Physics Sample Paper - 1

Board – ICSE	Class –10th	Topic – Full Portion Test	Max. Marks – 80	Time – 2.00 Hrs.

Section – I [40 marks]

Question 1 **[Each Que 2 Marks]**

1. How is force related to the momentum of a body?
2. (i) What is the weight of a body placed at the center of earth?
   (ii) What is the principle of an ideal machine?
3. A cook uses a 'fire tong' of length 28 cm to lift a piece of burning coal of mass 250 g. If he applies his effort at a distance of 7 cm from the fulcrum, what is the effort in S.I. unit? Take g = $10 m/s^2$.
4. (i) What do you mean by equilibrium of bodies?
   (ii) State two conditions for equilibrium.
5. An engine of power 200 W, operates for 4s, find the work done by the engine. If the force developed by the engine is 100 N, calculate the maximum displacement caused.

Question 2 **[Each Que 2 Marks]**

1. An erect, diminished and virtual image is formed when an object is placed between the optical center and principal focus of a lens.
   (i) Name the type of lens which forms the above image.
   (ii) Draw a ray diagram to show the formation of the image with the above characteristics.
2. Draw a ray diagram to illustrate, how a ray of light incident obliquely on one face of a rectangular glass slab of uniform thickness, emerges parallel to its original direction? Mention, which pairs of angles are equal?
3. Name any four regions of electromagnetic spectrum (other than visible light) in increasing order of wavelength.
4. On which day, a hot day or a cold day, an echo is heard sooner? Give reason for your answer.
5. (i) What name is given to sound waves of frequencies higher than 20 kHz?
   (ii) What name is given to the repetition of sound caused by the reflection of sound waves?

Question 3 **[Each Que 2 Marks]**

1. An observer stands at a distance of 850 m from a cliff and fires a gun. After what time-gap will he hear the echo, if sound travels at a speed of 350 ms^{-1} in air?
2. You have just paid the electricity bill for your house:

   (i) What was it that your family consumed for which you had to pay?

   (ii) In what unit was it measured?
3. Why is the filament of the electric iron or electric kettle put between mica sheets?
4. Explain briefly, how a fuse protects an electric circuit?
5. Is the specific heat of ice same as that of water?

Question 4 **[Each Que 2 Marks]**

1. (a) (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.
2. What do you understand by the following statements:

   (i) The heat capacity of the body is 60 JK^{-1}.

   (ii) The specific heat capacity of lead is 130 J kg^{-1} K^{-1}.
3. Calculate the energy released when a mass of 1 kg is completely converted into energy. (Velocity of light is 3 x 10^8 m/s)
4. What arc isotones? Give an example.
5. An element X changes to another element Y with the emission of beta particles. Write down the equation showing changes in the nucleus. Take the proton number and mas. number of X, as Z and A respectively.
6.

Section – II [40 marks]

Attempt any four questions from them.

Question 5

1. Define: [3]

   (i) Work

   (ii) Power and

   (iii) Energy.
2. (i) Define the S.I. unit of force. [1]

   (ii) How is work done related to the applied force? [1]

(iii) By what factor does the kinetic energy of a moving body change when its speed is reduced to half? [1]

3. (i) From the ground floor, a man comes up to the fourth floor of a building using the staircase. Another person comes up to the same floor using an elevator. Neglecting friction, compare the work done in the two cases. [2]

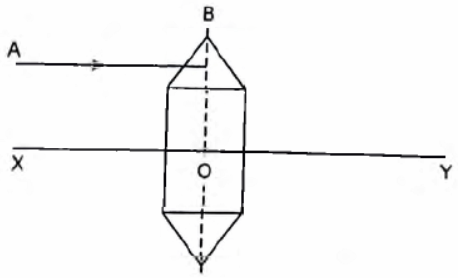
   (ii) A boy weighing 40 kgf climbs up a stair of 30 steps each 20 cm high in 4 minutes and a girl weighing 30 kgf does the same in 3 minutes. Compare: [2]

   (a) The work done by them.

   (b) The power developed by them.

Question 6

1. A ray of light falls normally on a glass slab. [3]
   (i) Draw diagram showing the path of the ray till it emerges out of the slab.
   (ii) What is the angle of incidence?
   (iii) What is the angle of refraction at each surface of slab?
2. A ray of light in passing from one transparent medium to the other medium having different optical density, bends. [3]
   (i) Name the phenomenon. Give reason for it.
   (ii) How do the following quantities change: speed, wavelength, frequency and amplitude if the second medium is denser than the first medium?
   (iii) State whether the ray of light will bend or not, if both medium have same optical densities.
3. The diagram below shows a lens as a combination of glass block and two prisms. Copy the diagram and answer the following questions: [4]
   (i) Name the lens formed by the combination.
   (ii) What is the line XY called?
   (iii) Complete the ray diagram and show the path of the incident ray AB after passing through the lens.
   (iv) The final emergent ray will either meet XY at a point or appear to come from a point on XY. What is the point called?



Question 7

1. The stem of a vibrating tuning fork is pressed against a table top.

(i) Will it produce an audible sound? [1]

(ii) Does it cause the table top to set in vibrations? If yes, what type of vibration are they? [2]

(iii) Under what condition does it lead to resonance? [1]

2. What are damped vibrations? How do they differ from natural vibrations? Give one example [3]

3. (i) (1) A certain sound has a frequency of 256 hertz and a wavelength of 1-3 m. Calculate the speed with which the sound travels. [1]

(2) What difference would be felt by a listener between this sound and another sound travelling at the same speed but of wavelength 2-6 m? [1]

(ii) What change, if any, would you expect in the characteristics of a musical sound when we increase: [1]

(1) Its frequency,

(2) Its amplitude.

Question 8

1. Four cells, each of e.m.f. 2 V and internal resistance 2Ω are connected in parallel, to form battery. The battery is connected to external resistance of 2.5 Ω and two resistance of 6Ω and 3Ω in parallel. Draw a circuit diagram and answer: [3]

(i) What is current in the main circuit?

(ii) What is current in 6Ω wire?

(iii) What is the drop in potential?

2. In an experiment of verification of Ohm's law, following observations are obtained: [3]

V (in V)	0.5	1.0	1.5	2.0	2.5
I (in A)	0.2	0.4	0.6	0.8	1.0

(i) Draw a graph between V and I.

(ii) Calculate potential difference V when the current I is 0.5 A.

(iii) Calculate current I when the potential difference V is 0.75 V.

3. (i) Explain briefly the functions of the following in the household wiring: [2]

(a) A three – pin plug

(b) Main switch

(ii) (1) What is the relation between the volt, the joule and the coulomb? [1]

(2) A cell has an e.m.f. of 'E' in volt and internal resistance of 'r' in ohm. When resistance of 2Ω and 5Ω are connected in turn, across its terminals, current of 0.5 A and 0.25A respectively pass through the circuit. Calculate the value of E and r. [1]

Questions 9

1. (i) Define temperature of a substance. State its S.I. unit. [2]
   (ii) Give one example each where high heat capacity of water is used: [2]
   (a) In cooling
   (b) As heat reservoir
2. 400 g of water at 50.5 ℃ is coold down to 10℃ by adding m g of ice cubes at 0℃ in it. Find m. take specific heat capacity of water = 4.2 Jg^{-1} $℃^{-1}$ and specific latent heat of ice = 336 Jg^{-1}. [2]
3. (i) The temperature recorded by a thermometer decreases when its bulb is covered with a piece of cloth soaked in spirit. Explain why? [2]
   (ii) A bucket contains 8 kg of water at ℃. 2kg of water at 80℃ pured into it. Neglecting the heat absorbed by the bucket, calculate the final temperature of the water. [2]

Questions 10

1. 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 a nucleus B. What k the composition of the nucleus?
   (ii) The nucleus B emits a beta particle and is transformed into a nucleus C. What is the composition of the nucleus C?
   (iii) Does the composition of nucleus C change if it emits gamma radiations?
2. What is a nuclear reactor? What is meant by enrichment of nuclear fuel? When does a nuclear reactor become critical? [3]
3. (i) Name the technique used to estimate the age of very old trees, plants, wood and other such specimens. Name the isotope that forms the basis of this technique. [2]
   (ii) Describe briefly, two properties each of alpha particles and gamma radiations. [2]