# PRE- BOARD II 2025-26

## CLASS –X,PHYSICS

## SCIENCE PAPER-1

Maximum Marks : **80**

Time allowed : **Two hours**

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 from this section)***

**Question 1**

**Choose the correct answers to the questions from the given options :** **[15]**

**(i)** The nuclear radiations which are **deflected** by a magnetic field are:

**(a)** only α, γ (b) only α, β (c) only β, γ (d) α, β and γ

**(ii)** Three substances A, B and C have equal thermal capacities. Given $M_A > M_B > M_C$ (where $M_A$, $M_B$ and $M_C$ are masses of A, B and C respectively). Which of the following gives the correct relation of their specific heat capacities. $C_A$, $C_B$ and $C_C$ are specific heat capacities of A, B and C respectively :

**(a)** $C_A = C_B = C_C$ (b) $C_A > C_B > C_C$ (c) $C_A < C_B < C_C$ (d) None of these

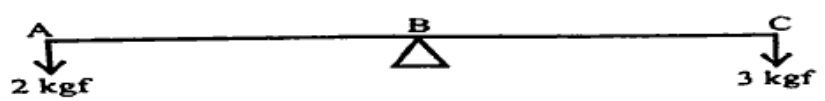
**(iii)** Light of wavelength λ enters from air into glass of refractive index μ. Inside glass, the wavelength of light is:

(a) μλ (b) λ/μ (c) μ/λ (d) λ

**(iv)** A solar cell converts solar energy into:

**(a)** heat energy (b) mechanical energy (c) chemical energy (d) electrical energy

**(v)** In the diagram given below, the rod AC pivoted at B is in equilibrium.




Choose appropriate relation.

(a) $AB = \frac{2}{3}$ BC (b) $AB = \frac{3}{2}$ BC (c) $AB = \frac{3}{5}$ BC (d) $AB = \frac{2}{5}$ BC

**(vi)** A bass drum produces wave **'X'**, when struck with a force of 20 N and wave **'Y'**, when struck with a force of 40 N, at the same point on the drum. Which of the following statement is correct with respect to the characteristics of sound?

**(a)** X is shriller than Y (b) Y is louder than X

(c) X is louder than Y (d) Y is shriller than X

**(vii)** A transformer **cannot** raise or lower the voltage of a D.C. supply because:

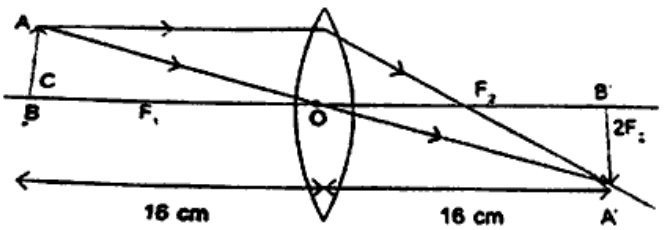
**(a)** There is no need to change the D.C. voltage.

**(b)** D.C. circuit has more losses.

**(c)** There is no variation of magnetic flux over time.

**(d)** Only A.C. is required to be altered.

**(viii)** In the diagram given below AB is the object and A'B' is the image. If the size of the image is same as the size of the object, then the focal length of the given lens will be:




**(a)** 4 cm (b) 16 cm (c) 32 cm (d) 8 cm

**(ix)** Four strings are stretched equally as given below. Which one will produce the sound of highest pitchg on plucking:

**(a)** Thick string of length 10 m (b)Thin string of length 1 m

(c) Thin string of length 10 m (d) Thick string of length 1 m

**(x)** Which of the following is **not true** for free vibrations:

**(a)** its amplitude is constant

**(b)** its frequency is constant

**(c)** it takes place in a frictionless medium

**(d)** it has an external force of constant magnitude acting on it

**(xi)** The radiations used in remote control of T.V. sets are:

(a) Ultraviolet **(b)** Radio waves **(c)** Microwaves **(d)** Infrared

**(xii)** **Assertion(A)**: A thicker convex lens has smaller focal length than a thinner convex lens of same material.

**Reason(R)**: A thicker lens bends light lesser than a thinner lens.

**(a)** Both A and R are true and R is the correct explanation for A.

**(b)** Both A and R are true but R is not he correct explanation of A.

**(c)** A is true but R is false.

**(d)** A is false but R is true.

**(xiii)** The direction of force experienced by a conductor carrying current, when placed in a magnetic field , is given by:

**(a)** Clock rule (b) Lenz's law

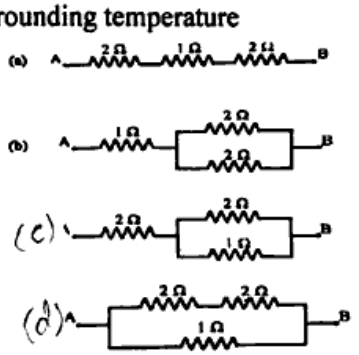
(c) Fleming's left hand rule (d) Fleming's right hand rule

**(xiv)** If a radioactive element is placed in an evacuated chamber , then the rate of radioactive decay will:

**(a)** decrease (b) increase

**(c)** remains unchanged (d) depends on the surrounding temperature

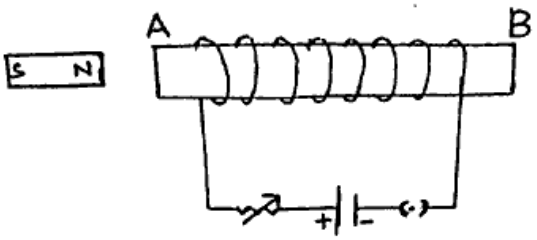
**(xv)** Which combination gives 2 Ω resistance across AB:




**Que**

**(i)** A small bar magnet is placed near an electromagnet as shown in the diagram. **[2]**

**(a)** In which direction will the magnet move, when current is allowed to flow through the circuit?




**(b)** Name the law used to find the polarities of the electromagnet?

**(ii)** Specific heat capacity of Aluminium is 0.882 J $g^{-1}$ $K^{-1}$. **[2]**

**(a)** Calculate the thermal capacity of an Aluminium bowl of mass 80 g.

**(b)** Express the specific heat capacity of Aluminium in S.I. unit.

**(iii)** Complete the following by choosing the correct answers from the bracket: **[6]**

**(a)** Unit of power used in mechanical engineering is_____ [watt / horse power / erg per second].

**(b)** Characteristic of any colour of light is its _____ [speed / frequency / wavelength].

**(c)** In a block and tackle system, decrease in the weight of the movable block _____ [decreases / does not affect / increases] the efficiency of the pulley system.

**(d)** The direction of induced current changes _____ in one complete rotation of a generator coil.[once / twice / 100 times].

**(e)** If the mass of a body is doubled and the velocity of the body is halved then the kinetic energy of the body _____ [is doubled / becomes half / remains same].

**(f)** Crowbar is an example of _____ [Class I / Class II / Class III] lever.

**Question 3**

**(i)** A ball of mass 2 kg is rolling with momentum 5 $kgms^{-1}$. Calculate: **[2]**

**(a)** its velocity

**(b)** its kinetic energy

**(ii)** **(a)** Name the waves used for echo-depth sounding. **[2]**

**(b)** Give one reason for their use in the above purpose.

**(iii)** A magician during a magic show , makes a lens of a particular material disappear by placing it in a bowl of liquid at room temperature: **[2]**

**(a)** Under what condition will this happen?

**(b)** If the liquid is heated through 20 °C, then what significant change will you observe?

**(iv)** Is it possible for a Hydrogen $\frac{1}{1}H$ nucleus to emit an alpha particle? Give a reason for your answer. **[2]**

**(v)** Aryan draws magnetic field lines close to the axis of a current-carrying circular loop. As he moves away from the centre of circular loop, he observes that the lines keep on diverging.

**[2]**

**(a)** Explain the reason for his observation.

**(b)** Write one property of magnetic field lines.

(vi) A fuse is rated 5 A. Can it be used with a geyser rated 1540 W, 220 V. Write Yes or No. Give supporting calculations to justify your answer. [2]

(vii) [3]
**(a)** Which class of lever always gives V.R. > 1?
**(c)** Along which marking the centre of gravity of a 6 inch plastic ruler lie?
**(d)** If the same ruler is made of steel, will there be a change in the position of the centre of gravity?

## SECTION B
***(Attempt any four questions from this section)***

### Question 4

(i) 'x' g of hot water at 50 ° C is mixed with 'y' g of cold water at 5 ° C. If the final temperature of the mixture is 20 ° C, then calculate the ratio x : y. (Neglect the heat taken by the calorimeter). [3]

(ii) **(a)** Define specific latent heat of fusion. [3]
**(b)** State the SI unit of specific latent heat of fusion.
**(c)** Why is there no change in the temperature during the change of phase of a substance?

(iii) **(a)** To reduce the radiation emitted from a radioactive source a student suggests to store it in a freezing unit which is maintained at -30 ° C. Is the given suggestion correct? Give a reason for your answer. [4]
**(b)** A beta particle is a high-energy electron. Which part of an atom emits this electron?
**(c)** Name the nuclear radiation with highest ionizing power.

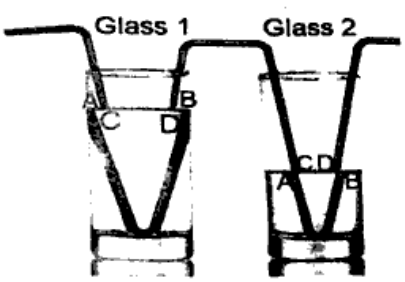
### Question 5

(i) Study the table below and answer the questions that follow: [3]

| FLUID | REFRACTIVE INDEX |
|---|---|
| Water | 1.33 |
| Glycerine | 1.47 |
| Ethyl alcohol | 1.36 |
| Vegetable oil | 1.45 |

**(a)** In which medium the speed of light will be minimum?
**(b)** How will the ray bend with respect to the normal, while entering **into** glycerin **from** vegetable oil?
**(c)** For a ray to suffer Total Internal Reflection in ethyl alcohol, what should be the pairing medium from the above table?

(ii) The diagram shows image of straws in Glass 1 and Glass 2 filled with water. [3]




**(a)** Name the phenomenon which is responsible for discontinuous appearance of straw in

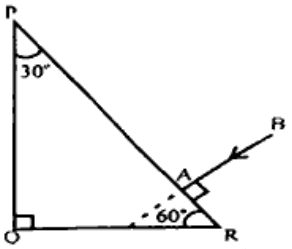
**(b)** Why is the difference, (AB - CD) **greater** in **Glass 1** as compared to the difference in **Glass 2**?

**(c)** If we replace water with a liquid of higher optical density, then what will be the effect on the difference (AB-CD)?

**(iii)** Study the diagram below and answer the following questions: **[4]**

**(a)** Complete the path of the ray AB through the given prism of critical angle 42°, till it emerges out of the prism.

**(b)** State the angle of refraction at the surface PR.




**Question 6**

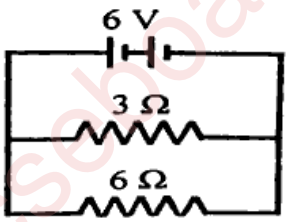
**(i)** Study the circuit diagram carefully and answer the questions that follow: **[3]**

Calculate:

**(a)** The resistance of the circuit.

**(b)** The current drawn from the cell.

**(c)** The ratio of the currents through 3 Ω and 6 Ω.




**(ii)** Name the following with respect to the household circuit: **[3]**

**(a)** the device that protects the main ring circuit.

**(b)** the accidental contact between live and neutral wire.

**(c)** the thickest pin in a three-pin plug.

**(iii)** **(a)** In general, what is the frequency of the domestic supply voltage in India? **[4]**

**(b)** An A.C. dynamo of a cycle, is a small device which is located near the wheel of the bicycle. As the cycle is peddled, the rotation of the wheel causes the internal components of the dynamo to move, producing electric current.

**1.** Name the principle on which dynamo works.

**2.** What is the energy conversion that occurs in a dynamo.

**3.** How does the speed of the bicycle affect the output of the dynamo?

**Question 7**

**(i)** **(a)** When sunlight enters earth's atmosphere, which colour of light is scattered the **most** and why? **[4]**

**(b)** Arrange the following radiations in the **decreasing order** of their wavelength:

**X-rays, infrared, microwaves, ultraviolet**

**(c)** Name the radiation used to detect the purity of gems.

**(ii)** A uniform half metre ruler is balance at 30 cm mark when a weight of 50 gf is suspended from 40 cm mark. Calculate the weight of metre ruler. Draw the diagram of this arrangement. **[3]**

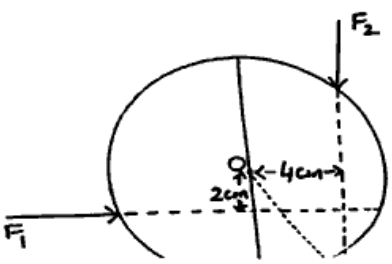
**(iii)** An object is kept at a distance of 14 cm, in front of a concave lens of focal length 21 cm. **[3]**

**(a)** Calculate the position of the image formed.

**(b)** If the object is moved further away from the lens, what will be the effect on the size of the image?

**Question 8**

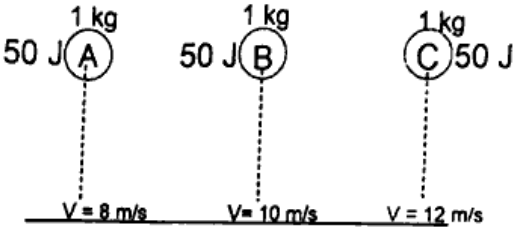
**(i)** The figure below shows a disc of radius 6 cm that can rotate freely about its centre O. It is in **equilibrium** due to forces $F_1$ and $F_2$ acting on it. **[3]**



**(a)** Which of the two forces $F_1$ or $F_2$ is greater?
**(b)** What is the ratio of the magnitudes of $F_1$ and $F_2$?
**(c)** If the point of application of $F_1$ is changed to 'P' along PO then, state the direction of rotation of the wheel.

**(ii)**

Three balls A, B and C of mass 1 kg each are released from a certain height as shown in the diagram. Their potential energy is 50 J each. The velocities with which they touch the ground are given in the diagram. **[3]**



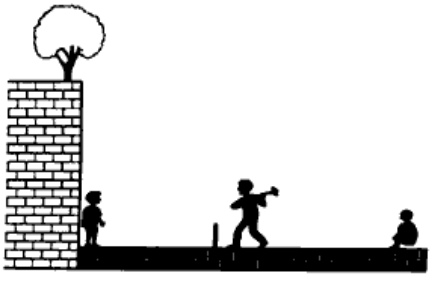

**(a)** Which ball(s) is/are contradicting the law of conservation of energy?
**(b)** Justify your answer.

**(iii)** **(a)** Draw a labelled diagram of block and tackle system of pulley with V.R. = 3. In the diagram, mark the direction of L, E and Tension. **[4]**
**(b)** Why is there no **unit** to Mechanical Advantage?

**Question 9**

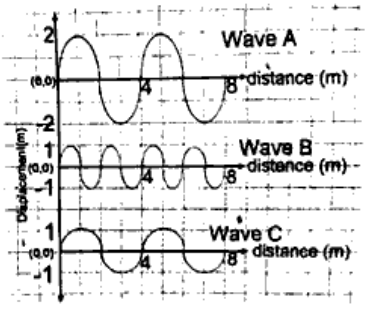
**(i)** During the initiation of spinning of the tub in a washing machine, the machine experiences violent jolts and the side panels begin to vibrate loudly. **[3]**
**(a)** Name the phenomenon which is responsible for this.
**(b)** How will you explain the cause of this loud noise to your mother?
**(c)** Why does the loud noise stop after some time?

**(ii)** A workman is hammering a lamp post into the ground. Some distance ahead is a vertical wall. A boy is standing at the base of the wall. The speed of sound in air is 330 $ms^{-1}$. It takes 1.5 second for the sound of hammer to reach the boy. **[3]**



A girl is standing at the same distance behind the post as shown in the diagram above.
**(a)** How long after the hammer strikes, will the girl be able to hear its echo?
**(b)** What is the distance of girl from the wall?

**(iii)** **(a)** Define **'quality'** of sound. **[4]**
**(b)** Study the below wave diagram and answer the questions that follow:




Among the waves A, B and C:
1. Which one is the loudest?
2. Which one is the shrillest?
3. A string instrument produces wave C. In order to produce wave B, what change needs to be made in the **same** string?