

Annual Examination 2023-2024

Class- IX

Physics

Marks- 80

Time- 2:00 hours.

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 Choose the correct option from the below given questions.

[10]

- a) Which of the following is not the unit of time
i) light year. ii) second. iii) minute. iv) hr
- b) The slope of velocity time graph determines
i) velocity. ii) displacement. iii) acceleration. iv) time
- c) "To every action there is an equal and opposite reaction" is
i) 1st law. ii) 2nd law. iii) 3rd law of Newton iv) none of these
- d) The magnetic field lines inside the magnet moves from
i) North to South. ii) South to North. iii) not present inside the magnet. iv) none of these
- e) Ammeter is used to measure
i) current. ii) voltage. iii) deflection. iv) none of these
- f) The unit of relative density is
- g) The least count of screw gauge is
- h) If the focus of convex lens is 10cm it's radius of curvature is.....
- i) With increase in temperature the speed of sound
- j) The total pressure inside a sea at a depth h is

Question 2

- (a) A block of wood floats in brine solution of density 1.15 gcm^{-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 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 the 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. 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 degree.

Draw a ray diagram to show the path of the ray reflected from the three mirrors successively. [2]

Question 4

- (i) 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 'T²' 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 $(1/60) \text{ h}$ and reaches the starting point. Calculate, [4]
 i. The distance covered by athlete
 ii. The displacement
 iii. The average speed and
 iv. 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

- i. Plot the velocity-time graph.
 ii. 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]
 i. The velocity of a body is continuously changing. Can its speed remain constant?
 ii. If the speed is changing, can the velocity of a body remain constant?
 iii. Is it possible for a body to have a constant speed in accelerated motion?

(c)

- i. 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? [3]
- ii. State two circumstances under which your weight would become zero?

Question 8

(a)

- i. What is second's pendulum? What is its approximate effective length? [4]
- ii. A second's pendulum is setup 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.

(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)

- i. Obtain a relation between the velocity, the wavelength and the frequency of the wave. [4]
- ii. Distance between the third and the eighth rarefaction is 50 cm. Calculate the wavelength of the wave.

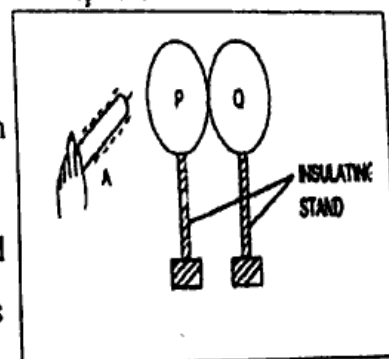
Question 10

(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 [3]

Q. Both the spheres stand on separate insulating stands.

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.



(b) State three factors on which the resistance of a wire depends. [3]

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?