ICSE Board
Class X Physics

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

General Instructions:

Answers to this paper must be written on the paper provided separately.
*You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.
The time given at the head of paper is the time allotted for writing the answers.

***Section I** is compulsory. Attend **any four** questions from **Section II**.*
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) (i) Which physical quantity does the electron volt measure? How is it related to the S.I unit of this quantity? [2]
(ii) Why are formulae one cars very broad and very low ?

(b) A boy weighing 40 kgf climbs up a stair of 30 steps each 20 cm high in 4 minutes and a girl weighing 30 kgf does the same in 3 minutes. Compare: [2]
(i) The work done by them.
(ii) The power developed by them.

(c) With reference to the terms Mechanical Advantage, Velocity Ratio and efficiency of a machine, name and define the term that will not change for machine of a given design. [2]

(d) Calculate the mass of ice required to lower the temperature of 300 g of water 40°C to water at 0°C. [2]
(Specific latent heat of ice = 336 J/g, Specific heat capacity of water = 4.2J/g°C)

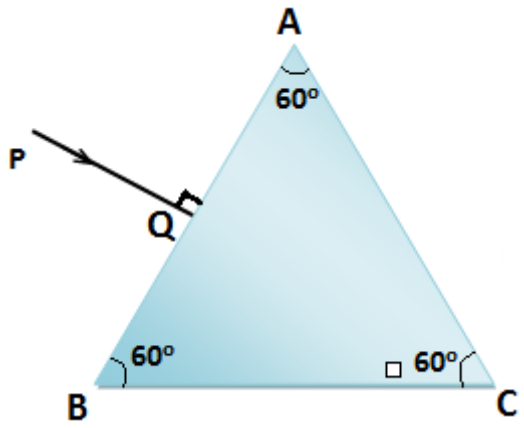
(e) (i) Draw a neat labelled diagram of a plier. What change can be made in it to increase its MA ?
(ii) UV radiations when passed through quinine sulphate, or zinc sulphide, or barium sulphide, or barium patinocyanide etc. show a property which is a test for its detection. Explain how this works
[2]

Question 2

(a) A bird flying at the height of 6m above the river surface while the fish is 8m below the surface. At what height would the bird appear to the fish?. Given R.I of water is 4/3. [2]

(b) A boy uses blue colour of light to find the refractive index of glass. He then repeats the experiment using red colour of light. Will the refractive index be the same or different in the two cases? Give a reason to support your answer. [2]

(c) Copy the diagram given below and complete the path of the light ray till it emerges out of the prism. The critical angle of glass is 42°. In your diagram mark the angles wherever necessary. [2]



(d) State the dependence of angle of deviation: [2]

(i) On the refractive index of the material of the prism.

(ii) On the wavelength of light

(e) The ratio of amplitude of two waves is 3:4. What is the ratio of their: [2]

(i) loudness?

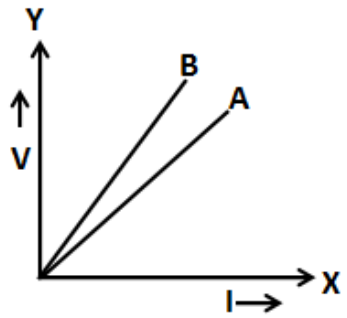
(ii) Frequencies?

Question 3

(a) State the ways by which the frequency of transverse vibrations of a stretch string can be increased. [2]

(b) What is meant by noise pollution? Name one source of sound causing noise pollution. [2]

(c) The V-I graph for a series combination and for a parallel combination of two resistors is shown in the figure below. Which of the two A or B. represents the parallel combination? Give reasons for your answer. [2]



(d) The music system draws a current of 400 mA when connected to a 12 V battery. [2]

(i) What is the resistance of the music system?

(ii) The music system if left playing for several hours and finally the battery voltage drops to 320 mA and the music system stops playing when the current.

(e) Calculate the quantity of heat produced in a 20 Ω resistor carrying 2.5 A current in 5 minutes. [2]

Question 4

(a) Give the equation which represents the process involved in the generation of energy in the sun and name the process. [2]

(b) An element ${}_{Z}S^{A}$ decays to ${}_{85}R^{222}$ after emitting 2 α particles and 1 β particle. Find the atomic number and atomic mass of the element S. [2]

(c) A radioactive substance is oxidized. Will there be any change in the nature its radioactivity? Give a reason for your answer. [2]

(d) State the characteristics required in a material to be used as an effective fuse wire. [2]

(e) Which coil of a step up transformer is made thicker and why? [2]

Name the energy changes which takes place when magnet is moved towards the coil having galvanometer at its ends.

SECTION - II (40 Marks)

*Attempt any **four** questions from this Section.*

Question 5

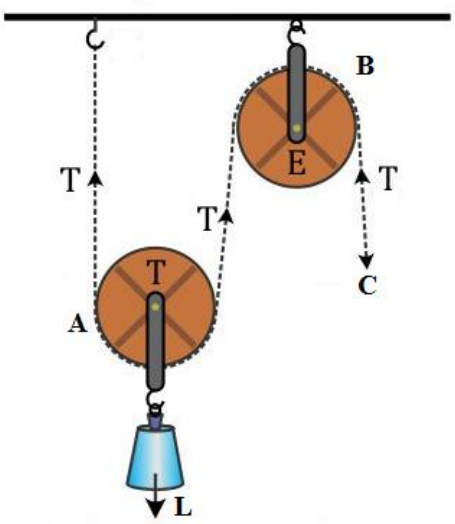
(a) Name the radiation: [3]

i) used for photography at night.

ii) Used for detection of fracture in bones.

iii) Whose wavelength range is from 10 nm to 400 nm.

(b) From the diagram given below. answer the question that follow: [3]



(i) What kind of pulleys are A and B?

(ii) State the purpose of pulley B.

(iii) What effort has to be applied at C just raise the load L = 20 kgf?
(Neglect the weight of pulley A and friction)

(c) [4]

(i) An effort is applied on the bigger wheel of a gear having 32 teeth. It is used to turn a wheel of 8 teeth. Where it is used.

(ii) A pulley system has three pulleys. A load of 120 N is overcome by applying an effort of 50N. Calculate the Mechanical Advantage and Efficiency of this system.

Question 6

(a) [3]

(i) What is the principle of method of mixtures?

(ii) What is the other name given to it?

(iii) Name the law on which the principle is based

(b) Some ice is heated at a constant rate, and its temperature is recorded after every few seconds, till steam is formed at 100°C. Draw a temperature time graph to represent the change. Label the two phase changes in your graph. [3]

(c) A copper vessel of mass 100 g contains 150 g of water at 50°C. How much ice is needed to cool it to 5°C? [4]

Given: Specific heat capacity of copper = 0.4 $Jg^{-1}{}^{\circ}C^{-1}$

Specific heat capacity of water = 4.2 $Jg^{-1}{}^{\circ}C^{-1}$

Specific latent heat of fusion ice = 336 Jg^{-1}

Question 7

(a) [3]

(i) Write a relationship between angle of incidence and angle of refractions for a given pair of media.

(ii) When a ray of light enters from one medium to another having different optical densities it bends. Why does this phenomenon occur?

(iii) Write one conditions where it does not bend when entering a medium of different optical density.

(b) A lens produces a virtual image between the object and the lens. [3]

(i) Name the lens.

(ii) Draw a ray diagram to show the formation of this image.

(c) What do you understand by the term' Scattering of light'? Which colour of white light is scattered the least and why? [4]

Question 8

(a) [3]

(i) Name the waves used for echo depth sounding.

(ii) Give one reason for their use for the above purpose.

(iii) Why are the waves mentioned by you not audible to us?

(b) [3]

(i) What is an echo

(ii) State two conditions for an echo to take place.

(iii) Give two examples of nuclear fusion reaction.

(c) [4]

(i) Name the phenomenon involved in tunning a radio set to a particular station.

(ii) Define the phenomenon named by you in part (i) above.

(iii) What do you understand by loudness of sound?

(iv) In which units is the loudness of sound measured?

Question 9

(a) [3]

(i) Which particles are responsible for current in conductors?

(ii) To which wire of a cable in a power circuit should the metal case of a geyser be connected?

(iii) To which wire should the fuse be connected?

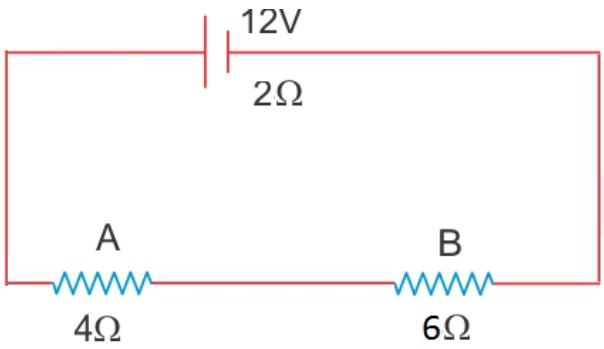
(b) [3]

(i) Name the transformer used in the power transmitting station of a power plant.

(ii) What type of current is transmitted from the power station?

(iii) At what voltage is this current available to our household?

(c) A battery of emf 12 V and internal resistance 2 Ω is connected with two resistors A and B of resistance 4 Ω and 6 Ω respectively joined in series. [4]



Find:

(i) Current in the circuit

(ii) The terminal voltage of the cell.

(iii) The potential difference across 6Ω Resistor.

(iv) Electrical energy spent per minute in 4Ω resistor.

Question 10

(a) Arrange α, β, and γ rays in ascending order with respect to their [3]

(i) Penetrating power.

(ii) Lionising power.

(iii) Biological effect.

(b) [3]

(i) Name the radiations used

i. in Satellite communication

ii. to produce Vitamin D in food of plants and animals.

(ii) An electric gadget draws a current 200mA from a battery of 12V. Find its resistance.

(c) [4]

(i) Represent the change in the nucleus of a radioactive element when a β particle is emitted.

(ii) What is the name given to elements with same mass number and different atomic number

(iii) Calculate the total resistance between A and B, G is the galvanometer whose resistance is 110 Ohm. It was noticed that the galvanometer did nt show any deflection.