



QUESTION PAPER (2020-2021)

ICSE – PHYSICS

CLASS X

Maximum Marks: 80

Time: 2 Hours

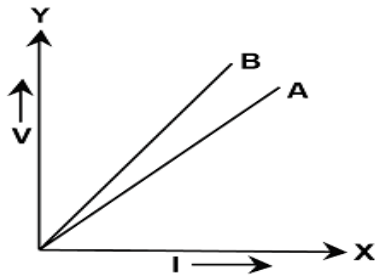
**General Instructions:**

1. Section A is compulsory. Attempt any four questions from Section B.
2. The intended marks for questions or parts of question are given in brackets [ ].

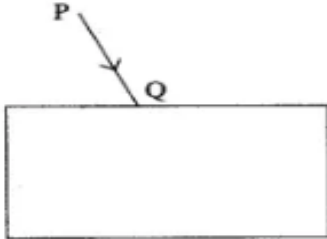
**Section A**

*Attempt all questions from this Section.*

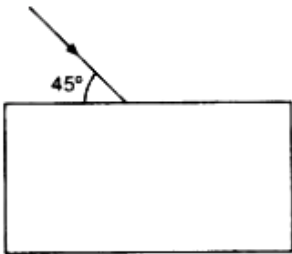
**Question 1:**

(a)	(i) What are isobars? (ii) Give one example of isobars.	2
(b)	The human ear can detect continuous sounds in the frequency range from 20 Hz to 20,000 Hz. Assuming that the speed of sound in air is 330 ms for all frequencies; calculate the wavelengths corresponding to the given extreme frequencies of the audible range.	2
(c)	Explain briefly why the work done by a fielder when he takes a catch in a cricket match is negative.	2
(d)	What is meant by noise pollution? Name one source of sound causing noise pollution.	2
(e)	The V-I graph for a series combination and for a parallel combination of two resistor is shown in the figure below. Which of the two A or B, represents the parallel combination? Give a reason for your answer. 	2

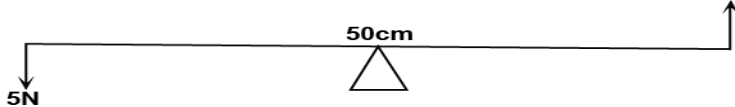
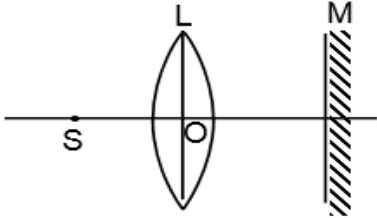
**Question 2:**

(a)	A coin at the bottom of a trough containing water to a depth of 15 cm appears to be 3.75 cm raised above from the bottom. Calculate the refractive index of water.	2
(b)	Calculate the resistance of 1 km long copper wire of radius 1 mm. (Resistivity of copper is $1.72 \times 10^{-8} \Omega m$ .)	2
(c)	(i) Name the prism required for obtaining spectrum of ultraviolet light. (ii) Name the radiation which can be detected by a thermopile.	2
(d)	In the given diagram, PQ is a ray of light incident on a rectangular glass block. (i) Copy the diagram and complete the path of the ray of light through the glass block. In your diagram, mark the angle of incidence by letter i and the angle of emergence by the letter e. (ii) How are the angle i and e related to each other?  	2
(e)	Draw a graph between angle of deviation and angle of incidence of light falling on glass prism.	2

**Question 3:**

(a)	A pulley system has three pulleys. A load of 120 N is overcome by applying an effort of 50 N. Calculate the mechanical advantage and efficiency of this system.	2
(b)	(i) Give two characteristic properties of copper wire which make it unsuitable for use as fuse wire. (ii) Name the material which is used as a fuse wire.	
(c)	Draw the diagram given below and clearly show the path taken by the emergent ray?  	2
(d)	What energy conversions take place in the following when they are working? (i) Electrical toaster. (ii) Microphone	2
(e)	(i) Name the prism required for obtaining spectrum of ultraviolet light. (ii) Name the radiation which can be detected by a thermopile.	2

**Question 4:**

(a)	Why do pieces of ice added to a drink, cool it much faster than ice cold water?	2
(b)	<p>Two forces each of 5 N act vertically upwards and downwards respectively on the two ends of a uniform meter rule which is placed at its mid-point as shown in the diagram. Determine magnitude of the resultant moment of these forces about the midpoint.</p> 	2
(c)	Explain, why water is used in hot water bottles for fomentation and also as a universal coolant?	2
(d)	<p>The diagram shows a point source of light S, a convex lens L and plane mirror M. These placed such that rays of light from S return to it after reflection from M.</p>  <p>(i) What is the distance OS called?            (ii) To which point (left of S or right of S) will the rays return, if M is moved to the left and brought in contact with L?</p>	2
(e)	Give two examples of material required in resistance wire.	2

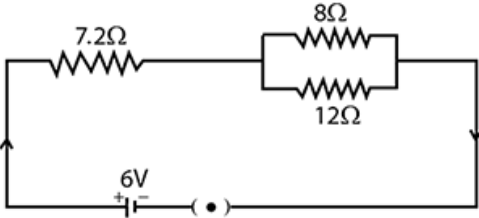
**SECTION B**

*Attempt any four questions from this section.*

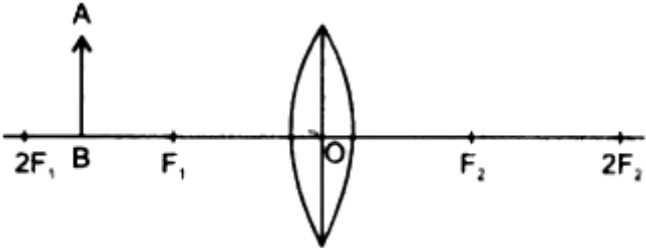
**Question 5:**

(a)	<p>(i) What name is given to the acceleration experienced by a particle in uniform circular motion?            (ii) Where does the position of centre of gravity lie for            a) A circular lamina            b) A triangular lamina</p>	3
(b)	<p>(i) What are damped vibrations?            (ii) Give one example of damped vibrations.            (iii) Name the phenomenon that cause a loud sound when the stem of a vibration tuning fork is kept pressed on the surface of a table.</p>	3
(c)	<p>(i) How does a stretched string on being set into vibration, produce the audible sound?            (ii) Will the sound be audible, if the string is set into vibration on the surface of the moon?            Given reason for your answer.</p>	4

**Question 6:**

(a)	<p>A body of mass 50 kg has a momentum of <math>3000 \text{ kg ms}^{-1}</math> Calculate:</p> <p>(i) The kinetic energy of the body.</p> <p>(ii) The velocity of the body.</p>	3
(b)	<p>The relationship between the potential difference and the current in a conductor is stated in form of a law.</p> <p>(i) Name the law.</p> <p>(ii) What does the slope of V-I graph for a conductor represent?</p> <p>(iii) Name the material used for making the connecting wire..</p>	3
(c)	<p>Three resistors are connected to a 6 V battery as shown in the figure</p> <div style="text-align: center;">  </div> <p>Calculate:</p> <p>(i) The equivalent resistant of the circuit.</p> <p>(ii) Total current in the circuit.</p> <p>(iii) Potential difference across the <math>7.2 \Omega</math> resistor.</p>	4

**Question 7:**

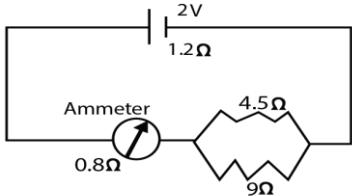
(a)	<p>(i) Write an expression for the electrical energy spent in the flow of current through an electrical appliance in terms of I, R and t.</p> <p>(ii) At what voltage is the alternating current supplied to our houses?</p> <p>(iii) How should the electric lamps in a building be connected?</p>	3
(b)	<p>A lens form an erect, magnified and virtual image of an object.</p> <p>(i) Name the lens.</p> <p>(ii) Draw a labelled ray diagram to show the image formation</p>	3
(c)	<p>An object AB is placed between <math>2F_1</math>, and <math>F_1</math>, on the principal axis of a convex lens as shown in the diagram.</p> <p>Copy the diagram and using three rays starting from point A, obtain the image of the object formed by the lens.</p> <div style="text-align: center;">  </div>	4

**Question 8:**

(a)	<p>It is observed that the temperature of the surrounding starts falling when the ice in a frozen lake starts melting? Give a reason for the observation.</p>	3
(b)	<p>(i) A substance has nearly zero resistance at a temperature of 1K. What is such a substance called?</p>	3

	(ii) State any two factors which affect the resistance of a metallic wire.	
(c)	(i) Draw a diagram to show a block and tackle pulley system having a velocity ratio of 3 marking the direction of load (L), effort (E) and tension (T). (ii) The pulley system drawn lifts a load of 150N when an effort of 60N is applied. Find its mechanical advantage. (iii) Is the above pulley system an ideal machine or not?	4

**Question 9:**

(a)	A battery is designed by connecting four cells, each of emf 1.5V and resistance 2.0 ohm in parallel. If this battery is now connected to an resistance of 2.5 ohm, find (i) the total resistance of the circuit (ii) the current flowing in the external circuit and (iii) the potential drop across the terminal of the lens.	3
(b)	Make a table with the names pf three electrical appliances used in your home in one column, their power, voltage rating and approximate time for which each one is used in one day in the other columns.	3
(c)	A cell of e.m.f 2V and internal resistance $1.2 \Omega$ connected with an ammeter of resistance $0.8 \Omega$ and two resistors of $4.5 \Omega$ and $9 \Omega$ as shown in the diagram below:   <p>(i) What would be the reading on the Ammeter? (ii) What is the potential difference across the terminals of the cell?</p>	4

**Question 10:**

(a)	Draw the diagram of a right angled isosceles prism which is used to make an inverted image erect.	3
(b)	A ray of monochromatic light is incident from air on a glass slab. (i) Draw a labelled ray diagram showing the change in the path of the ray till it emerges from the glass slab. (ii) Name the two rays that are parallel to each other. (iii) Mark the lateral displacement in your diagram.	3
(c)	Name any four regions of electromagnetic spectrum (other than visible light) in increasing order of their wavelength.	4

