

Question 6

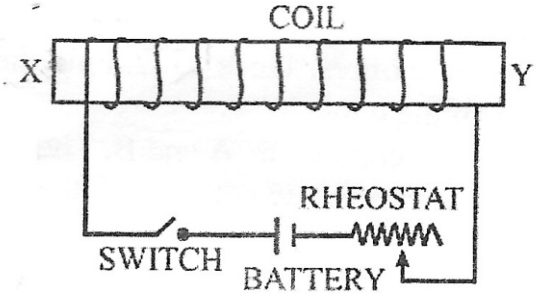
(i) (a) Explain the motion of a rocket with the help of Newton's third law. [3]
(b) How does acceleration vary with the force applied for a given body? Show it with the help of a graph.

(ii) (a) Name two substances which contract on heating. [3]
(b) Why does our nose start bleeding on high mountains?

(iii) (a) An object is placed (i) asymmetrically (ii) symmetrically, between two plane mirrors inclined at an angle of 50^0. [4]
Find the number of images.
(b) State the direction of incident ray which after reflection from a spherical mirror retraces its path. Give a reason to your answer.

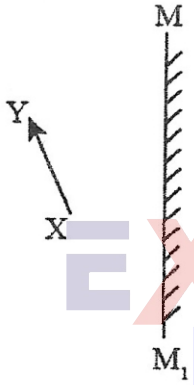
Question 7

(i) The figure given below shows a coil wound around a soft iron bar XY. [3]
State the polarity at the ends X and Y as the switch is pressed.
Give reason for your answer.



(ii) A particle initially at rest, moves with an acceleration 5 ms^{-2} for 5 s. [3]
Find the distance travelled in
(a) 4 s (b) 5 s and (c) 5^{th} second.

(iii) (a) The diagram below shows an object XY in front of a plane mirror MM_1. Draw on the diagram, path of two rays from each point X and Y of the object to show the formation of its image. [4]



(b) How do the following factors affect, if at all, the speed of sound in air:
(i) frequency of sound, (ii) moisture in air?

Question 8

(i) (a) An average person can hear sounds of frequencies in the range _____ to _____. [3]

(b) The sound of an explosion on the surface of a lake is heard by a boat man 100 m away and by a diver 100 m below the point of explosion.

(i) Who would hear the sound first: boat man or diver? Give reason.

(ii) If sound takes time t to reach the boat man, how much time approximately does it take to reach the diver?

(ii) (a) Define least count of a vernier callipers. [3]

(b) 'The value of g remains same at all places on the earth surface'. Is this statement true? Give reason for your answer.

(iii) (a) A body of mass 3.5 kg displaces 1000 cm^3 of water when fully immersed inside it. Calculate: [4]

(i) the volume of body

(ii) the upthrust on body and

(iii) the apparent weight of body in water.

(b) What is the direction of velocity of an object moving in a circular path?

Question 9

(i) (a) Differentiate between uniform acceleration and variable acceleration. [3]

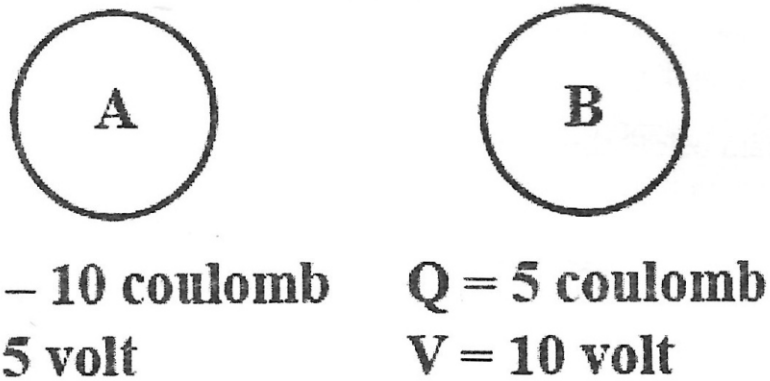
(b) A source of wave produces 40 crests and 40 troughs in 0.4 s. What is the frequency of the wave.

(ii) (a) A current 0.2 A flows in a wire of resistance 15 Ω. Find the potential difference across the ends of the wire. [3]

(b) Figure given below shows two conductors A and B. Their charges and potentials are given in the diagram. State with reason the direction of

(i) flow of electrons, and

(ii) flow of current, when both the conductors are joined by a metal wire.



(iii) (a) Give two differences between primary cell and secondary cell. [4]

(b) (i) What conclusion is drawn regarding the magnetic field at a point if a compass needle at that point rests in any direction?

(ii) Give reason for your answer.

**********ALL THE BEST**********