ICSE Board
Class X Physics
Board Paper – 2015

Time: 2 hour **Maximum Marks: 80**

General Instructions:

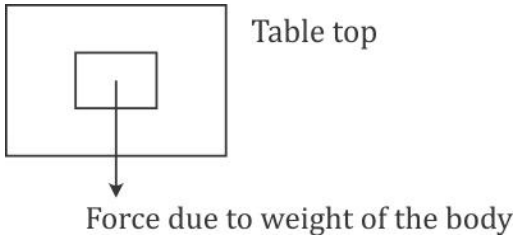
1. *Answers to this paper must be written on the paper provided separately.*
2. *You will **not** be allowed to write during the first **15** minutes. This time is to be spent in reading the question paper.*
3. *The time given at the head of paper is the time allotted for writing the answers.*
4. *Attempt **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 - I (40 Marks)

Attempt all question from this Section.

Question 1

(a) When a body is placed on a table top, it exerts a force equal to its weight downwards on the table top but does not move or fall. [2]



(i) Name the force exerted by the table top.

(ii) What is the direction of the force?

(b) [2]

(i) Name one factor that affects the lateral displacement of light as it passes through a rectangular glass slab.

(ii) On reversing the direction of the current in a wire, the magnetic field produced by it gets _____.

(c) [2]

(i) On what factor does the position of the centre of gravity of a body depend?

(ii) What is the SI unit of the moment of force?

(d) Name the factors affecting the turning effect of a body. [2]

(e) [2]

(i) Define equilibrium.

(ii) In a beam balance when the beam is balanced in a horizontal position, it is in _____ equilibrium.

Question 2

(a) How is work done by a force measured when the force: [2]

(i) is in the direction of displacement?

(ii) is in an angle to the direction of displacement?

(b) State the energy in the following while in use: [2]

(i) Burning of a candle.

(ii) A steam engine.

(c) [2]

(i) A scissor is a _____ multiplier.

(ii) 1 kWh = _____ J.

(d) Explain the motion of a planet around the Sun in a circular path. [2]

(e) Rajan exerts a force of 150 N in pulling a cart at a constant speed of 10 m/s. Calculate the power exerted. [2]

Question 3

(a) [2]

(i) Give the expression for mechanical advantage of an inclined plane in terms of the length of an inclined plane.

(ii) Name a common device where a gear train is used.

(b) The speed of light in glass is 2×10^5 km/s. What is the refractive index of glass? [2]

(c) [2]

(i) Draw a graph between displacement and the time for a body executing free vibrations.

(ii) Where can a body execute free vibrations?

(d) [2]

(i) What happens to the resistivity of semi-conductor with the increase of temperature?

(ii) For a fuse, higher the current rating _____ is the fuse wire.

(e) [2]

(i) Name the high energetic invisible electromagnetic waves which help in the study of the structure of crystals.

(ii) State an additional use of the waves mentioned in part (e)(i).

Question 4

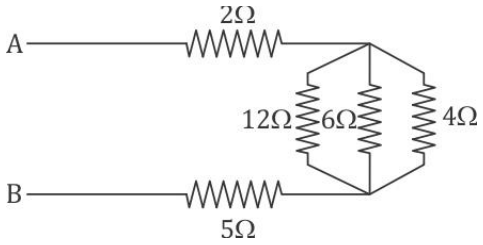
(a) Rishi is surprised when he sees water boiling at 115°C in a container. Give reasons as to why water can boil at the above temperature. [2]

(b) [2]

(i) Why does a current carrying, freely suspended solenoid rest along a particular direction?

(ii) State the direction in which it rests.

(c) Find the equivalent resistance between points A and B. [2]



(d) Give two similarities an AC generator and a DC motor [2]

(e) [2]

(i) Why is a cathode ray tube evacuated to a low pressure?

(ii) What happens if the negative potential is changed on a grid?

SECTION - II (40 Marks)

Attempt any four questions from this Section.

Question 5

(a) Draw a simplified diagram of a lemon crusher, indicting of load and effort. [2]

(b) [4]

(i) Name the physical quantity measured in terms of horse power.

(ii) A nut is opened by a wrench of length 20 cm. If the least force required is 2N, find the moment of force needed to loosen the nut.

(iii) Explain briefly why the work done by a fielder when he takes a catch in a cricket match is negative.

(c) A block and tackle system has V.R. = 5. [4]

(i) Draw a neat labelled diagram of a system indicating the direction of its load and effort.

(ii) Rohan exerts a pull of 150 kgf. What is the maximum load he can raise with this pulley system if its efficiency = 75%?

Question 6

(a) [3]

(i) Where should an object be placed so that a real and inverted image of the same size as the object is obtained using a convex lens?

(ii) Draw a ray diagram to show the formation of the image as specified in the part a(i).

(b) [3]

(i) Why does the Sun appear red at sunrise?

(ii) Name the subjective property of light related to its wavelength.

(c) Jatin puts a pencil into a glass container having water and is surprised o see the pencil in a different state. [4]

(i) What change is observed in the appearance of the pencil?

(ii) Name the phenomenon responsible for the change.

(iii) Draw a ray diagram showing how the eye sees the pencil.

Question 7

(a) [2]

(i) State the safe limit of sound level in terms of decibel for human hearing.

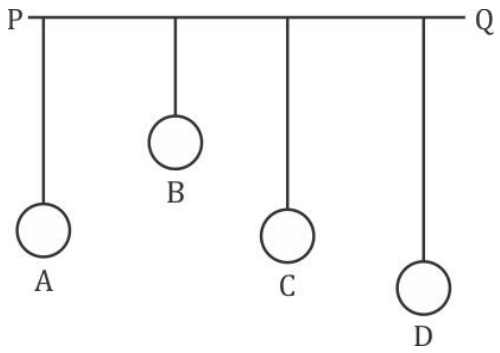
(ii) Name the characteristic of sound in relation to its waveform.

(b) A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3s and the second echo 2s later. Calculate: [3]

(i) The speed of sound.

(ii) The distance of the other cliff from the person.

(c) In the diagram below, A, B, C, D are four pendulums suspended from the same elastic string PQ. The length of A and C are equal to each other while the length of pendulum B is smaller than that of D. Pendulum A is set in to a mode of vibrations. [5]



(i) Name the type of vibrations taking place in pendulums B and D?

(ii) What is the state of pendulum C?

(iii) State the reason for the type of vibrations in pendulum B and C.

Question 8

(a) [3]

(i) Name the device used to increase the voltage at a generating station.

(ii) At what frequency is AC supplied to residential houses?

(iii) Name the wire in a household electrical circuit to which the switch is connected.

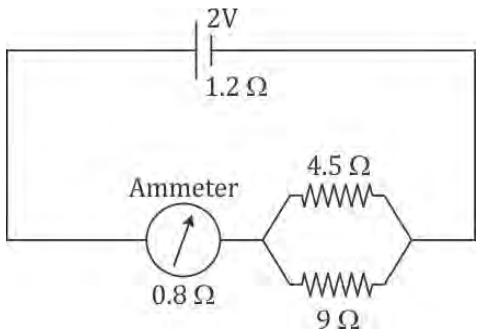
(b) The relationship between the potential difference and the current in a conductor is stated in the form of a law. [3]

(i) Name the law.

(ii) What does the slope of V-I graph for a conductor represent?

(iii) Name the material used for making the connecting wire.

(c) A cell of Emf 2 V and internal resistance 1.2 Ω is connected with an ammeter of resistance 0.8 Ω and two resistors of 4.5 Ω and 9 Ω as shown in the diagram below: [4]



(i) What would be the reading on the Ammeter?
(ii) What is the potential difference across the terminals of the cell? [4]

Question 9

(a) [2]
(i) Name a gas caused by the Greenhouse effect.
(ii) Which property of water makes it an effective coolant?

(b) [4]
(i) Water in lakes and ponds do not freeze at once in cold countries. Give a reason is support of your answer.
(ii) What is the principle of Calorimetry?
(iii) Name the law on which this principle is based.
(iv) State the effect of an increase of impurities on the melting point of ice.

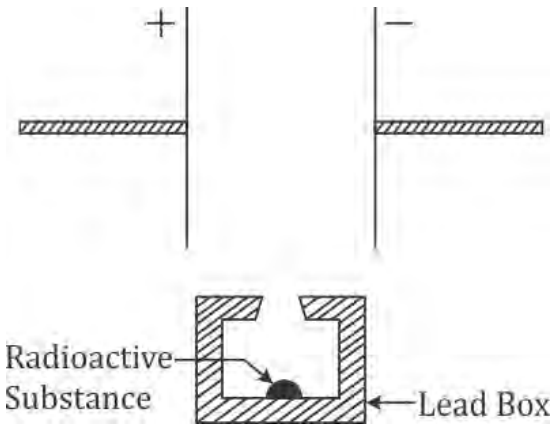
(c) A refrigerator converts 100 g of water at 20°C to ice at −10°C in 35 minutes. Calculate the average rate of heat extraction in terms of watts.
Given: Specific heat capacity of ice = 2.1 J $g^{-1}°C^{-1}$
Specific heat capacity of water = 4.2 J $g^{-1}°C^{-1}$
Specific latent heat of fusion of ice = 336 J g^{-1} [4]

Question 10

(a) [2]

(i) What is thermionic emission?

(ii) Name the unit in which the work function of a metal is expressed.



(b) [5]

(i) Complete the diagram as given above by drawing the deflection of radioactive radiations in an electric filed.

(ii) State any two precautions to be taken while handling radioactive substances.

(c) An atomic nucleus A is composed of 84 protons and 128 neutrons. [3]

(i) The nucleus A emits an alpha particle and is transformed into nucleus B. What is the composition of nucleus B?

(ii) The nucleus B emits a beta particle is transformed into nucleus C. What is the composition of nucleus C?

(iii) Does the composition of nucleus C change if it emits gamma radiations?