

**PRE - BOARD EXAMINATION 2024 – 25**  
**CLASS – X**  
**SUBJECT – PHYSICS**

*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.*

*Attempt all questions from Section A and any four questions from Section B.*

*All working, including rough work, must be clearly shown and must be done on the same sheet as rest of the answer.*

*Omission of essential working will result in loss of marks.*

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

**SECTION A**

**NOTE: Attempt ALL questions from this section**

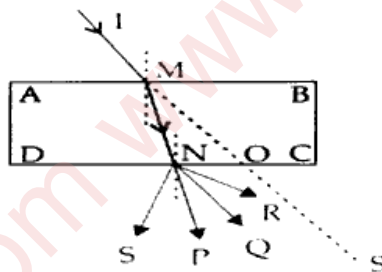
**Question 1.**

**Choose the correct option. (Write correct answer with correct option number, do not show solution)**

i. The heaviest nuclear radiation is: [1]

- (a)  $\alpha$  – radiation      (b)  $\beta$  – radiation      (c)  $\gamma$  – radiation      (d)  $x$  – radiation

ii. A ray of light IM is incident on a glass slab ABCD as shown in the figure below. The emergent ray for this incident ray is: [1]



- (a) ray NP      (b) ray NQ      (c) ray NR      (d) ray NS

iii. The kinetic energy of a body depends on: [1]

- (a) position      (b) centre of gravity      (c) momentum      (d) displacement

iv. The radio – active element used for argon dating is: [1]

- (a) Argon      (b) Potassium      (c) Carbon      (d) Uranium

v. Which transformer is used in the following device and which coil is thicker? [1]



- (a) step – up, secondary      (b) step – down, secondary      (c) step – up, primary      (d) step – down, primary

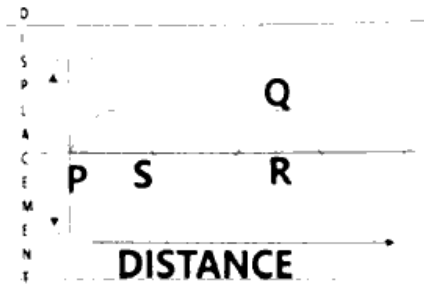
vi. Three metals A, B and C, are supplied with the same quantity of heat. Their masses are in the ratio 2:3:4. If they show the same rise in the temperature, then the ratio of their thermal capacities will be: [1]

- (a) 4 : 3 : 2      (b) 2 : 3 : 4      (c) 1 : 1 : 1      (d) 16 : 9 : 1

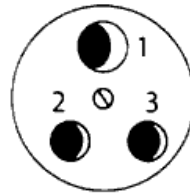
vii. The energy transformation in loud speaker is: [1]

- (a) sound to electrical      (b) electrical to sound      (c) magnetic to sound      (d) sound to magnetic

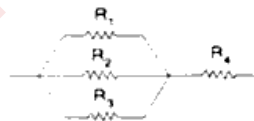
- viii. Sam, a teenager, enjoys playing his music loudly. However, his grandmother consistently lowers the volume of the music player. Analyse the wave to identify which characteristic of the wave has been altered when the grandmother reduces the volume. [1]



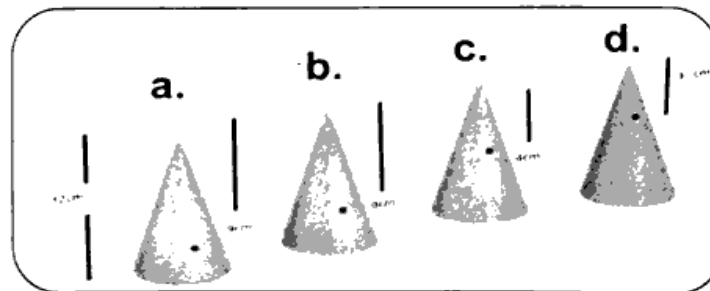
- (a) the length PS becomes more. (b) the length SR becomes less.  
 (c) the length QR becomes less. (d) the length PR becomes less.
- ix. Three wires with proper colour coding (BROWN, GREEN AND LIGHT BLUE) are connected to the three terminals of a three - pin socket. Which of the following combination of the wire is correct with the proper terminals 1, 2 and 3 of the socket? [1]



- (a) 1- BROWN 2 - GREEN 3 - LIGHT BLUE (b) 1- GREEN 2 - BROWN 3 - LIGHT BLUE  
 (c) 1- GREEN 2 - LIGHT BLUE 3 - BROWN (d) 1- BROWN 2 - LIGHT BLUE 3 - GREEN
- x. The refractive index of a diamond is 2.4. It means that: [1]
- (a) the speed of light in vacuum is equal to 2.4 times the speed of light in diamond.  
 (b) the speed of light in the diamond is 2.4 times the speed of light in a vacuum.  
 (c) the speed of light in a vacuum is 2.4 times the speed of light in the diamond.  
 (d) the wavelength of light in diamond is 2.4 times the wavelength of light in vacuum.
- xi. If  $R_1 = R_2 = R_3 = R_4 = 3$  ohm, then the equivalent resistance for the following combination is: [1]

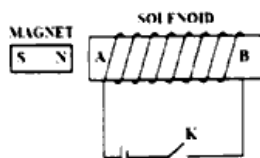


- (a) 12 ohm (b) 4 ohm (c) 8 ohm (d) 6 ohm
- xii. In the diagram below, four cones are depicted, each with a height of 12cm. The position of the center of gravity is indicated by dots located at 9cm, 8cm, 4cm, and 3cm from the apex of each cone. Which of these cones is completely solid? [1]



- (a) fig a (b) fig b (c) fig c (d) fig d
- xiii. The boiling point of water is  $100^{\circ}\text{C}$ . While measuring boiling point of water, Rahul added some salt to it. How will its boiling point be affected? [1]
- (a) increases (b) decreases (c) remains  $100^{\circ}\text{C}$  (d) nothing can be predicted

- xiv. Following diagram shows a small magnet placed near a solenoid AB. If current is switched on in the solenoid by pressing the key, then..... [1]



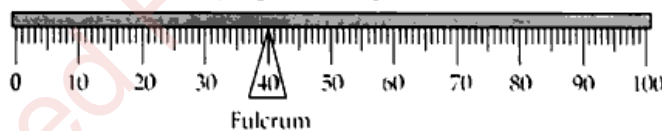
- (a) the magnet will be attracted towards the solenoid (b) the magnet will be repelled by the solenoid  
 (c) the magnet will not be affected (d) nothing can be said.
- xv. During his experiments with a single movable pulley, Jaspreet determined the velocity ratio, mechanical advantage and efficiency as X, Y & Z, respectively. Subsequently, after lubricating the pulley thoroughly, he recalculated the velocity ratio, mechanical advantage and efficiency as X', Y' & Z', respectively. He observed that one of these values remains same. Which of the following relationships accurately represents the scenario? [1]
- (a)  $X' = X$  (b)  $Y' = Y$  (c)  $Z' = Z$  (d) None

**Question 2.**

- i. **Fill in the blanks with correct option:**
- (a) ..... radiations (*X / gamma / micro*) are the most energetic electromagnetic radiations. [1]  
 (b) When light travels from glass to air, its speed ..... (*increases / decreases / remains same*) [1]  
 (c) The commercial unit of electrical energy is ..... (*kilowatt – hour / joule / horsepower*). [1]  
 (d) A freely suspended simple pendulum in air is disturbed and left to oscillate on its own. It has ..... (*free / damped / forced*) vibrations. [1]  
 (e) The conductors that lose their electrical resistance at low temperatures are called ..... (*semiconductors / insulators / superconductors*). [1]  
 (f) Total internal reflection takes place when angle of incidence is ..... (*greater than / smaller than / equal to*) critical angle. [1]
- ii. Calculate the heat capacity of 40 g of water in S.I. unit. (specific heat capacity of water is 4.2 J/g/K). [2]
- iii. Write two characteristics of a high tension wires. [2]

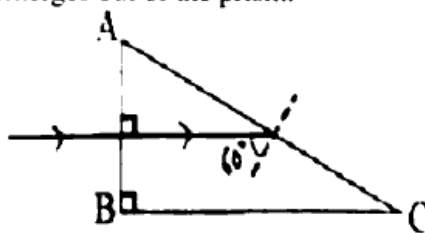
**Question 3.**

- i. Name the lens which always forms an erect and virtual image. Also state whether the image is magnified or diminished? [2]
- ii. **The diagram below shows the balanced position of a metre scale.**



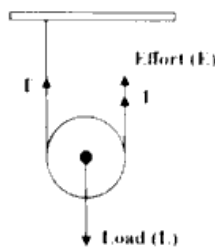
Which portion (0 to 40 cm mark or 40 to 100 cm mark) is heavier? What will be your observation on shifting the fulcrum to 60 cm mark? [2]

- iii. A stone tied at the end of a string is whirled by hand in a horizontal circle with uniform speed. Name the force required for this circular motion. What is the direction of the force mentioned by you? [2]
- iv. **The diagram below shows the path of light passing through a right-angled prism of critical angle  $42^\circ$ .** Complete the path of the ray till it emerges out of the prism. [2]



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- v. Which isotope of uranium is more fissionable? Why? [2]
- vi. Two copper wires A and B are of same length present at temperature  $30^{\circ}\text{C}$ . Radius of A is twice the radius of B. Which of them has:
  - a) greater resistance?                      b) greater resistivity? [2]
- vii. State the value of ideal mechanical advantage of the given pulley. The direction of effort is not convenient. Draw a diagram to show the method to change the direction of effort. Also state the ideal mechanical advantage of the new arrangement. [3]

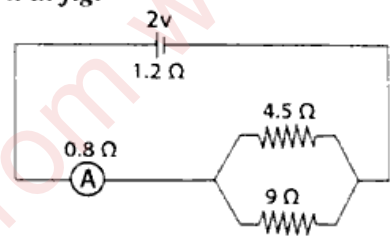


**SECTION B**

**NOTE: Attempt ANY FOUR questions from this section**

**Question 4.**

- i. *We are able to see the T.V. channels when we set T.V. on auto – tuning.*
  - (a) Which phenomenon led to the clear visibility of the channels, due to auto – tuning?
  - (b) Define the phenomenon stated by you.
  - (c) Give one more example of this phenomenon. [3]
- ii. *Specific resistance of a material is its characteristic property.*
  - (a) Define specific resistance.
  - (b) What happens to the specific resistance of a conductor if its length is tripled?
  - (c) Name a substance whose specific resistance remains almost unchanged with the increase in temperature. [3]
- iii. *A cell of e.m.f. 2 V and internal resistance 1.2  $\Omega$  is connected to an ammeter of resistance 0.8  $\Omega$  and two resistors of 4.5  $\Omega$  and 9  $\Omega$  as shown in fig.*



Find:

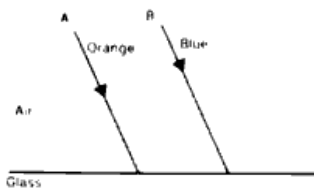
- (a) The reading of the ammeter.
- (b) The potential difference across the terminals of the cells.
- (c) The potential difference across the 4.5 ohm resistor. [4]

**Question 5.**

- i. *A nucleus A with 86 protons and 136 neutrons emits a particle and transforms into a nucleus B with 84 protons and 134 neutrons.*
  - (a) Name the particle emitted.
  - (b) Write a balanced reaction to represent the transformation.
  - (c) What will be the effect on the radiation emitted in the above reaction when it is allowed to pass through an electric field. [3]
- ii. *(A metal piece of mass 420 g present at  $80^{\circ}\text{C}$ ) is dropped in (80g of water present at  $20^{\circ}\text{C}$ ) in a calorimeter of mass 84g. If the final temperature of the mixture is  $30^{\circ}\text{C}$ , then calculate the specific heat capacity of the metal piece. [Specific heat capacity of water = 4.2 J/g/k, Specific heat capacity of the copper = 0.2 J/g/k] [3]*
- iii. *A block and tackle system of pulleys has velocity ratio equal to 5.*
  - (a) Draw a labeled diagram of the system clearly, the direction of the load and effort.
  - (b) What is the value of the mechanical advantage of the given system if it is an ideal system? [4]

**Question 6.**

- i. The diagram given below shows two parallel rays A (Orange) and B (Blue) incident from air, on air – glass boundary.

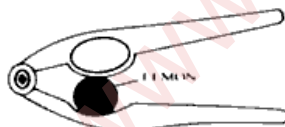


- (a) Copy and complete the path of the rays A and B. [3]  
 (b) How do the speeds of these rays differ in glass?  
 (c) Are the two refracted rays in glass parallel? [3]
- ii. In an activity, it is observed that the work done by the force is negative.  
 (a) State the angle between the direction of force and the direction of displacement.  
 (b) Give one example for the situation given.  
 (c) How much will be the work done if the body moves in the direction normal to the direction of force? [3]
- iii. Following table shows the consumption of electrical energy in Rohan's home. Calculate the amount of electricity bill to be paid by Rohan for 30 days if the rate of electricity consumption is ₹ 4.00. [4]

Electrical Appliance	Wattage (in Watt)	Usage time
4 Ceiling fans	220 per fan	18 hr/day
6 LED bulbs	15 per bulb	12 hr/day
Television set	250	8 hr/day
Induction stove	1800	4.5 hr/day

**Question 7.**

- i. Observe the following picture.



- (a) To which class lever does it belong?  
 (b) Show the position of load, effort and fulcrum in the given diagram.  
 (c) Give one more example of the lever of same class. [3]
- ii. Five bulbs are connected in series in a room. One bulb is fused. It is removed and remaining four bulbs are again connected in series to the same circuit.  
 (a) What will be the effect on the (1) Resistance of the circuit and (2) the intensity of each bulb?  
 (b) State one advantage of connecting the appliances in parallel. [3]
- iii. Study the diagram below.

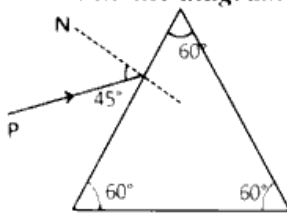


- a) Name the lens 'LL'.  
 b) Give reason to support your answer in part a.  
 c) Complete the diagram to form the image of the object AB. [4]

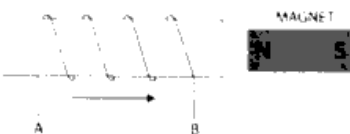
**Question 8.**

- i. A boy standing in front of a wall produces two whistles per second. He notices that the sound of his whistling coincides with the echo. The echo is heard only once when whistling is stopped. Calculate the distance between the boy and the wall. (The speed of sound in air = 320 m/s) [3]

- ii. A monochromatic ray of light is incident on an equilateral prism placed at minimum deviation position with an angle of incidence  $45^\circ$  as shown in the diagram.



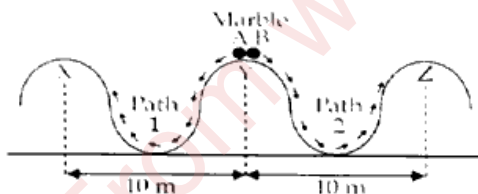
- (a) Copy the diagram and complete the path of the ray PQ to emerge out of the prism.  
 (b) Define the term 'dispersion of light'.  
 (c) Infra - red radiations are used as signals during wars. Why? [3]
- iii. The diagram shows a coil of several turns of copper wire near a magnet NS. The coil is moved in the direction of the arrow shown in the diagram.



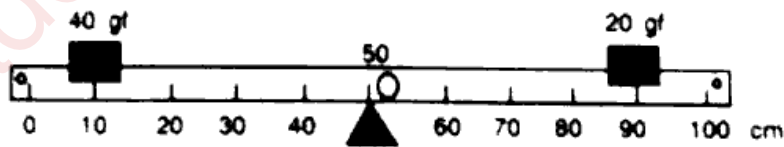
- (a) In what direction does the induced current flow in the coil? (A to B or B to A)  
 (b) Name the law used to arrive at the conclusion in part (a).  
 (c) How would the magnitude of current in coil be altered if:  
 1. the coil has twice the number of turns?  
 2. the coil and magnet moves in the same direction and with the same speed? [4]

**Question 9.**

- i. A fish is looking at a 1.0 m high plant at the edge of a pond.  
 (a) Will it appear to the fish shorter or taller in height?  
 (b) Draw a ray diagram to support your answer. [3]
- ii. Two identical marbles A and B are rolled down along Path 1 and Path 2 respectively. Path 1 is frictionless and Path 2 is rough.



- (a) Which marble/s will surely reach the next peak?  
 (b) Along which path/s the mechanical energy will be conserved?  
 (c) Along which path/s is the law of conservation of energy obeyed? [3]
- iii. Following diagram shows a metre rule pivoted at point O and the weights of 40 gf and 20 gf suspended as shown.



- (a) Is the rule in equilibrium? Show necessary calculations.  
 (b) In which direction will it turn?  
 (c) Where should you place a weight of 40 gf to make the rule in equilibrium? [4]