**GUIDELINES**

(By Subrata Sir & group of ICSE and CBSE school teachers)

ICSE EXAMINATION–2023

**PHYSICS**

**(Mock Test - 1)**

*Time allowed : Two hours Maximum Marks : 80 Answers to this Paper must be written on the paper provided separately.*

*You will not be allowed to write during first 15 minutes.*

*This time is to be spent in reading the question paper.*

*The time given at the head of this Paper is the time allowed for writing the answers, Section A is compulsory. Attempt any four questions from Section B.*

*The intended marks for questions or parts of questions are given in brackets [ ].*

# SECTION A

*(Attempt all questions.)*

1. Choose the correct answers to the questions from the given options. [15]
   1. Converting I N-m into COS unit will yield
      1. 1 gf m (b) 98 dyne cm

(c) 980 dyne cm (d) None of these

* 1. An electron and a proton are detected in a cosmic ray experiment, the first with kinetic energy 10 keV and the second with the 100 keV. Obtain the ratio of speed of electron to that of proton speeds. (Take, electron mass = 9.1110–31 kg, proton mass =1.6710–27 kg, and leV = 1.60l0–19J)

(a) 12.81 (b) 6.16

(c) 13.54 (d) 11.62

* 1. The raindrops fall on the ground. It has maximum kinetic energy at
     1. surface of the earth
     2. just leaving the clouds
     3. mid-way between the earth and cloud
     4. None of the above
  2. As compared to 12C atom, 14C atoms has
     1. two extra protons and two extra electrons
     2. two extra protons but no extra electrons
     3. two extra neutrons but no extra electrons
     4. two extra neutrons and two extra electrons
  3. Absolute refractive index of some materials *A, B, C* and *D* are given as below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Medium | A | B | C | D |  |
| Refractive index | 1.54 | 1.33 | 2.42 | 1.65 |  |

In which of these materials, light travels fastest?

* + 1. A (b) B

(c) C (d) D

* 1. Two lenses of power –3.5 D and +1.0 D are placed in contact with each other. What is the focal length of this combination?
     1. 10 cm (b) 20 cm

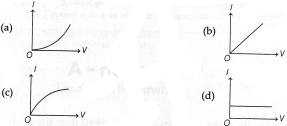
(c) 30 cm (d) 40 cm

* 1. Sound waves of wavelength  travelling in a medium with a speed of *v* m/s enter anoth ;- medium, where its speed is 2v m/s. What will be the wavelength sound waves in th: second medium?

(a)  (b) 4

(c) 2 (d) 3

* 1. Which of the following does not produce a sound wave ?
     1. A bell ringing under water
     2. A gun fired in a room with no echoes
     3. A hammer hitting a block of rubber
     4. An explosion in outer space
  2. The *V-I* characteristics of four circuit elements are shown below. Which among the following characteristics is of ohmic conductor?



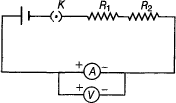
* 1. To determine the equivalent resistance of a series combination of two resistors *R*

*1*

*2*

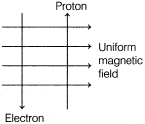
following arrangement is done by a student.

and *R*



Which of the following statement is true about the given arrangement?

* + 1. It will give incorrect reading for I as well as for V.
    2. It will give correct reading for I but incorrect reading for V.
    3. It will give incorrect reading for I but correct reading for V.
    4. It will give correct reading for both I and V.
  1. A uniform magnetic field exists in the plane of paper, point from left to right as shown in figure. In the field, an electron and a proton moves as shown and experiences forces. Which of the following statement is true?



* + 1. Both particles will move into the plane of paper.

1. Electron will move into plane of the paper, while proton will move out of the plane of paper.
2. Electron will move opposite while proton will move along the direction of field.
   1. Pure steam at 100°C is passed into a bottle containing 1.6 kg of cold water at 20°C. How much steam is needed to raise the temperature of cold water by 100°C ?

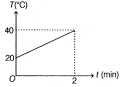
(Take, specific heat capacity of water = 4.2l03 Jkg–1 °C–1 and specific latent heat of steam

= *2.*24106 J kg–1)

(a) 0.21 kg (b) 0.22 kg

(c) 0.23 kg (d) 0.24 kg

* 1. A substance of mass 1.5 kg is heated by a 100 W heater. Using the graph given belowP,.Tfi.nOd the specific heat capacity of the substance.



(a) 320 Jkg–1 °C–1 b) 400 Jkg–1 °C–1

(

(c) 480 Jkg–1 °C–1 (d) 520 Jkg–1 °C–1’

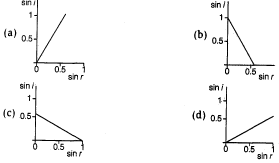
* 1. How does the light should enter the glass to produce a large amount of bending?
     1. Obliquely, making a small angle of incidence
     2. Obliquely, making a large angle of incidence
     3. Perpendicularly to the glass surface
     4. All of the above
  2. A ray of light enters a glass block at an angle of incidence *i,* producing an angle of refraction

*r* in the glass.

Several different values ured and a graph is drawn of sin *i* against sin *r.*

of *i* and *r* are meas

Which graph is correct ?



1. (i) (a e crossing a river, why? [1]

) The passengers in a boat are not allowed to stand whil

) What is the name given to atoms a substance which ha

(b ve the same atomic number but

different mass number ? [1]

(c) What is the difference in the atomic structure of such atoms? [1]

1. A meter scale is balanced on a knife edge at its centre. 10 g weight is put one on top of the other at the 12 cm mark, the scale is found to be balanced at 45.0 cm. What is the mass of the meter scale? [2]
2. What is neutral equilibrium? Give explanation. [2]
3. A boy of mass 30 kg is sitting at a distance of 2 m from the middle of a see-saw. Where should a boy of mass 40 kg sit, so as to balance the see-saw? [2]
4. A lift is designed to carry a load of 4000 kg through 10 floors of a building average of 6 m per floor, in 10s. Calculate
   1. velocity of the lift and [1]
   2. power of the lift [1]
5. (a) A boat which is stationary at a distance of 1500 m from the shore, sends a signal to the

coast. Its echo is heard in 10s. Find the velocity of sound. [1]

(b) Why the window glasses of a car starts vibrating violently, when loud music is played inside it? [1]

1. V-I graph for a given metal at two temperatures are shown, which of these metals, is for a higher temperature? [2]



1. (i) (a) Hew image of an object is formed by a camera lens? [1]

(b) Draw a ray diagram to show the above procedure. [1]

1. Calculate the equivalent resistance between A and B from the following diagram. [2]



1. State the energy change which takes place when a magnet is moved inside a coil having a galvanometer at its ends. Name this phenomenon. [2]

(iv|) An iron ball requires 6000 J heat energy to raise its temperature by 20°C. Calculate the heat capacity of the iron ball. [2]

(v) (a) What are ultraviolet radiations? [1]

(b) State one use of ultraviolet radiations. [1]

# SECTION B

*[Attempt any four questions.]*

1. (i) (a) Which type of rays exist beyond visible red end of the electromagnetic spectnrum ? State one use of these rays. [2]

(b) Which type of rays exist before visible violet end of the electromagnetic spectnrum ? Name a source for these radiations. [1]

1. (a) Draw a rays diagram to show 180° deviation with the help of prism. [2]

(b) What is the name of the prism used. [1]

1. A ray of light strikes the surface of a rectangular glass block such that the angle of incidence is 0°.
   1. Sketch a diagram to show the approximate path taken by the ray as it passes through the glass block and emerges from it. [1]
   2. State the conditions required for total internal reflection of light to take place. [2]
   3. Draw the emergent ray if angle of incidence is not equal to zero. [1]
2. (i) (a) Define power of a lens. [1]
3. Write the formula to calculate it. [1]
4. What is its SI unit? [1]
5. (a) How are angle of incidence and angle of emergence related when prism is in position of minimum deviation?

(b) The critical angle for material of which the equiangular prism *ABC* (shown in figure) is made, is of 60°. A ray of light incident on the side *AB* of the prism is refracted along *DE* such that the angle it makes with the side *AC* is 150°. Also *EDE=90°.* Draw the path of the incident ray on the side *AB* (which travels along *DE)* and also the path which the ray *DE* travels from the point *E* onwards. [2]



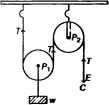
1. (a) Study the given diagram. [3]



* 1. Copy and complete the ray diagram showing the formation of the image
  2. Name the lens *LL’* used.
  3. State the characteristics of the image formed,

(b) Name the lens that forms image between *F2* and *2F2.* [1]

1. (i) The figure shown below is the combination of a movable pulley *Pl* with a fixed pulley *P2,* is used for lifting up a load *w.*



1. If the free end C of the string moves through a distance *x,* by what distance is the load

*w* raised? [1-1-]

2

1. What effort *E* has to be applied at *C* to just raise the load, w = 20 kgf ? Neglect the

2

weight of the pulley *Pl*

and the friction. [1-1-]

1. Verify the principle of moments. [3]
2. (a) A water pump raises 50 L of water through a height of 25 m in 5 s. Calculate the work done and the power which the pump supplies. (Take, =10 m/s2, =1000 kg/m3) [2]

(b) How is the kinetic energy of a moving cart affected if I its mass is doubled.

II. its velocity is tripled. [2]

1. (i) (a) What is meant by an echo? Mention one important condition that is necessary for an echo to be heard distinctly. [1-1-]

2

(b) A boy stands 60 m in front of a tall wall and claps. The boy continues to clap every time an echo is heard. Another boy finds that the time taken between the first and fifty first clap is 18 s. Calculate the speed of the sound. [1-1-]

2

1. (a) What is the nature of beta particles? Explain briefly how beta particles are ejected from the nucleus of an atom. [1-1-]

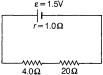
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(b) Alpha and beta particle are deflected in an electric or a magnetic field, but gamma rays are not deflected in such a field. Give reason. [1-1-]

2

1. (a) Why is white light considered to be polychromatic in nature? [1]
2. Calculate the speed of electromagnetic wave in a glass slab in which frequency of electromagnetic wave is 4l014 Hz and wavelength is 500 nm. [1]
3. A radio can tune into any station from 7.5 MHz to 12 MHz band. What is the corre- sponding wavelength band? [2]
4. (i) A cell of emf 1.5 V and internal resistance 1.0 *.* is connected to two resistors of 4.0  and

20.0  in series as shown in figure.



Calculate the

1. current in the circuit, [1]
2. potential difference across the 4.0  resistor and [1]
3. voltage drop when the current is flowing. [1]
4. One isotope of uranium has a mass number 235 and atomic number 92.
   1. What is the number of electrons in the neutral atom of this isotope? [1]
   2. What is the number of protons and number of neutrons in its nucleus? [1]
   3. Do all isotopes have the same number of neutrons? [1]
5. (a) Which is the better way to connect lights and other appliances in domestic circuit, series connection or parallel connection? Justify your answer. [2]

(b) An electrician has made electric circuit of a house in such a way that, if a lamp gets fused in a room of the house, then all the lamps in other rooms of the house stop working. What is the defect in this type of circuit wiring? Give reason. [2]

1. (i) (a) Iron has specific heat capacity of 0.419 kJ kg–1 oC–1. What can be understood by this statement? [1]

(b) Why does temperature of a substance remain constant during melting and vaporisation even when heat is being supplied to it continuously? [2]

1. A vessel of negligible thermal capacity contains 5 kg of water at 50°C. If 5.0 kg of ice at *0°C*

is added to it, find

* 1. heat energy imparted by water in fall of its temperature from 50°C to 0°C. [1]
  2. mass of ice melted and [1]
  3. final temperature of mixture. Given, specific heat capacity of water = 4200 J kg–1K–1’, specific latent heat of ice = 336 kJ kg–1. [1]

1. (a) Mention the three processes by which the strength of electromagnet is increased. [1-1-]

2

1. Write the three uses of electromagnet. [1-1-]

2

1. Write any one difference between electromagnet and permanent magnet. [1]