

ICSE Board
Class VII Physics
Sample Paper – 2

Time: 2 hrs

Total Marks: 75

General Instructions:

1. **All** questions are **compulsory**.
2. Questions 1 to 15 carry one mark each.
3. Questions in 2A and 2B carry one mark each.
4. Questions in 3A and 3B carry one mark each.
5. Question in 4A and 4B carries one mark each.
6. Questions in 5A carry one mark each and 5B carry five marks.
7. Questions in 6 carry two marks each.
8. Question 7A and 7B carry ten marks in total.

Question 1

Choose the correct answer out of the four available choices given under each question. [15]

1. The relative density of a substance is expressed by comparing its density to the density of
(a) air
(b) mercury
(c) iron
(d) water

2. The time period of a 'seconds pendulum' is
(a) 1 sec
(b) 2 sec
(c) 1 min
(d) 2 min

3. When the Sun is behind you, your shadow will be
(a) behind you
(b) in front of you
(c) on your left side
(d) on your right

4. The intensity of sound is measured in
(a) joule
(b) decibel
(c) watt
(d) None of the above

5. The pupil of your eye is a net
(a) Absorber of radiant energy
(b) Emitter of radiant energy
(c) Both (a) and (b)
(d) None of the above
6. An object completes one round of a circle of radius 7 m in 20 seconds. The distance travelled after 10 seconds is
(a) 22 m
(b) 24 m
(c) 26 m
(d) 28 m
7. The electrode connected to the positive terminal of a battery is called the
(a) Anode
(b) Pole
(c) Cathode
(d) Photo diode
8. An echo of the sound produced can be heard only if it reaches our ear after
(a) $1/15^{\text{th}}$ of a second
(b) $1/13^{\text{th}}$ of a second
(c) $1/10^{\text{th}}$ of a second
(d) $1/5^{\text{th}}$ of a second
9. A mirror changes the _____ of light that falls on it.
(a) Direction
(b) Optical density
(c) Speed
(d) None of the above
10. Which one of the following types of surfaces is the best radiator and absorber of heat?
(a) white, silvery
(b) red, shiny
(c) dull, black
(d) polished, black

11. Name the instrument used to control current in an electric circuit.

- (a) Ammeter
- (b) Cell
- (c) Plug key
- (d) Rheostat

12. According to the laws of reflection,

- (a) $\angle i = \angle r$
- (b) $\angle i > \angle r$
- (c) $\angle r > \angle i$
- (d) $\angle i \neq \angle r$

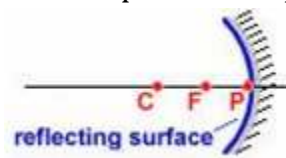
13. Radius of curvature of a concave mirror is always _____ to the mirror.

- (a) parallel
- (b) perpendicular
- (c) inclined at 60°
- (d) inclined at 45°

14. Cellophane paper is an example of

- (a) an opaque object
- (b) a translucent object
- (c) a transparent object
- (d) an luminous object

15. In the figure below, the distance between point P and point F is,



- (a) Centre of curvature
- (b) Radius of curvature
- (c) Focal length
- (d) Aperture

Question 2

(A) Answer the following questions in one word or one sentence. [5]

1. Define acceleration.
2. What is the normal human temperature?
3. What kind of mirror provides images of large areas?
4. What is the S.I. unit of electric charge?
5. Does the human ear respond to ultrasonic sound?

(B) Fill up the blanks and rewrite the sentences: [5]

1. The image formed by a _____ mirror is always virtual and small in size.
2. In case of a spring balance, the extension produced in the spring is directly proportional to the _____ force acting on it.
3. Tracing paper is a _____ object.
4. _____ is the shortest length between the initial and final positions of a moving particle in a given time.
5. Woolen clothes are good heat insulators because _____ is trapped within the woolen fibres.

Question 3

(A) Match the items in column I with the appropriate items in column II. [5]

Column A	Column B
Velocity	An electrical conductor
Electrical charges move freely in it	Reflection of sound
The image is erect and the same size as the object	212°F
Echo	Plane mirror
Boiling point of water	m/s

(B) Define the following: [5]

1. Centripetal acceleration
2. Compression
3. Conductor of electricity
4. Thermal energy
5. Reflecting surface

Question 4

- (A) Identify and classify the following types of motions as oscillatory, curvilinear, multiple, random motion or uniform motion: [5]

The up and down motion of needle of the sewing machine	
A ball is thrown upwards at an angle	
Motion of an object along a straight line with constant speed	
A person drawing water from a well	
Motion of a football	

- (B) Give one word for the following [5]

1. The ratio of the density of a substance to the density of water at 4°C.
2. At infinity it gives a real, inverted and diminished image
3. Two sounds can be heard distinctly if they reach our ear at an interval of at least
4. When an object in motion has no specific path and suddenly changes its direction, the motion is said to be
5. These are based on the nuclear fusion of Uranium-235

Question 5

- (A) State whether the following statements are True or False [5]

1. A strip of glass is cut from a hollow sphere and silvered from the outer side, such that the reflecting surface appears on the inner side. The mirror is convex.
2. The reflecting surface of a spherical mirror may be curved inwards or outwards.
3. Conduction is possible in vacuum.
4. A piece of iron (density 7.6 g/cm³), floats in mercury (density 13.6 g/cm³).
5. Electric current can flow through metals.

- (B)

1. Draw neat diagrams and state the characteristics of the image formed when an object is placed between the focus and the centre of curvature of a concave mirror. [3]

2. Give reasons.

The freezing chest of a refrigerator is always fitted near the top in a refrigerator. [2]

Question 6

Answer the following questions in short:

1. A stone of mass 25 g is immersed completely in water contained in a measuring cylinder. The initial level of water was 50 cm^3 and after lowering the stone it was found to be 60 cm^3 . Find the density of the stone? [2]
2. Draw the circuit diagram to represent the circuit shown in figure below: [2]



3. A cyclist travels a distance of 4 km from P to Q and then a distance of 3 km at right angle to PQ. What is the displacement of the cyclist? [2]
4. Give four uses of plane mirrors. [2]
5. List four properties of the image formed by a concave mirror when an object is placed between the focus and the pole of the mirror. [2]

Question 7

(A)

1. Describe an experiment to prove that sound cannot travel in vacuum. [4]
2. What is rectilinear propagation of light? Give examples. [3]

(B) Give three differences between concave and convex mirrors. [3]

ICSE Board
Class VII Physics
Sample Paper – 4 Solution

Question 1

1. **(d)** water

The relative density of a substance is expressed by comparing its density to the density of water at 4°C.

2. **(b)** 2 sec

The time period of a 'seconds pendulum' is 2 sec.

3. **(b)** in front of you

When light comes from behind you, your body will block the path of light and hence, in the absence of light, the shadow will be formed in front of you.

4. **(c)** decibel

The intensity of sound is measured in decibels.

5. **(a)** Absorber of radiant energy

The pupil of your eye is a net absorber of radiant energy.

6. **(a)** 22 m

Within 10 seconds, the body finishes half a rotation = $\frac{1}{2}(2\pi r)$

Therefore distance covered,

$$\begin{aligned} &= \frac{1}{2} \left(2 \times \frac{22}{7} \times 7 \right) \\ &= 22 \text{ m} \end{aligned}$$

7. **(a)** anode

The electrode connected to the positive terminal of a battery is called anode.

8. **(c)** 1/10th of the second

The echo of the sound produced can be heard only if it reaches our ear after 1/10th of a second.

9. **(a)** direction

A mirror changes the direction of light falling on it.

10. **(d)** polished, black

A polished surface is the best radiator and a black surface is the best absorber of heat.

11. (d) rheostat

The instrument which is used to control current in an electric circuit is called a rheostat.

12. (a) $\angle i = \angle r$

According to the laws of reflection, $\angle i = \angle r$

13. (b) perpendicular

The radius of curvature of a concave mirror is always perpendicular to the mirror.

14. (b) a translucent object

Cellophane paper is an example of a translucent object.

15. (c) focal length

In the given figure, point P is the pole and F is the focus and the distance between the pole and the focus is known as the focal length of the mirror.

Question 2

(A)

1. Acceleration is defined as the rate of change of velocity of a body.
2. Normal temperature of the human body is 98.6°F or 37°C. On the Kelvin scale, the normal temperature of the human body is 310 K.
3. A convex mirror.
4. The S.I. unit of electric charge is coulomb.
5. The human ear does not respond to ultrasonic sound.

(B)

1. The image formed by a convex mirror is always virtual and small in size.
2. In case of a spring balance, the extension produced in the spring is directly proportional to the gravitational force acting on it.
3. Tracing paper is a translucent object.
4. Displacement is the shortest length between the initial and final positions of a moving particle in a given time.
5. Woollen clothes are good heat insulators because air is trapped within the woollen fibres.

Question 3

(A)

Column A	Column B
Velocity	m/s
Electrical charges move freely in it	An electrical conductor
The image is erect and the same size as the object	Plane mirror
Echo	Reflection of sound
Boiling point of water	212°F

(B)

1. Centripetal acceleration: The acceleration which occurs in circular motion is known as centripetal acceleration.
2. Compression: When a vibrating object moves forward, it pushes and compresses the air in front of it creating a region of high pressure called compression.
3. Conductors of electricity: Substances which allow electric current to flow through them with ease are called conductors of electricity.
4. Thermal energy: The heat energy transferred between objects which are at different temperatures is called thermal energy.
5. Reflecting surface: If a light ray gets reflected on striking a surface, then the surface is called reflecting surface..

Question 4

(A)

The up and down motion of needle of the sewing machine	Oscillatory
A ball is thrown upwards at an angle	Curvilinear
Motion of an object along a straight line with constant speed	Uniform motion
A person drawing water from a well	Multiple motion
Motion of a football	Random Motion

(B)

1. Relative density
2. Concave mirror
3. 0.1 s
4. Random Motion
5. Atomic power plants

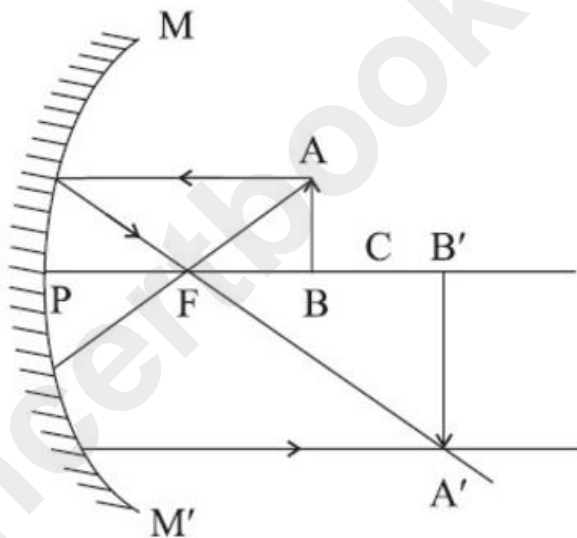
Question 5

(A)

1. False. A strip of glass is cut from a hollow sphere and silvered from the outer side, such that the reflecting surface appears on the inner side. The mirror is concave.
2. True
3. False. Conduction and convection requires a material medium to take place. Radiation is possible in vacuum.
4. True
5. True

(B)

1.



When an object is placed between the principal focus and the centre of curvature of a concave mirror, then the image formed will be real, inverted, enlarged and formed beyond the centre of curvature but not at infinity.

2. The freezing chest of a refrigerator is always fitted near the top in a refrigerator, as it cools the remaining space of the refrigerator by convection currents. The air near the freezing chest cools and descends while the warmer air at the bottom rises up.

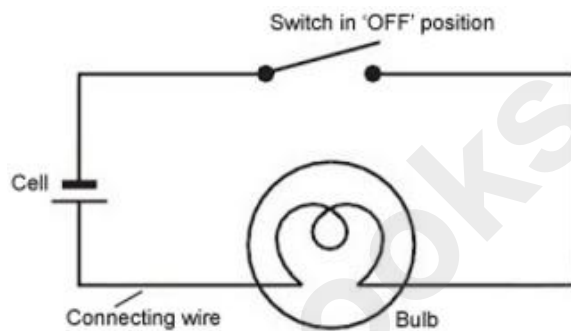
Question 6

1. Mass of stone = 25 g

Volume of stone = Final level of water – Initial level of water
= 60 – 50 = 10 cm³

$$\therefore \text{Density of stone} = \frac{\text{Mass}}{\text{Volume}} = \frac{25}{10} = 2.5 \text{ g/cm}^3$$

2. The circuit diagram is showing switch in 'OFF' position:



- 3.



The displacement of the cyclist is PR.

$$\text{Thus, displacement} = \sqrt{4^2 + 3^2} = 5 \text{ km}$$

4. Uses of plane mirrors:

- Plane mirrors are used at home to view ourselves.
- Plane mirrors are used in making periscopes.
- They are also fixed on the walls of certain shops, such as jewellery shops, to make the shops look bigger.
- Plane mirrors are used in solar cookers.

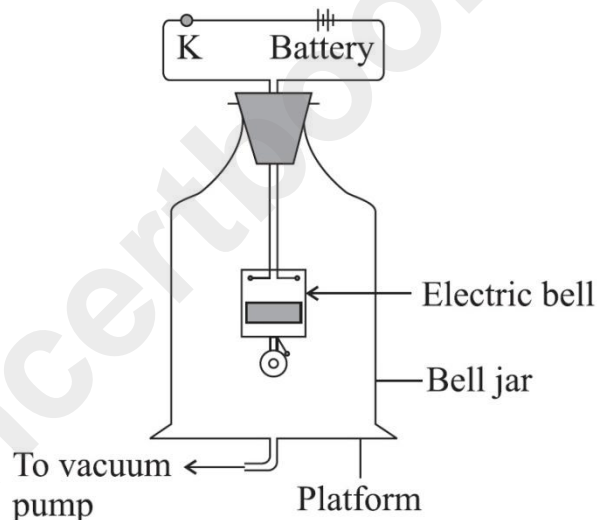
5. Four properties of the image formed by a concave mirror, when the object is placed between the focus and the pole of the mirror:
- virtual
 - enlarged
 - behind the mirror
 - erect

Question 7

(A)

1. Experiment

- i. Connect the bell to the battery so that it starts ringing. Arrange the bell jar around the bell and connect it to a vacuum pump.



- ii. Start the vacuum pump so that it starts evacuating air from the bell jar. Keep on observing the sound of the ringing bell all the time.
- iii. We observe that we keep on hearing the sound of the bell even after the bell jar is kept over it. But as the air inside the bell jar is slowly evacuated, the intensity of the sound continues to lessen and after sometime we cannot hear it at all, even though the bell continues to ring.
- iv. Thus we conclude that the sound of the bell reaches us through the air in the bell jar.
- v. When the vacuum pump removes air from the bell jar, the sound does not reach us even though the bell rings.

2. The property of light travelling in a straight line is called the rectilinear propagation of light. A light source can be seen only if there is a straight-line path between the source and our eyes.

Examples:

- i. Sunrays entering a dark room through a small opening appear to travel in a straight line.
- ii. Light from a torch, headlights of cars, etc. appears to travel in a straight line.
- iii. Light from a projector travels in a straight line towards the screen.
- iv. Light emitted from a laser pointer appears to travel in a straight line.

(B)

Parameters	Concave mirror	Convex mirror
Shape	Reflecting surface is curved inwards and faces towards the centre of the sphere.	Reflecting surface is curved outwards and faces away from the centre of the sphere.
Polishing	The outer spherical surface is polished.	The inner spherical surface is polished
Nature of image	Real and inverted.	Virtual and erect