



ST. JOSEPH'S COLLEGE, PRAYAGRAJ
HALF YEARLY EXAM – OCTOBER 2023

PHYSICS

Class IX

Time: 2:00 Hrs.

M.M.: 80

Answers to this Paper must be written on the paper provided separately.

*You will **not** be allowed to write during the 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

(Attempt all questions from this section)

Question 1

Choose the correct answers to the questions from the options.

[1×15]

(Do not copy the question, write the correct answers only).

- (i) Pressure inside a liquid does not depend on
 - a) Depth
 - ☒ b) Area of surface on which acts
 - c) Density of liquid
 - d) Acceleration due to gravity.
- (ii) In hydraulic machine the two Pistons are of area of cross section in the ratio 1:10 wh force is needed on the narrow piston to overcome a force of 100 Newton on the wider piston.
 - ☒ a) 10N
 - b) 20N
 - c) 100N
 - d) None of these
- (iii) Greater the iceberg inside the sea is the upthrust acting on it
 - ☒ a) Greater
 - b) Lesser
 - c) Equal
 - d) None of these
- (iv) It is difficult for a person to sit on the floor of a swimming pool because of
 - a) His weight
 - b) Water being cold
 - ☒ c) Buoyant Force
 - d) Pressure acting on him
- ☒ (v) For a body floating in a vertical position it's centre of buoyancy
 - ☒ a) Lies below the centre of gravity of the body
 - b) Lies above the centre of gravity of the body
 - c) Coincides with the centre of gravity of the body
 - d) None of these
- (vi) The pressure P_1 at the top of a dam and P_2 at a depth h from the top inside water (density ρ) are related as
 - a) $P_1 > P_2$
 - b) $P_1 = P_2$
 - c) $P_1 - P_2 = h\rho g$
 - ☒ d) $P_2 - P_1 = h\rho g$
- (vii) Inertia is the measure of its
 - a) Weight
 - b) Density
 - c) Volume
 - ☒ d) Mass
- (viii) For a constant force, Acceleration is to the inertia of the body.
 - ☒ a) Directly proportional
 - b) Equal
 - c) Inversely proportional
 - d) Independent
- (ix) During basketball match the players dribble the ball using the:
 - ☒ a) Newton's first law
 - b) Newton's second law
 - c) Newton's third law
 - d) None of these

- (x) Assertion: An object may acquire acceleration even if it is moving at a constant speed.
Reason: with change in the direction of motion, an object can acquire acceleration
- Both assertion and reason are true and reason is the correct explanation of assertion.
 - Both assertion and reason are true but reason is not the correct explanation of assertion.
 - Assertion is true but reason is false.
 - Both Assertion and Reason are false
- (xi) Upthrust increases with
- Density of solid
 - Density of water
 - Density of fluid in which it is immersed
 - Density of vessel
- (xii) If a ray of light is incident normal to a plane mirror, the angle of incidence is equal to:
- 0°
 - 180°
 - 360°
 - 90°
- (xiii) On reflection through a plane mirror remains unchanged.
- Alphabet A
 - Alphabet O
 - Alphabet H
 - All of these
- (xiv) Light rays coming from the sun are
- Convergent beam of light
 - Divergent beam of light
 - Parallel beam of light
 - None of the above
- (xv) The incident ray and reflected ray are when the incident ray is perpendicular to the mirror surface.
- Parallel to each other
 - The same
 - The same but oppositely directed
 - Perpendicular to each other.

Question 2

- What will be the number of images formed if two mirrors are kept inclined to each other at angle 72° . [3]
 - What will be the property of image formed in case of convex mirror.
 - Why sea divers wear special suits while diving in deep waters?
- What are the two factors that affect upthrust? [2]
- Why a gas bubble grows when released from the bottom of the lake grown in size as it rises to the surface of the lake. [2]
- Why sportsman run some distance before taking a long jump. [2]
- What do you understand by acceleration due to gravity? What is its average value? [2]
- Name two factors that do not affect the time period of a simple pendulum. [2]
- With a help of a diagram, show that a concave mirror acts as a converging mirror [2]

Question 3

- Draw a neat labeled diagram showing pole, principal axis, focus and centre of curvature of a convex mirror. [2]
- Why does a hanging carpet get cleaned when beaten with a stick? [2]
- Calculate the pressure exerted by water at the bottom of a beaker. The depth of water is 45cm.
(take $g=10\text{m/s}^2$ and density of water= 10^3kg/m^3) [2]
- Explain Pascal's law of transmission of pressure in a liquid. [2]
- Why does a gas balloon rise up in the air? [2]

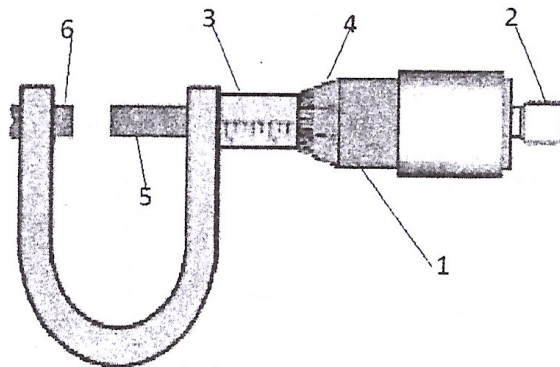
SECTION-B

[Attempt any four questions]

Question 4

- (i) How is the time period of a simple pendulum affected if
- The length is increased by 16 times?
 - The acceleration due to gravity is reduced to one-fourth?

[3]



- The amplitude of swing is decreased?
- (ii) Name the parts of screw gauge
- (iii) From the data given in the table, draw a displacement-time graph.

[3]

[4]

Time t (in s)	0	2	4	6	8	10
Distance move d S (in m)	0	10	20	30	40	50

From the graph Calculate (a) the average velocity,
(b) displacement at 5s, and (c) displacement between 5s and 9s.

Question 5

- (i) An object of mass 100kg is accelerated uniformly from a velocity of 5m/s to 8 m/s in 6s. Calculate the (a) final momentum, (b) rate of change of momentum and (c) magnitude of force applied.

[3]

What will you predict about the weather if the level of mercury in barometric tube-

[3]

- Falls suddenly
- Falls gradually
- Rises gradually

- (iii) (a) Distinguish between mass and weight.

[4]

- (b) A body is dropped from the top of a tower. It acquires a velocity 20 ms^{-1} on reaching the ground. Calculate the height of the tower. (Take $g = 10 \text{ ms}^{-2}$)

Question 6

- (i) A body of volume V and density d is completely immersed in a liquid of density d_1 . If g is the acceleration due to gravity, write expressions for the following:

[3]

- The upthrust on the body
- The loss in weight of the body
- The apparent weight of the body in the liquid.

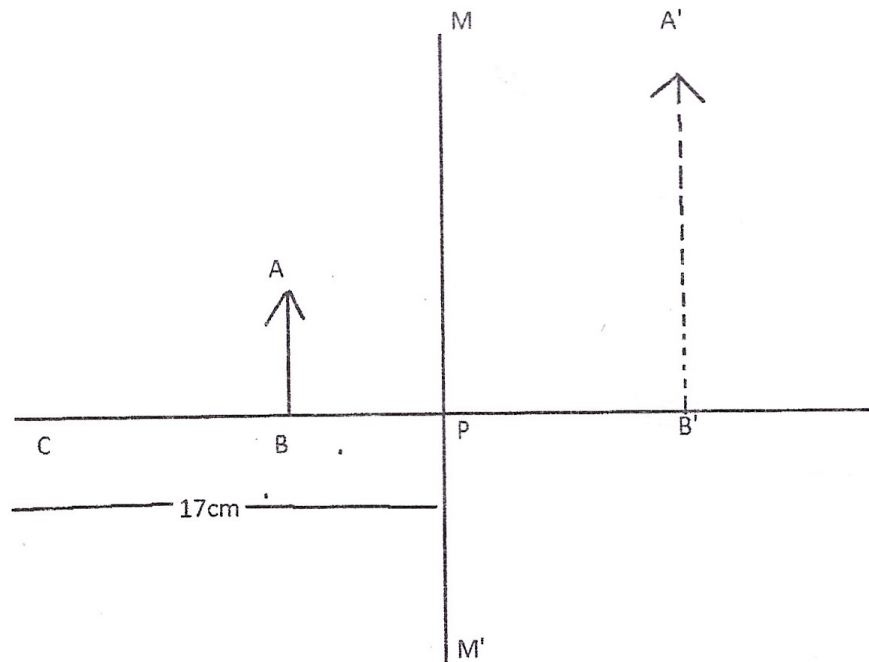
- (ii) Consider an object AB in front of a convex mirror with the centre of curvature at C. [3]
- Locate the focus F of the mirror
 - Using ray diagram, show the position of image formed
 - What is the nature and size of the image formed?
- (iii) Define: (a) Focal length (b) Relative density [4]
(c) Variable velocity (d) Real image

Question 7

- (i) Draw a ray diagram and get the image formed by a concave mirror when an object is kept beyond the centre of curvature at a finite distance. State the properties of the image formed. [3]
- (ii) (a) State Newton's second law of motion. [3]
(b) When a shot is fired from a gun, the gun gets recoiled. Explain.
- (iii) How the atmospheric pressure varies with height. Draw the graph for the variation of pressure with height. [4]

Question 8

- (i) The diagram below shows image formation A'B' of an object AB kept between pole (P) and focus (F) in a spherical mirror MM'. Identify the spherical mirror used and state the focal length of the spherical mirror. [3]



- (ii) How far should an object be held from a concave mirror of focal length 40cm so that a image is formed at a distance of 60 cm on the same side as object. [3]
- (iii) (a) Water is heated from 0°C to 10°C. How does the density of water change with temperature ? [4]
(b) A body of volume 100 cm³ weighs 1 kgf in air. Find:
(i) its weight in water and (ii) its relative density