

ICSE Board
Class X Physics

Time: 2 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 [].

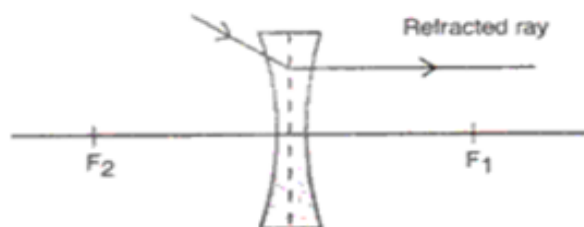
Section 1 (40 Marks)
Attempt all questions from this section

Question 1 **[10]**

- (a) A thread with a stone tied to its one end is whirled in a horizontal circle. What is responsible for the centripetal force?
- (b) A train is travelling on a one-level track at a speed of 72 km/h. It is pulled by an engine which exerts a force of 12,000 N. Calculate the power of the engine in kilowatts.
- (c) What is an inclined plane? Give two examples of its use in daily life.
- (d) A load of 800 N is lifted through a height of 2 m by an effort of 40 N applied at a distance of 50 m. Calculate the efficiency.
- (e) A ball of mass 8 kg is dropped from a height of 10 m. What is the velocity with which it strikes the ground?

Question 2 **[10]**

- (a) When a bird looks at a fish in water, does it appear raised or deeper than it actually is? Similarly, when a fish looks at a bird, does it appear nearer or further away?
- (b) Complete the diagram by drawing the corresponding incident ray.



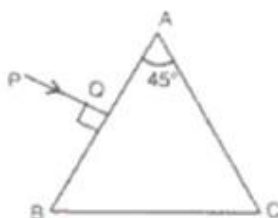
- (c) State four uses of a hand lens.

- (d) Two convex lenses each of focal length f are separated by an equal distance of $2f$. With the help of a ray diagram show that a parallel beam of light remains parallel after refraction through both lenses.
- (e) Write two uses of ultraviolet radiation.

Question 3

[10]

- (a) PQ is the incident ray as shown on Prism ABC. Show the corresponding refracted and emergent rays.

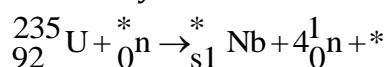


- (b) Which of these quantities; (i) frequency, (ii) wavelength and (iii) amplitude determine the loudness of a sound wave? How is loudness related to the above mentioned quantity?
- (c) 1080 g of ice at 0°C is mixed with 1080 g of water at 80°C . Calculate the final temperature of the mixture.
- (d) Which molecules, ice at 0°C or water at 0°C , have greater potential energy? Why?
- (e) Which lamp has greater resistance, a 40-W lamp or a 60-W lamp, when connected to the same supply?

Question 4

[10]

- (a) Can you connect resistors of $2\ \Omega$, $3\ \Omega$ and $6\ \Omega$ to produce an effective resistance of $4\ \Omega$? If yes, how?
- (b) State the factors on which the e.m.f. of a cell depends.
- (c) A DC motor is rotating in the anticlockwise direction. How can you reverse the direction of the motor?
- (d)
- what happens inside the nucleus that causes the emission of beta rays?
 - Name the two wires of a household wiring circuit which are of the same potential.
- (e) Complete the following reaction by inserting the appropriate quantity in the spaces marked by asterisks.



Section 2 (40 Marks)
Attempt any four questions from this section

Question 5

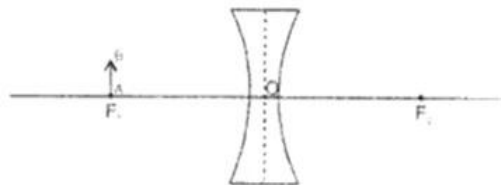
[10]

- (a)
- i. Why isn't a machine 100% efficient?
 - ii. Why do we use a bicycle in spite of it being a mechanical disadvantage?
- (b) Two forces each of magnitude 3 N act vertically upwards and downwards on the two ends of a uniform rod of length 1 m freely pivoted at its centre. Determine the resultant moment of the forces about the midpoint of the rod.
- (c) A pulley system lifts a load of 600 N by an effort of 200 N. If the resistance due to the movable parts of the machine is 400 N, find
- i. MA
 - ii. VR
 - iii. Number of pulleys
 - iv. Efficiency

Question 6

[10]

- (a) Give an example where high specific heat capacity of water is used as a heat reservoir.
- (b) Give the list of seven types of radiations, in the order of their increasing wavelength, which make up the complete electromagnetic spectrum.
- (c)



The above diagram shows a small linear object AB placed at the principal focus F_1 of a diverging lens. Points O and F_2 are the optical centre and the first focus of the lens. Using two rays, draw a ray diagram to locate the image formed in the lens. Mention two characteristics of this image.

Question 7**[10]**

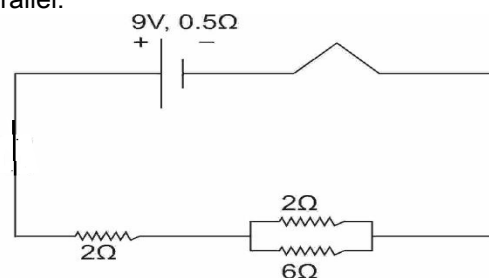
- (a) Give reasons for the following
- The sound of a kettle drum is unmusical.
 - The rattling of a factory is unpleasant.
- (b) The given some instruments show tones at frequencies listed below : i. keyboard : 200 Hz
flute : 250 Hz violin : 300 Hz. Which has highest pitch.
- (c)
- Is fire extinguished more effectively using hot water or cold water?
 - In a calorimeter box, the calorimeter is surrounded by a coaxial shining cylindrical vessel. Why?

Question 8**[10]**

- (a) An arrow-shaped object is placed at a distance of 40 cm from a convex lens of focal length 200 mm. Draw a ray diagram showing how the image of this object is formed. What is the nature of this image?
- (b)
- What is the power of a converging lens of focal length 0.25 m?
 - What is the focal length of lens of power $-5D$?
 - If lenses (i) and (ii) are put together, what is the power of this combination?
- (c) What is an echo? An observer situated between two parallel cliffs emits an intense sound. Two successive echoes are then heard after 5 s and 7 s, respectively. Calculate the distance between the cliffs. Take the velocity of sound as 332 m/s.

Question 9**[10]**

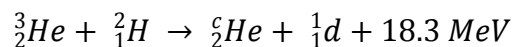
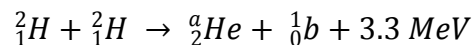
- (a) Describe the ring main system of distribution of power (Only diagram is required).
- (b) In the circuit diagram given below, a cell of 9V and internal resistance $0.5\ \Omega$ is connected across a resistor A of $2\ \Omega$ in series and two resistors $2\ \Omega$ and $6\ \Omega$ which are in parallel. Find:
- the total resistance
 - the total current
 - the current in the $6\ \Omega$ resistor
 - the potential difference across the terminals of the cell.



- (c)
- Define specific latent heat of fusion of ice.
 - What happens to the heat supplied to the substance when the heat supplied causes no change in the temperature of the substance?

Question 10**[10]**

- (a) Give the reason for the energy release in a nuclear fission reaction.
- (b) In the following nuclear fusion reaction equations, replace a, b, c, d with proper mass number or atomic symbol:



- (c) Why does nuclear fusion require high temperature and high pressure?
- (d) Give one constructive and destructive use of the nuclear fission reaction.
- (e) What is the difference between:
- A β -particle and an electron
 - An α -particle and a helium nucleus
 - Give two equations of each representing α -decay and β -decay.