ICSE PAPER – 2012
Class X
PHYSICS

Time: 1½hrs. **Maxi mum Marks: 80**

General Instruction

1. Answer 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 tim e is to be spent in
3. reading the Question Pa per.
4. The time given at the he ad of this Paper is the time allowed for writi ng the answers.
5. **Section I** is compulsory. Attempt **any four** questions from **Section I I**.
6. The intended marks for questions or parts of questions are given in brackets [ ].

Section - I

Question 1 **[10]**

(a) (i) Define 1 kgf.

(ii) How is related to the S.I unit of force?

(b) (i) What are non-contact forces?

(ii) How does the distance of separation between two bodies affect the magnitude of the non-contact force between them?

(c) A boy of mass 30 kg is sitting at a distance of 2 m from the middle of a seesaw. Where should a boy of mass 40 kg sit so as to balance the see-saw?

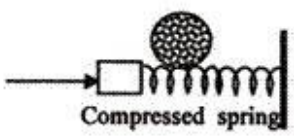
(d) (i) What is meant by the term 'moment of force'?

(ii) If the moment of force is assigned a negative sign then will the turning tendency of the force be clockwise or anticlockwise?

(e) A ball is place on a compressed spring. When the spring is released, the ball is observed to fly away.

(i) What form of energy does the compressed spring posses?

(ii) Why does the ball fly away?



Question 2 **[10]**

Question 3 **[10]**

(a) (i) What is meant by 'Dispersion of light'?

(ii) In the atmosphere which colour of light gets scattered the least?

(b) Which characteristic of sound will change if there is a change in

(i) Its amplitude

(ii) Its waveform.

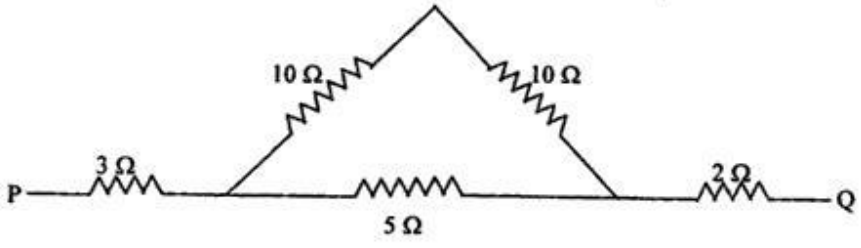
(c) (i) Name one factor which affects the frequency of sound emitted due to vibrations in an air column.

(ii) Name the unit used for measuring the sound level.

(d) An electrical appliance is rated at 1000 KVA, 220 V. If the appliance is operated for 2 hours, calculate the energy consumed by the appliance in:

(i) kWh (ii) joule

(e) Calculate the equivalent resistance between P and Q from the following diagram:



Question 4 **[10]**

(a) (i) What is an e.c. generator or Dynamo used for?

(ii) Name the principle on which it works.

(b) Differentiate between heat capacity and specific heat capacity.

(c) A hot solid of mass 601 g at 100 °C is placed in 150 g of water at 20 °C. The final steady temperature recorded is 25°C. Calculate the specific heat capacity of the solid. Specific heat capacity of water = 4200 J kg^{-1} $°C^{-1}$]

(d) (i) What is the value of the speed of gamma radiations in air or vacuum?

(ii) Name a material which exhibits fluorescence when cathode rays fall on it.

(e) Given any two important sources of background radiation.

Section- II

Question 5 **[10]**

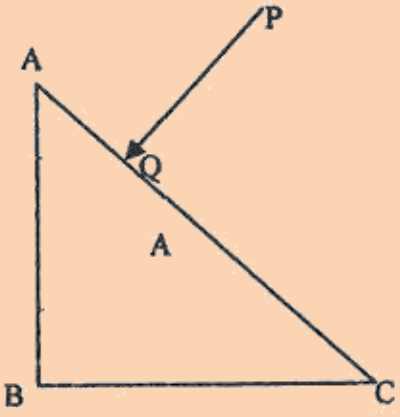
Question 6 **[10]**

(a) (i) What is meant by the term 'critical angle'?

(ii) How is it related to the refractive index of the medium?

(iii) Does the depth of a tank of water appear to change or remain the same when viewed normally form above?

(b) A ray of light PQ is incident normally on the huypotenuse of a right angled prism ABC as shown in the diagram given below:



(i) Copy the diagram and complete the path of the ray PQ till it emerges from the prism.

(ii) What is the value of the angle of deviation of the ray?

(iii) Name an instrument where this action of the prism is used.

(c) A converging lens is used to obtain an image of an object placed in font of it. The inverted image is formed between F_2 and $2F_2$ of the lens.

(i) Where is the object placed?

(ii) Draw a ray diagram to illustrate the formation of the image obtained.

Question 8 **[10]**

(a) (i) A cell is sending current in an external circuit. How does the terminal voltage compare with the e.m.f of the cell?

(ii) What is the purpose of using a fuse in an electrical circuit?

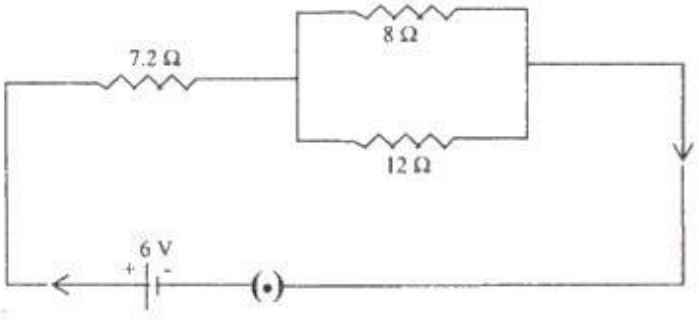
(iii) What are the characteristic properties of fuse wire?

(b) (i) Write an expression for the electrical energy spent in the flow of current through an electrical appliance in terms of 1, R and t.

(ii) At what voltage is the alternating current supplied to our houses?

(iii) How should the electric lamps in a building be connected?

(c) Three resistors are connected to a 6 V battery as shown in the figure given below:



Calculate:

(i) The equivalent resistance of the circuit.

(ii) Total current in the circuit.

(iii) Potential difference across the 7.2 Ω resistor.

Question 9 **[10]**

(a) (i) Write an expression for the heat energy liberated by a hot body.

(ii) Some heat is provided to a body to raise its temperature by 25°C. What will be the corresponding rise in temperature of the body as shown on the Kelvin scale?

(iii) What happens to the average kinetic energy of the molecules as ice melts at 0°C?

(b) A piece of ice at 0°C is heated at a constant rate and its temperature recorded at regular intervals till steam is formed at 100°C. Draw a temperature – time graph to represent the change in pause. Label the different parts of your graph.

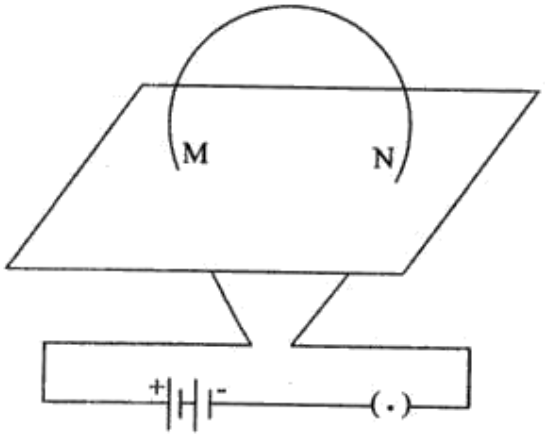
(c) 40 g of ice at 0°C is used to bring down the temperature of a certain mass of water at 60°C to 10°C. Find the mass of water used.

[Specific heat capacity of water = 4200 J kg^{-1} $°C^{-1}$]

[Specific latent heat of fusion of ice = 336 × 10^3 J kg^{-1}]

Question 10 **[10]**

(a) The diagram below shows a current carrying loop or a circular coil passing through a sheet of cardboard at the points M and N. The sheet of cardboard is sprinkled with iron filings.



(i) Copy the diagram and draw an arrow on the circular coil to show the direction of current flowing through it.

(ii) Draw the pattern of arrangement of the iron filings when current is passed through the loop.

(b) (i) Draw a simplified labeled diagram of a hot cathode ray tube.

(ii) Name a common device where a hot cathode ray tube is used.

(c) (i) A certain nucleus X has mass number 14 and atomic number 6. The nucleus X changes to ${}_{7}Y^{14}$ after the loss of a particle.

(i) Name the particle emitted.

(ii) Represent this change in the form of an equation.

(iii) A radioactive substance is oxidized. What change would you expect to take place in the nature of its radioactivity? Give a reason for your answer.