



DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2024-2025
FINAL EXAMINATION

CLASS: IX
SUBJECT: PHYSICS [SET A]

FULL MARKS: 80
TIME: 2 HOURS

Candidates are allowed additional 15 minutes for only reading the paper.

They must NOT start writing during this time.

The intended marks for questions or parts of questions are given in brackets []

Section A is compulsory. Attempt any four questions from Section B

This paper consists of six printed pages

SECTION A

Question 1

[15 × 1 = 15]

Choose the correct answers to the questions from the given options:

(i) In which of the following pairs, are symbol of unit and quantity not correctly matched?

(a) Momentum - kgms^{-1}

(b) Energy - $\text{kgm}^2\text{s}^{-1}$

(c) Density – kgm^{-3}

(d) Pressure - $\text{kgm}^{-1}\text{s}^{-2}$

(ii) Assertion(A) : A quick collision between two bodies is more violent than a slow collision, even when the initial and the final velocities are identical.

Reason(R) : The rate of change of momentum determines the force.

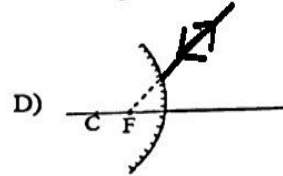
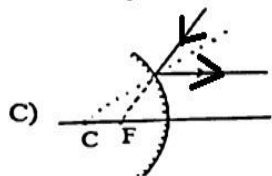
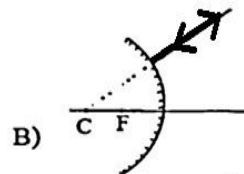
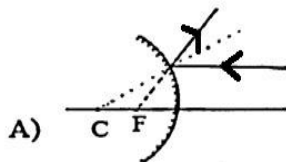
(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, and R is not the correct explanation of A.

(c) A is true, but R is false.

(d) A is false, but R is true.

(iii) Choose the incorrect diagram.



(a) A

(b) B

(c) C

(d) D

(iv) A body will experience minimum upthrust when it is completely immersed in

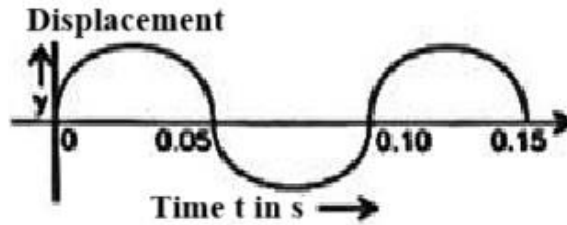
(a) water

(b) mercury

(c) turpentine

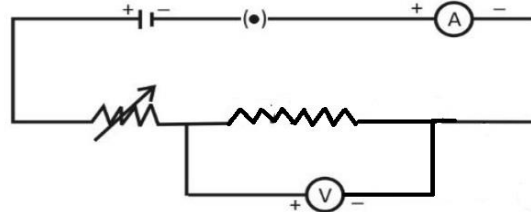
(d) glycerine

- (v) The following diagram shows displacement-time graph of a wave travelling in a string with velocity 20 ms^{-1} .



The value of wavelength is

- (a) 1 m (b) 1.5 m (c) 2m (d) 2.5m
- (vi) Assertion(A) : On a rainy-day sound travels slower than on a dry day.
Reason(R): When moisture is present in the air, the density of air decreases
- (a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.
- (vii) In a uniform magnetic field, the field lines are
- (a) curved and converging (b) parallel equidistant straight lines
(c) parallel but non-equidistant straight lines (d) curved and diverging
- (viii) For the reflector of a torch and a streetlight, the preferred mirrors are
- (a) convex, convex (b) concave, concave (c) convex, concave (d) concave, convex
- (ix) To determine the resistance of a resistor, a student arranged the circuit components as shown in the diagram. However, he did not succeed to achieve the objective.
Which of the following mistakes he has committed in setting up the circuit?

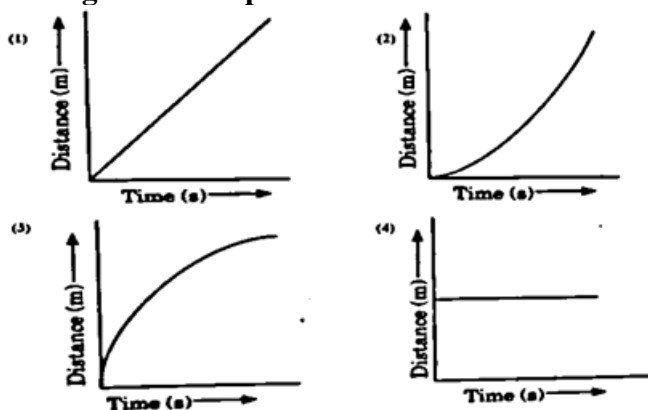


- (a) position of voltmeter is incorrect
(b) position of ammeter is incorrect
(c) terminals of voltmeter are wrongly connected
(d) terminals of ammeter are wrongly connected
- (x) If n electrons pass through any cross-section of a conductor in time t , the current in conductor I is (the symbols represent usual meanings)
- (a) et/n (b) $n.e.t$ (c) ne/t (d) nt/e
- (xi) A ray of light incidents on a plane mirror at an angle 60° with the mirror. The deviation produced in the ray is
- (a) 30° (b) 60° (c) 90° (d) 120°

- (xii) In reflection from plane mirror, if the angle of incidence is plotted along X axis and angle of reflection is plotted along Y axis, the nature of the graph will be
- a straight line parallel to X-axis
 - a straight line parallel to Y-axis
 - a curve with increasing slope
 - a straight line passing through the origin and making an angle 45° with the X-axis

- (xiii) The distance through which a compression or a rarefaction travel in unit time gives
- density of sound wave
 - speed of sound
 - wavelength of sound
 - frequency of sound

- (xiv) Choose the figure that represents uniform motion of an object.

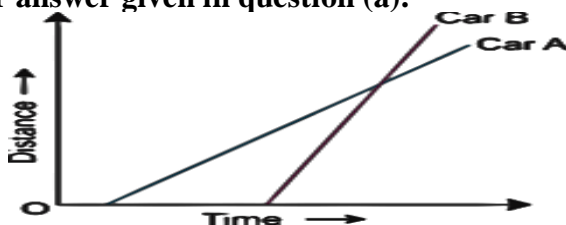


- (a) 1 (b) 2 (c) 3 (d) 4

- (xv) The planet that experiences the strongest gravitational force at its surface in our solar system is
- Jupiter
 - Mars
 - Earth
 - Mercury

Question 2

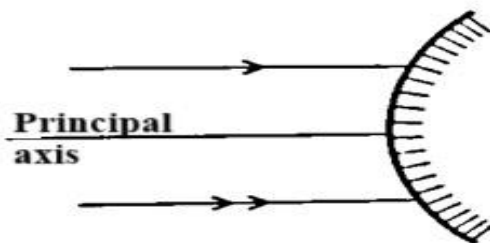
- (i) Complete the following by choosing the correct answers from the bracket: [6]
- Primary cells provide current as a result of _____ [reversible/irreversible] chemical reaction and secondary cells provide current as a result of _____ [reversible, irreversible] reaction.
 - The volume of ice _____ [increases/decreases/remains same] when ice melts.
 - A boy is enjoying a ride on a merry-go-round, which is moving with a constant speed 5 ms^{-1} . The boy is _____ [at rest/moving with uniform velocity/moving with acceleration].
 - The unit of physical quantity obtained from the area of acceleration-time graph is _____ [$\text{ms}^{-1}/\text{ms}^{-2}/\text{ms}^{-3}$].
 - The unit in which distance is not expressed is _____ [steradian/light year/fermi].
- (ii) The distance-time graphs of two cars A and B are shown below. [2]
- Which car is moving faster?
 - Justify your answer given in question (a).



- (iii) One end of a long iron pipe is stuck by a hammer. [2]
 (a) How many times the sound will be heard at the other end?
 (b) Justify your answer.

Question 3

- (i) Differentiate between reflection by a plane mirror and that by the white board in a classroom. [2]
 (ii) Complete the following ray diagram to show the formation of the image. [2]



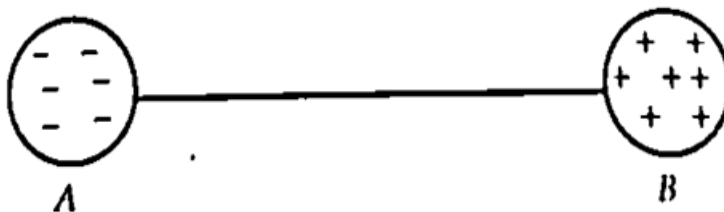
- (iii) State any two ways to minimize the emission of greenhouse gases. [2]
 (iv) 25 J and 30 J of work are done when 5 C of charge is moved from infinity to point A and point B respectively. Calculate the potential difference between the points A and B. [2]
 (v) Why does a person drawing water from a well, fall backward, when the rope snaps. [2]
 (vi) In which gas, Helium or Sulphur dioxide the speed of sound is more? Justify. [2]
 (vii) A solenoid is a type of electromagnet formed by a helical coil of wire, wound around a soft iron bar whose length is substantially greater than its diameter. The bar exhibits magnetic properties when an electric current flows through the solenoid. The magnetic field so produced is very similar to the magnetic field produced by a bar magnet. [3]
 (a) Name the material used to make loops around the bar.
 (b) Mention any one way to increase the strength of an electromagnet.
 (c) Why is soft iron preferred to make an electromagnet?

SECTION B

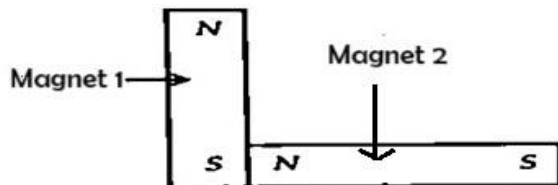
(Attempt any four questions)

Question 4 [3+3+4]

- (i) (a) 5 A of current is flowing in a conductor for 4 s through a potential difference of 3 V. Calculate the work done in the process.
 (b) State the direction of current flow in the following diagram.



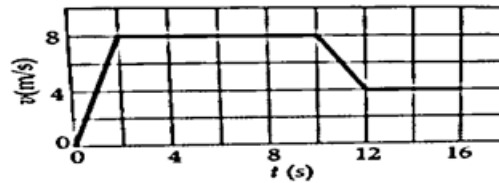
- (ii) (a) Draw magnetic field lines for the combination of two magnets as shown in the following diagram.



- (b) How will a needle magnet orient itself when placed at neutral points?

(iii) With reference to the following diagram answer the following:

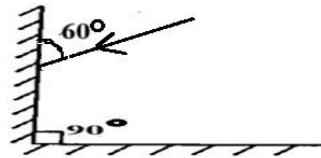
- (a) Acceleration
- (b) retardation
- (c) distance travelled in first 8 s.



Question 5

[3+3+4]

- (i) A wave pulse of frequency 200 Hz, on a string moves a distance 8 m in 0.05 s. Determine:
 - (a) the speed of the pulse.
 - (b) the wavelength of wave on string.
 - (c) the nature of the wave - transverse or longitudinal.
- (ii) Copy and complete the diagram below. Show all the angles of incidence and reflection as relevant in the diagram.

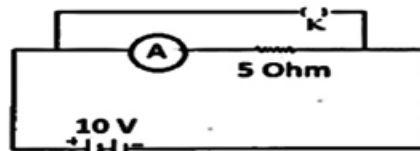


- (iii) An object of height 20 cm is kept at a distance of 48 cm in front of a mirror of focal length 12 cm. If the mirror forms virtual and diminished image of the object then determine:
 - (a) image distance.
 - (b) size of the image.

Question 6

[3+3+4]

- (i) (a) What will be the reading of the ammeter when the key is
 - i. closed?
 - ii. open?



- (b) Define 1 ohm resistance.
- (ii) (a) Why do the vegetable and fruits get damaged in extreme frost?
 - (b) A deep pond of water has its top layer frozen. What will be the likely temperature of the layers:
 - i. just in contact with ice?
 - ii. at the bottom of the pond?
- (iii) A block of wood of volume 30 cm^3 floats in water with 10 cm^3 of its volume above the surface of water.
 - (a) Calculate the density of the block.
 - (b) Determine the weight of the block in newton.

Question 7

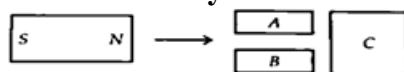
[3+3+4]

- (i) (a) A weight of 800 N is balanced on piston of area 300 cm^2 by applying a force of 16 N on the piston of smaller area. Find the area of the smaller piston.
 - (b) "A hydraulic machine acts as a force multiplier." Justify.

(ii) A bar magnet is shown in the figure.

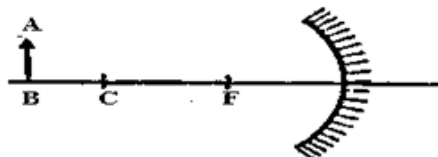
(a) Redraw the diagram and mark the polarities formed on the parts A, B and C.

(b) Define the phenomenon that you have used to determine the polarities.



(iii) (a) Copy and complete the following ray diagram to obtain the image of an object AB.

(b) Mention the nature of the image.



Question 8

[3+3+4]

(i) (a) The speed of sound in air and water are 340 ms^{-1} and 1500 ms^{-1} respectively.

i. How much time will it take to cover a distance of 680 m in air?

ii. How much distance will it cover in the same time in water?

(b) Mention one property that a medium must have for sound to propagate through it.

(ii) (a) Does image formed by curved mirrors suffer lateral inversion? Justify your answer.

(b) What is the maximum distance of image formed by a convex mirror from pole?

(iii) A body is thrown upward with an initial velocity of 9.8 ms^{-1} .

(a) What is the speed and direction of motion after 2 s?

(b) Find the maximum height to which the body will rise. [Take $g = 9.8 \text{ ms}^{-2}$]

Question 9

[3+3+4]

(i) Derive the equation $S = ut + \frac{1}{2}at^2$ graphically for a uniformly accelerated motion.

(ii) We take a glass tumbler and place a thick square card on its mouth. A coin is then placed above this card in the middle. On flicking the card hard with our fingers, the card moves away but the coin drops into the glass tumbler. Answer the following question based on this paragraph.

(a) Give reasons for the above observation.

(b) State the law of motion that justifies the above observation.

(iii) A ball is initially moving with a velocity 0.5 ms^{-1} . The velocity of the ball decreases at a rate of 0.05 ms^{-2} . Answer the following questions with reference to this statement.

(a) How long will it take to stop?

(b) How far the ball can travel before it stops?

(c) Represent the journey of the object by drawing a velocity-time graph.