

**ICSE Board  
Class X Physics****Sample Paper - 5****Time: 1½ hrs****Total Marks: 80****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 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 1 (40 Marks)****Attempt all questions from this section****Question 1****[10]**

- (a) What is the source of contact forces on the atomic scale?
- (b) A railway engine pulls a train with a force of 6000 N over a distance of 200 m on a level track. Calculate the work done in joules and ergs.
- (c) Write two characteristics of a third class lever.
- (d) A crowbar 2 m long is pivoted about a point 0.1 m from its tip. Calculate the least force which must be applied at the other end to displace a load of 100 kgf.
- (e) When does a ray of light neither refract nor deviate while passing through a glass block?

**Question 2****[10]**

- (a) A student standing at one end of a closed corridor 86 m long blows a short blast on a whistle and notes a series of echoes. If the time from the blast to the fifth echo is 2.5 s, calculate the speed of sound.
- (b) Distinguish between a real image and a virtual image.
- (c) A fish is obliquely viewing a fisherman standing on the river bank from underwater. Does the man appear taller or shorter than his actual height to the fish?
- (d) How will the image formed by a convex lens be affected if the central portion of the lens is wrapped by a black paper as shown in the diagram below?



- (e) Draw a graph representing the variation of angle of deviation ( $\delta$ ) by a prism for various angles of incidence (i) of monochromatic light.

**Question 3**

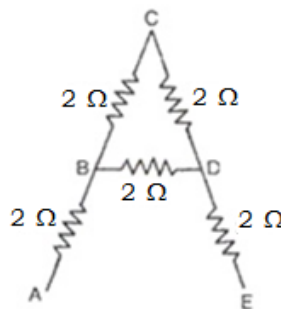
**[10]**

- (a) Name the part of the spectrum which extends to both sides of the visible spectrum. Give one application of each of these radiations.
- (b) Why does the loudness of the sound heard by a plucked wire increase when it is mounted on a board?
- (c) 2 kg of ice melts when a jet of steam at  $100^\circ\text{C}$  is passed through a hole drilled in a block of ice. What mass of steam was used?  
Given:  
Specific heat capacity of water =  $4200 \text{ J/kg}^\circ\text{C}$   
Specific latent heat of fusion of ice =  $336 \times 10^3 \text{ J/kg}$   
Specific latent heat of vaporisation of steam =  $2268 \times 10^3 \text{ J/kg}$
- (d) Why does the heat supplied to a substance during its change of state not cause any rise in its temperature?
- (e) What special characteristics must (i) a heating wire and (ii) a fuse wire have?

**Question 4**

**[10]**

- (a) An electric bulb is rated 500 W, 240 V. What information does this convey?
- (b) Calculate the equivalent resistance of the network shown in the figure below:



- (c) What is the nature of magnetic field lines formed due to current in a straight conductor?
- (d) Name two isotopes of uranium. Which of the isotopes of uranium is easily fissionable?
- (e) What is the effect of neutron to proton ratio  $\left(\frac{n}{p}\right)$  in a nucleus when
- An electron is emitted
  - A positron is emitted

**Section 2 (40 Marks)****Attempt any four questions from this section****Question 5 [10]**

- (a) A man drops a 50-kg stone from the top of a ladder of length 10 m. What is its kinetic energy when it reaches the ground? What is its speed just before it hits the ground?
- (b) A uniform metre scale of weight 50 g f is balanced at the 30 cm mark when weights of 80 g f and 60 g f act at the 5 cm mark and the 45 cm mark, respectively. What force must be applied at the 20 cm mark to balance the metre scale?
- (c)
- What is the principle of levers?
  - Give the SI unit of the following:
    - Mechanical advantage
    - Velocity ratio
    - Weight
    - Mass
  - What is the relation between VR and the number of strands of a string used to support the load in a block and tackle system?

**Question 6 [10]**

- (a) Why does the sun appear reddish early in the morning?
- (b) A concave lens is also known as a diverging lens. Why?
- (c)
- What is a totally reflecting prism?
  - The ozone layer gives us protection from which solar radiation?
  - Why does a converging lens behave as a 'burning glass'?

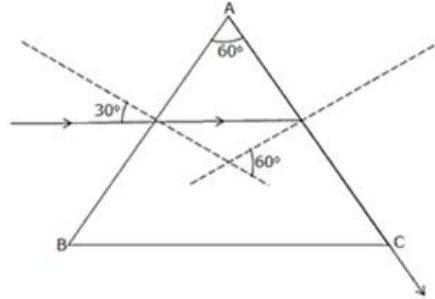
**Question 7 [10]**

- (a) i. State the difference between a tone and a note.  
ii. A violin note and a sitar note may have the same frequency, and yet, we can distinguish between these two notes. Explain.
- (b) How does a stretched string produce an audible sound on being set into vibration?
- (c) What is an echo? State the three conditions necessary for the formation of an echo.

**Question 8 [10]**

- (a) A piece of ice of mass 15 g is added to water of mass 100 g in a copper calorimeter of mass 50 g. The temperature of water falls from 288 K to 276 K after the addition of ice. Calculate the specific latent heat of fusion of ice.  
Given, specific heat capacity of copper =  $0.42 \text{ J/g}^\circ\text{C}$   
Specific heat capacity of water =  $4.2 \text{ J/g}^\circ\text{C}$ .

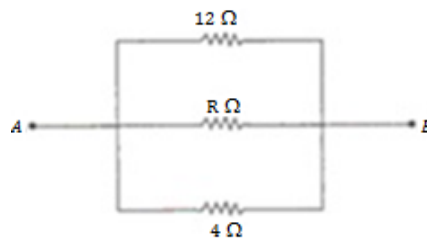
- (b) At what angle should a ray of light be incident on the face of a  $60^\circ$  prism so that the ray just passes grazingly along the interface AC? If the angle of refraction at face AB is  $19^\circ$ , find the angle of incidence at face AC. Give its specific name.



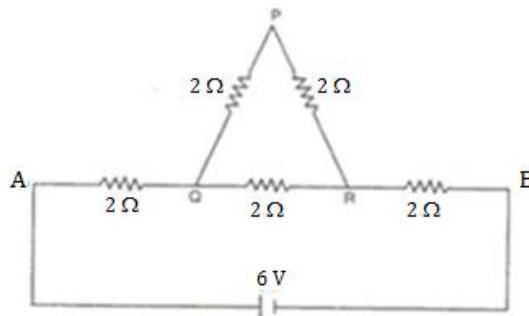
- (c) State the basic principle of heat transfer.

**Question 9**
**[10]**

- (a) i. Find the value of  $R$  in the following figure if the equivalent resistance between terminals A and B is  $2\Omega$ .



- ii. Find the equivalent resistance between terminal A and terminal B.



- (b) A house is fitted with 20 lamps of 60 watt each, 10 fans consuming 0.5 A each and an electric kettle of resistance  $110\Omega$ . If energy is supplied at 220 V and costs Rs 3.25 per kW h, calculate the bill for November assuming that these appliances run for 6 hours a day.
- (c) Draw magnetic field lines for (i) a solenoid and (ii) a bar magnet.

**Question 10**
**[10]**

- (a) Mention three properties of nuclear forces.
- (b) Give the difference between isotopes and isobars.
- (c) Explain the tracer technique and give its applications.