

Sample Paper 10
ICSE Class X 2023-24
Physics
Science Paper - 1

Time: 2 Hours

Max. Marks: 80

General Instructions:

1. Answer to this Paper must be written on the paper provided separately.
 2. You will not be allowed to write during first 15 minutes.
 3. This time is to be spent in reading the question paper.
 4. The time given at the head of this Paper is the time allowed for writing the answers.
 5. Section A is compulsory. Attempt any four questions from Section B.
 6. The intended marks for questions or parts of questions are given in brackets [].
-

SECTION - A

(Attempt all questions from this Section.)

QUESTION 1.

Choose the correct answers to the questions from the given options.

[15]

(Do not copy the questions, write the correct answer only.)

- (i) A force of 50 N produces a moment of force of 10 Nm in a rigid body. Calculate the perpendicular distance between the point of application of force and the turning point is 45 cm.
- | | |
|-----------|-----------|
| (a) 1.5 m | (b) 0.1 m |
| (c) 0.2 m | (d) 0.8 m |
- (ii) During energy transformation some form of energy is given out without it being used anywhere. Such an energy is called
- | | |
|---------------------|-------------------------------|
| (a) stored energy | (b) dissipated form of energy |
| (c) wasteful energy | (d) backup energy |
- (iii) During free fall the total energy at $\frac{3}{4}$ th the height is
- | |
|---|
| (a) gravitational potential energy at the top |
| (b) constant |
| (c) $\frac{3}{4}$ th the initial potential energy. |
| (d) zero |
- (iv) When an element gives out high energy radiations on its own, the change which takes place is :
- | | |
|---------------------|---------------------|
| (a) nuclear change | (b) chemical change |
| (c) physical change | (d) none of these |

- (v) **Assertion :** 40 W tube light give more light in comparison to 40 w bulb.

Reason : Light produced is same from same power.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
 (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
 (c) Assertion (A) is true but reason (R) is false.
 (d) Assertion (A) is false but reason (R) is true.

- (vi) State T for true and F for false

- I. To recombine the spectrum to obtain white light, the dispersive prism and recombination prism should be in same position.
 II. If a glass prism is dipped in water, its dispersive power decreases.
 III. When sunlight comes down through the clouds, Tyndall effect is observed.
 IV. Headlights are made of yellow colour because of its long wavelength and low scattering.

	I	II	III	IV
(a)	T	T	T	T
(b)	F	T	T	T
(c)	F	F	T	T
(d)	F	T	F	T

- (vii) A person standing between two cliffs hears two echo one after 3s and another after 4 sec, so time taken for first echo is and that for second echo is

- (a) 3 s, 7 s
 (b) 7 s, 7 s
 (c) 3 s, 4 s
 (d) 3 s, 1 s

- (viii) An echo is heard after 0.8 s, when a person fires a cracker, 132.8 m from a high building. Calculate the speed of sound.

- (a) 632 ms^{-1}
 (b) 432 ms^{-1}
 (c) 532 ms^{-1}
 (d) 332 ms^{-1}

- (ix) A bulb has a resistance of 20Ω and the potential difference across its terminals is V. If the bulb is used for t seconds then energy consumed by the bulb is :

- (a) $\frac{V}{20} \times t$
 (b) $\frac{V \times t^2}{20}$
 (c) $\frac{V^2}{20} \times t$
 (d) $V \times t = 20$

- (x) The direction of current in a conductor can be obtained by?

- (a) Fleming right hand rule
 (b) Maxwell's cork-screw rule
 (c) Fleming left hand rule
 (d) Right hand thumb rule

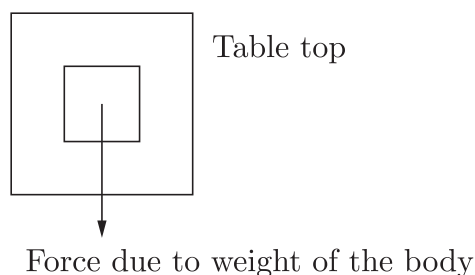
- (xi) A main switch in the main distribution board is present in
(a) A live wire (b) a neutral wire
(c) a live as well as neutral wire (d) an earth wire
- (xii) 4000 calories of heat energy is supplied to crushed ice at 0°C , such that it completely melts to form water at 0°C . If sp. latent heat of fusion of ice is 80 cal g^{-1} , what is the mass of ice ?
(a) 5 g (b) 25 g
(c) 50 g (d) 45 g
- (xiii) The S.I. unit of specific heat capacity is :
(a) $\text{kJ kg}^{-1} \text{K}^{-1}$ (b) J k^{-1}
(c) $\text{J kg}^{-1} \text{K}^{-1}$ (d) J kg^{-1}
- (xiv) Velocity of light is more in than
(a) water, air (b) sea water, mineral water
(c) air, water (d) brown glass, transparent glass
- (xv) The device used in the figure uses radiations to cook food.



- (a) safe vault (b) mini oven
(c) microwave oven (d) none of these

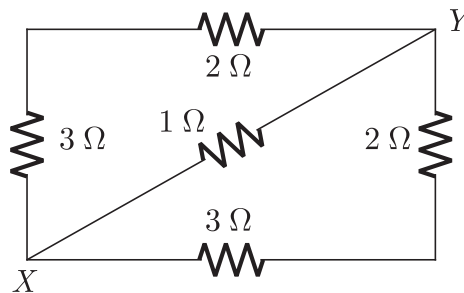
QUESTION 2.

- (i) What step could be taken to increase the mechanical advantage of a lever ? [3]
- (ii) 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]



- (a) Name the force exerted by the table top.
(b) What is the direction of the force ?

- (iii) A simple machine enables us to lift a load of 10000 N by the application of an effort of 500 N. However, when the point of application of the effort moves through 2.5 m, the load gets raised through 10 cm only. What are the values of the (a) M.A. and (b) V.R. ? [2]
- (iv) Does a coolie carrying load on his head do any work while standing or while moving? If not, why? [2]
- (v) Write the circumstances in which work done by a force is zero. [2]
- (vi) Calculate the resistance between the points X and Y in the network shown below : [2]



- (vii) (a) Draw a graph between displacement and the time for a body executing free vibrations.
(b) Where can a body execute free vibrations? [2]

QUESTION 3.

- (i) (a) Name a prism required for obtaining a spectrum of Ultraviolet light. [2]
(b) Name the radiations which can be detected by a thermopile.
- (ii) (a) What is an A.C. generator or dynamo used for? [2]
(b) Name the principle on which it works.
- (iii) The wires connected to a bulb do not glow whereas the filament of a bulb glows when current flows through it. [2]
- (iv) A bucket contains 8 kg of water at 25°C . 2 kg of water at 80°C is poured into it. Neglecting the heat absorbed by the bucket, calculate the final temperature of the water. [2]
- (v) State whether following nuclear disintegrations are allowed or not ? (Star indicates excited state). [2]
(a) ${}_Z^*X^A \longrightarrow {}_ZX^A + \gamma$ -rays
(b) ${}_ZX^A \longrightarrow {}_{Z-2}^*X^A + {}_2\text{He}^4$.

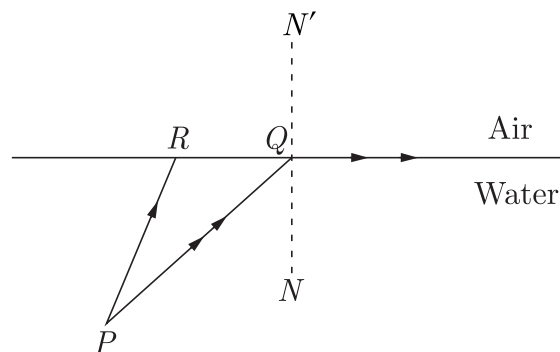
SECTION - B

(Attempt any four questions.)

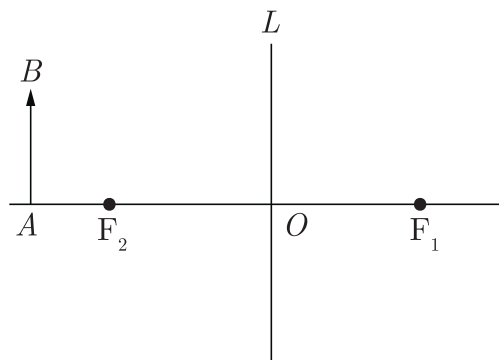
QUESTION 4.

- (i) PQ and PR are two light rays emerging from the object P as shown in the figure below:

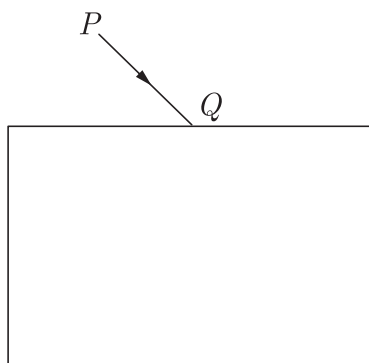
[3]



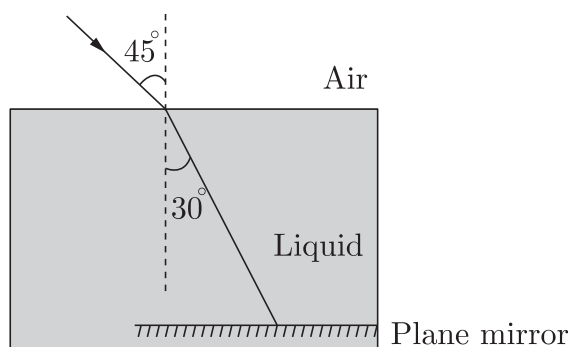
- What is the special name given to the angle of incidence ($\angle PQN$) of ray PQ ?
 - Copy the ray diagram and complete it to show the position of the image of the object P when seen obliquely from above.
 - Name the phenomenon that occurs if the angle of incidence $\angle PQN$ is increased still further.
- (ii) The diagram below shows an object AB placed on the principal axis of a lens L . The two foci of the lens are F_1 and F_2 . The image formed by the lens is erect, virtual and diminished. Copy the diagram and answer the following questions: [3]
- Draw the outline of the lens (L) used.
 - Draw a ray of light starting from B and passing through O . Show the same ray after refraction by the lens.
 - Draw another ray from B , which after passing parallel to the principal axis, is incident on the lens and emerges after refraction from it.



- (iii) (a) In the diagram given below, PQ is a ray of light incident on a rectangular glass block. [4]



- (1) Copy the diagram and complete the path of the ray of light through the glass block. In your diagram, mark the angle of incidence by letter i and the angle of emergence by the letter e .
 - (2) How are the angles i and e related to each other?
- (b) A ray of monochromatic light enters a liquid from air as shown in the diagram given below.



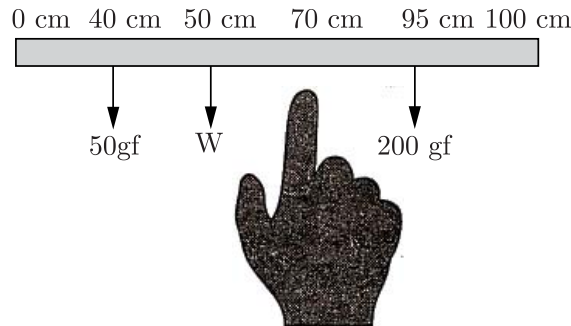
- (1) Copy the diagram and show in the diagram the path of the ray of light after it strikes the mirror and re-enters the medium of air.
- (2) Mark in your diagram the two angles on the surface of separation when the ray of light moves out from the liquid to air.

QUESTION 5.

- (i) A postage stamp appears raised by 7.0 mm when placed under a rectangular glass block of refractive index 1.5. Find the thickness of the glass block. [3]
- (ii) (a) A glass slab is placed over a page in which VIBGYOR is printed where every letter is printed with its corresponding colour. Will the image of all the letters lie in the same plane? If not which letter will appear to be raised maximum? [3]
- (b) What is a periscope? Draw a ray diagram using right angled prisms.
- (iii) (a) Sound made in front of a tall building 18 m away, is repeated. Name the phenomenon and briefly explain it. [4]
- (b) A tuning fork, held over an air column of a given length, produces a distinct audible sound. What do you call this phenomenon? How does it occur?

QUESTION 6.

- (i) Shyam is trying to balance a meter rod on his finger as shown in the diagram. Two weight 50 gf and 200 gf at 40 cm and 95 cm respectively and his finger at 70 cm. [3]



- (a) Find the anti-clockwise moment and clockwise moment.
 (b) Find the weight of meter rod.
- (ii) A simple machine enables us to lift a load of 10000 N by the application of an effort of 500 N. However, when the point of application of the effort moves through 2.5 m, the load gets raised through 10 cm only. What are the values of the (a) M.A., (b) V.R. and (c) Efficiency of the machine? [3]
- (iii) A man drops a 50 kg stone from the top of a ladder of length 10 m. What is its kinetic energy. When it reaches the ground? What is its speed just before it hits the ground ? [Take $g = 9.8 \text{ ms}^{-2}$] [4]

QUESTION 7.

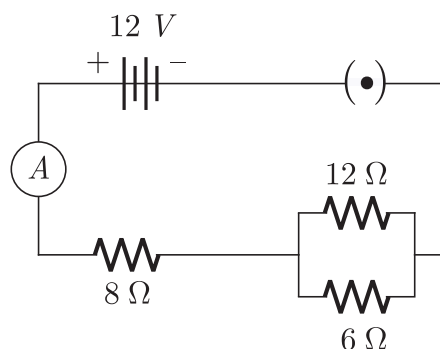
- (i) (a) A wire of length 80 cm has a frequency of 256 Hz. Calculate the length of a similar wire under similar tension, which will have frequency 1024 Hz. [3]
 (b) A certain sound has a frequency of 256 hertz and a wavelength of 1.3 m.
 (1) Calculate the speed with which this sound travels.
 (2) What difference would be felt by a listener between the above sound and another sound travelling at the same speed but of wavelength 2.6 m ?
- (ii) Name the radiations : [3]
 (a) that are used for photography at night.
 (b) used for detection of fracture in bones.
 (c) whose wavelength range is from 100 \AA to 4000 \AA (or 10 nm to 400 nm).
- (iii) A block and tackle pulley system has a velocity ratio 3. [4]
 (a) Draw a labelled diagram of this system. In your diagram, indicate clearly the points of application and direction of the load and effort.
 (b) Why should the lower block of this pulley system be of negligible weight ?

QUESTION 8.

- (i) A coil of copper wire is connected to a galvanometer. What would happen if a bar magnet were : [3]
- (a) pushed into the coil with its north pole entering first?
 - (b) pulled out of the coil?
 - (c) held stationary inside the coil?
- (ii) What are radio-isotopes ? Name four uses of these isotopes. [3]
- (iii) An electrical heater is rated 4 KW, 220 V. Calculate : [4]
- (a) The current,
 - (b) Resistance of the heater,
 - (c) Energy consumed in 2 hrs.,
 - (d) Total cost if 1 KWh is charged at Z 0.50.

QUESTION 9.

- (i) (a) Define heat capacity and state its SI unit. [3]
- (b) Why is the base of a cooking pan generally made thick ?
- (c) How is the transference of heat energy by radiation prevented in a calorimeter ?
- (ii) Draw a well labelled diagram showing the changes taking place (a) while heating and (b) while cooling a substance. [3]
- (iii) Three resistors are connected to a 12 V battery as shown in the figure given below: [4]



- (a) What is the current through the 8 ohm resistor?
- (b) What is the potential difference across the parallel combination of 6 ohm and 12 ohm resistor?
- (c) What is the current through the 6 ohm resistor?

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