GREENLAWNS SCHOOL, WORLI

PHYSICS

PRELIMINARY EXAMINATION – 2025 - 26

STD: X **Marks: 80**

Date:12/01/2026 **Time: 2hrs**

Answers to this paper must be written on the paper provided separately.
You will not be allowed to write during the 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.

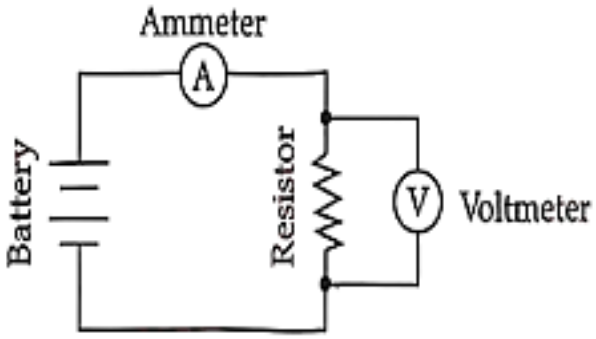
Section A is compulsory. Attempt any four questions from **Section B.**
The intended marks for questions or parts of questions are given in **[ ].**
Write neatly and legibly**.**

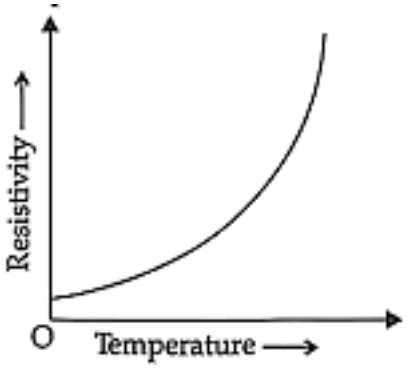
SECTION - A

(Attempt **all** questions from this Section.)

Question 1 MCQ **[15]**

i. The graph below shows the variation of resistivity of copper with temperature. Kishore constructs a simple circuit as shown below. The resistor is made of copper. He then heats the copper resistor. What will happen to the current flowing through the circuit? Why?





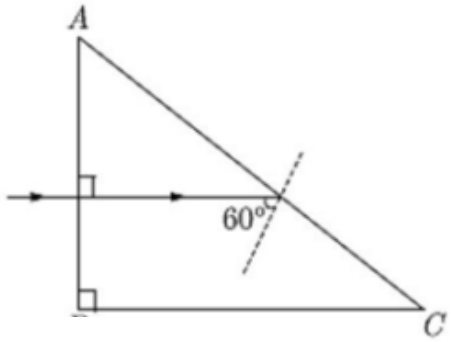
(a) The current will increase because the resistance of copper increases with an increase in temperature.

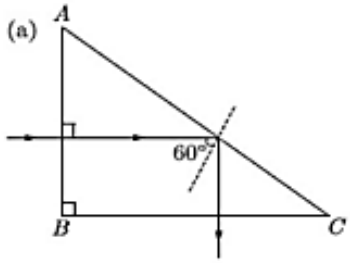
(b) The current will increase because the resistance of copper decreases with an increase in temperature.

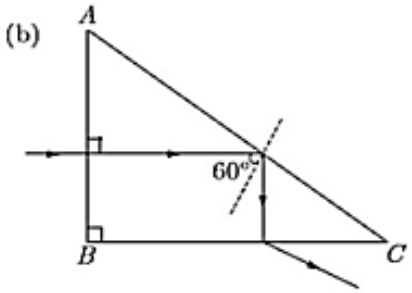
(c) The current will decrease because the resistance of copper increases with an increase in temperature.

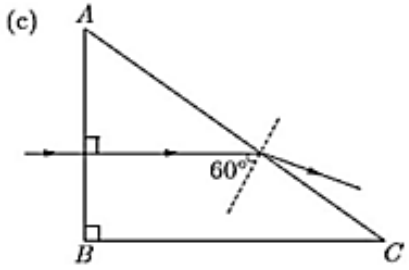
(d) The current will decrease because the resistance of copper decreases with an increase in temperature.

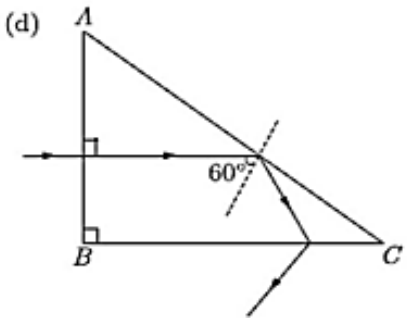
ii. The diagram below shows the path of light passing through a right angled prism of critical angle 42°.
Which of the following diagrams shows the correct path of this ray till it emerges out of the prism?











iii. 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

iv. The magnifying power of a concave lens is

(a) Always > 1
(b) always < 1
(c) Always = 1
(d) Can have any value

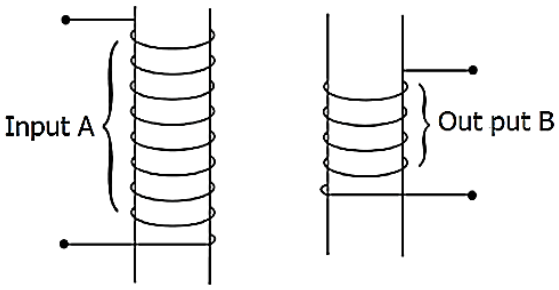
v. The diagram in a simple sketch of a transformer. The correct statement is

(a) A is a primary Coil and B is a secondary coil

(b) It is a sketch of a step-up transformer

(c) Turns ratio is more than 1

(d) All of the above are correct



vi. In carbon – 14 dating process, the particles of radiation are emitted as:

(a) Alpha particle
(b) Gamma particle
(c) Beta particle
(d) None of these

vii. As the frequency of a sound wave decreases in a given medium, the wavelength of the wave

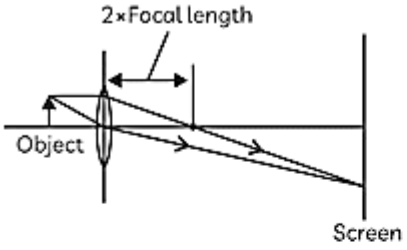
(a) Increases, but the speed of the wave remains same
(b) Increases, and the speed of wave also increases
(c) Decreases, but the speed of sound wave remains constant
(d) Both velocity & wavelength of the wave remains constant

viii. Shourya of mass 55kg and Yash of mass 40kg are sitting on a see saw at 2m and 1.5m respectively from the centre of the see saw in an amusement park as shown in the figure.
Is the see saw in equilibrium?

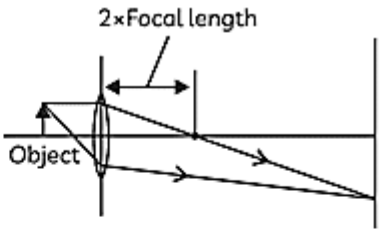
(**a)** Incomplete data
(b) yes
(c) no
(d) none of the above

ix. Which diagram shows image formation of an object on a screen by a converging lens?

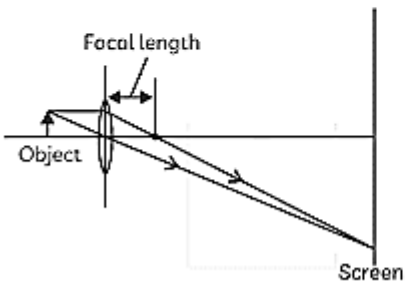
(a)



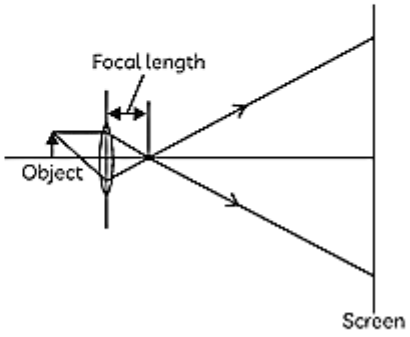
(b)



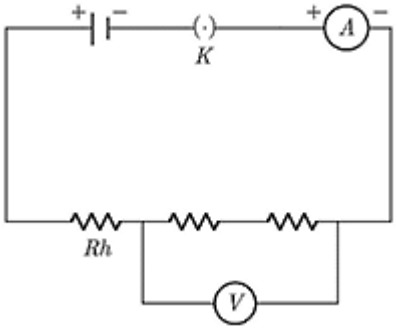
(c)



(d)



x. To determine the equivalent resistance of two resistors when connected in series, a student arranged the circuit components as shown in the diagram. But he failed to achieve the objective.
Which of the following mistakes has been committed by him in setting up the circuit?



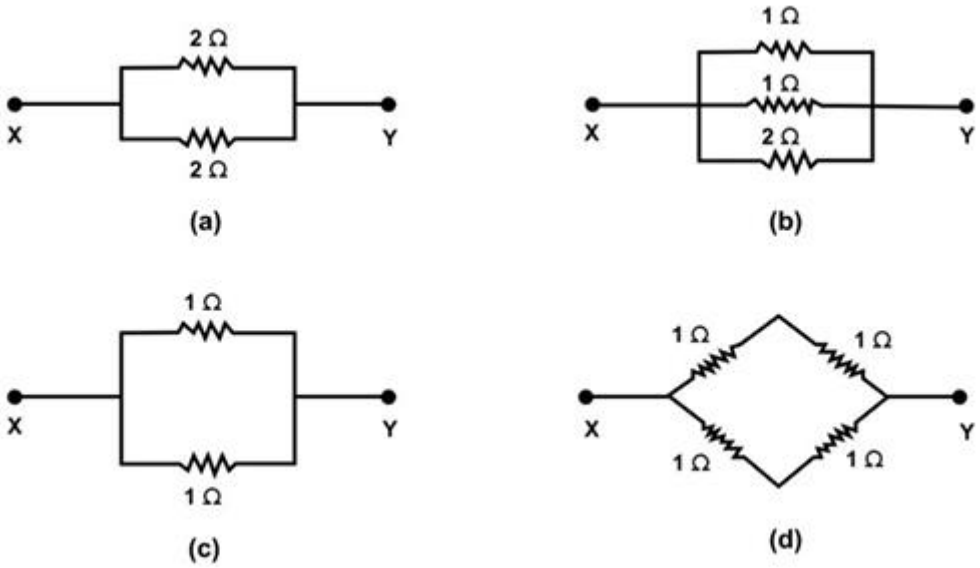
(a) Position of ammeter is incorrect.
(b) Terminals of ammeter are wrongly connected.
(c) Position of voltmeter is incorrect.
(d) Terminals of voltmeter are wrongly connected

xi. Latent heat when supplied to a substance increases:

(a) the temperature of the substance
(b) the density of the substance
(c) the kinetic energy of the substance particles
(d) the inter-molecular space in the substance

xii **Assertion(A):** The mechanical advantage of an ideal single movable pulley is independent of the weight of the pulley
Reason(R): An ideal single movable pulley can be used as a force multiplier.
(a) Both A and R are true, and R is correct explanation of A
(b) Both A and R are true, but R is not correct explanation of A
(**c)** A is true but R is false
(d) Both A and R are false

xiii. Which of the following combination have the same equivalent resistance between X & Y?



(a) Both (a) and (c)
(b) Both (b) and (d)
(c) Both (b) and (c)
(d) Both (a) and (d)

xiv. For a given mass if kinetic energy increases 16 times the momentum:

(a) increases four times
(b) increases twice
(c) decreases four times
(d) decreases twice

xv. What would be the colour of the sky if there is no atmosphere?

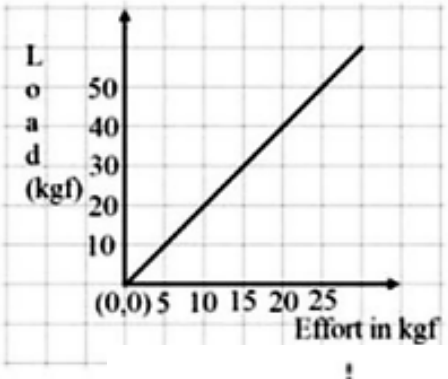
(a) Blue
(b) Red
(c) No colour
(d) Black

Question 2

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

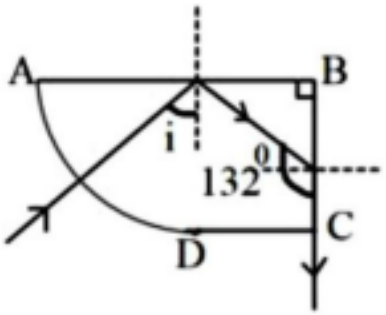
(a) A body moving with uniform speed in a circular path has a constant_____ [velocity/acceleration/speed].
(b) An electric generator is a device which converts _____(chemical/mechanical) energy. to electrical energy and works on the principle of ___(electromagnetic induction/magnetic effects of electric current).
(c) To an Astronaut in a spaceship, the earth appears ------. (black/blue/red)
(d) For a fuse, higher the current rating ----------(thicker/thinner) is the fuse wire.
(e) Light travels faster in _____ [water/air/glass].

(ii) The graph shows load against effort for a lever with load and effort on the same side of the fulcrum.



(a) Which feature of the load and the effort graph must be calculated to determine mechanical advantage?
(b) Which class does this lever belong to? **[2]**

(iii) ABC is a glass block whose two sides, AB and BC, are at right angles to each other. A ray of light is incident on the surface AB, as shown in the diagram, and suffers total internal reflection before falling on the surface BC. Finally, the light ray emerges out along the surface BC.



(a) What is the angle of incidence at the surface AB?
(b) What is the critical angle for the glass block BC? **[2]**

Question 3

i. Name the coil of which the wire is thicker in a step-down transformer. Give reason to your answer. **[2]**

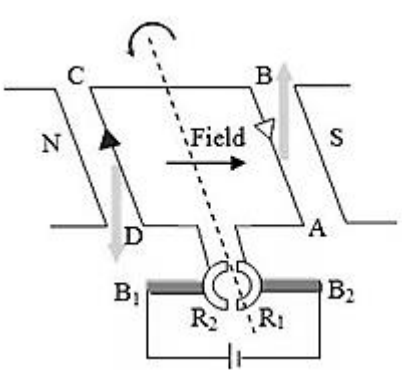
ii **(a)** Name the unit of physical quantity obtained by the formula $2K/V^2$ were, K: Kinetic energy V: Linear velocity
(b) A force F acts on a body and displaces it by a distance S in a direction at angle with the direction of force. Write an expression for the work done by the force. **[2]**

iii. A nucleus ${}_{84}X^{202}$ of an element emits an alpha particle followed by a beta particle. The final nucleus is ${}_{a}Y^{b}$. Find a and b. **[2]**

iv. During a calorimetry experiment, 100 g of ice is placed in a beaker and heat is applied. The ice melts but the temperature remains constant at 0 ºC until all the ice has melted. Why does the temperature remain constant during the melting of ice? **[2]**

v. In an electric motor a current carrying coil is placed in between two opposite poles of magnets. During a complete rotation the coil experiences zero torque at two positions relative to the magnetic field. What will be those positions of coil relative to magnetic field which will result in no torque? **[2]**

vi. Observe the figure given below and answer the following questions:



(a) What is the role of R1 and R2 in the given circuit?
(b) On what principle does the above given circuit works? **[2]**

vii. **(a)** Write a relationship between angle of incidence and angle of refraction for a given pair of media.
(b) State any two factors on which lateral displacement of a light on a glass slab depends.
(c) What do you mean by the term critical angle? **[3]**

SECTION–B

(Attempt **any four** questions from this Section**)**

Question 4

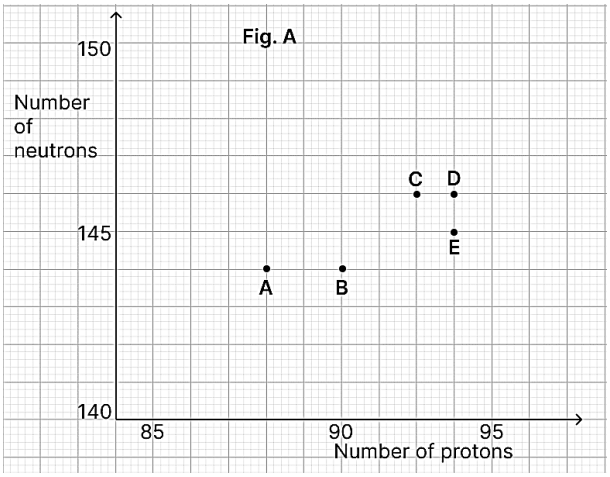
(i) An aquarium made of glass is filled with water. A small object is placed at the bottom of the aquarium, and you observe the object from above through the water. You are given the absolute refractive indices of water and glass is 4/3 and 3/2 Assume the actual depth of the object in water is 30 cm.
(a) Calculate the apparent depth of the object as seen from above the water's surface.
(b) Explain why the object appears closer than it is.
(c) If the aquarium had no water, but only the glass, how would the apparent depth change? **[3]**

(ii) Arjun takes a meter scale and suspends a weight of 2N at one end 'X' and another weight of 5N on the other end 'Y'. He then balances the ruler horizontally on a knife edge placed at the 70cm mark from X.

(a) Calculate the weight of the ruler using the principle of moments.

(b) He now adds an additional weight of 1N at end X and balances the ruler by moving the knife edge to a new position. The position is_____ (less than, greater than or equal to) 70cm from mark X. Fill in the blank. **[3]**

(iii) The graph (Fig. A) illustrates the correlation between the number of protons (x-axis) and the number of neutrons (y-axis) for elements A, B, C, D, and E in the periodic table. These elements are denoted by the letters rather than their conventional symbols.



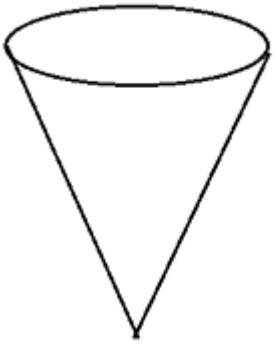
(a) Identify the radioactive radiation emitted when element C decays into element E. Represent this using a nuclear reaction.

(b) What is the special name given to elements D and E?

(c) If element C transforms into element B by emitting a radioactive ray, how will this ray behave in an electric field? **[4]**

Question 5

i) Harshvardhan took an earthen pot which was filled with water up to its brim. The earthen pot was conical in shape and kept with its apex in downward direction.



(a) If the vertical height of the earthen pot is 12cm, where does its centre of gravity lie?

(b) Harshvardhan poured out all the water from the pot. How will its centre of gravity shift-towards the open end or towards its apex.

(c) Harshvardhan wanted to grow a plant in the given pot. So, he filled it completely again, with some soil. What will be the new position of its centre of gravity? **[3]**

ii) Two different liquids, Liquid A and Liquid B, of the same mass, are supplied with the same amount of heat. The temperature of Liquid A rises by 10 ºC, while the temperature of Liquid B rises by 15 ºC.

(a) Which liquid has a higher specific heat capacity?

(b) If Liquid A is a better coolant, explain why this aligns with your answer in (a).

(c) Assuming the power of the heating element and the duration of heating were the same, calculate the ratio of the specific heat capacity of Liquid A to Liquid B **[3]**

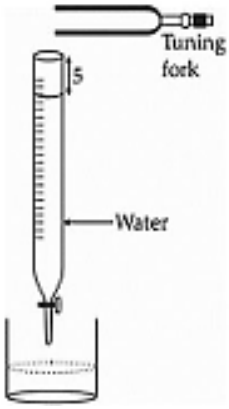
iii) **a)** Name the term given to a reciprocal of resistance. State its unit.
b) What is meant by super conductor? Why are these not commonly used? **[4]**

Question 6

i) A slide projector is being used by your teacher for a presentation in class.
(a) Name the type of lens used in a slide projector.
(b) Construct a ray diagram, to illustrate the formation of the image in a slide projector**.** **[3]**

ii) A boy stands in front of a cliff on the other side of a river. He fires a gun and hears an echo after 6 seconds. The boy then moves backward by 170 m and again fires the gun. He hears an echo after 7 seconds. Calculate:
(a) the width of river
(b) the speed of sound **[3]**

iii) In the given diagram, a vibrating tuning fork is kept near the mouth of a burette filled with water. The length of the air column is adjusted by opening the tap of the burette. At a length of 5 cm of the air column, a loud sound is heard.

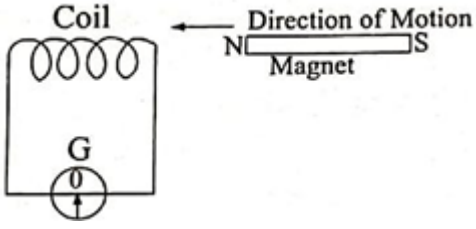


(a) Name the phenomenon illustrated by the above experiment.
(b) Why is a loud sound heard at this length?
(c) If the present tuning fork is replaced with a tuning fork of higher frequency, should the length of the air column increase or decrease to produce a loud sound? Give reason. **[4]**

Question 7

i) **(a)** Name the device used to protect the electric circuits from overloading and short-circuits**.**
(b) On what effect of electricity does the above device work?
(c) What do you mean by the term electromagnetic induction? **[3]**

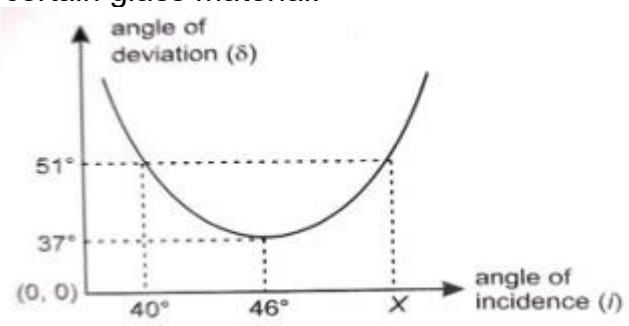
ii) The given figure below shows a fixed coil of several turns connected to a centre zero galvanometer G and a magnet NS which move in the direction as shown in the figure: Describe the observation in the galvanometer if,
(a) magnet is moved rapidly into the coil.
(b) magnet is held stationary in the coil.
(c) the motion of the magnet with respect to the coil is increased. **[3]**



iii) A lens of focal length 20 cm forms an inverted image at a distance 60 cm from the lens.
(a) Identify the lens.
(b) How far is the lens present in front of the object?
(c) Calculate the magnification of the image. **[4]**

Question 8

i) The diagram (not drawn to the scale) below shows the graphical relation between angle of deviation and angle of incidence, when light passes through a triangular prism of angle 62^0 of a certain glass material.



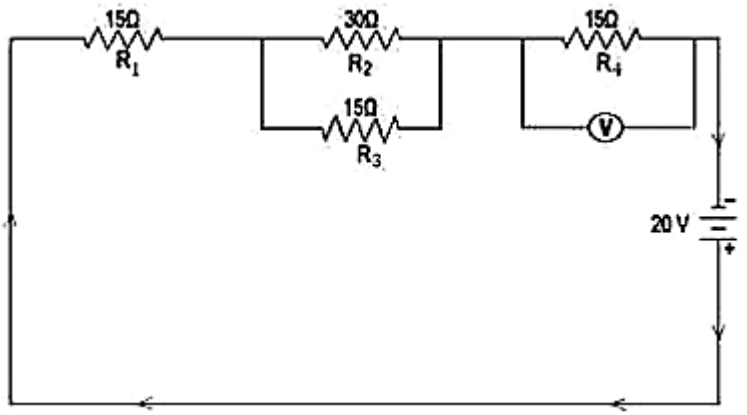
(a) State the angle of minimum deviation of this prism and the corresponding angle of incidence.

(b) Calculate the value of X. **[3]**

ii) **(a)** An element $^{A}S_{z}$ decays to $^{222}R_{85}$ after emitting two α-particle and one β-particle. Find the atomic number and mass number of the element S.

(b) A radioactive substance is oxidized. Will there be any change in radioactivity? Give one reason to support your answer. **[3]**

iii) Four resistors, a voltmeter and a battery are connected in a circuit as shown below.



(a) What is the net resistance of the circuit?

(b) How much potential difference will the voltmeter connected across the resistor R4 measure?

(c) If R3 is removed, will the net current in the circuit increase or decrease or remains same? **[4]**

Question 9

i) A student focused the image of a candle flame on a white screen by placing the flame at various distances from the convex lens. He noted his observations in the following table.

S. No.	Distance of flame from the lens (cm)	Distance of the screen from the lens (cm)
(i)	60	20
(ii)	40	24
(iii)	30	30
(iv)	24	40
(v)	15	70

Analyse the above table and give the answer to the following questions:

(a) What is the focal length of the convex lens?

(b) Which set of observation is incorrect and why? **[3]**

ii) Name the type of nuclear energy fission or fusion that is true for the statements given. **[3]**

a) The substance used for this process is radioactive.

b) It is possible at ordinary temperature.

c) This releases more energy per unit mass of substance.

iii) 104 g of water at 30° C is taken in a calorimeter made of copper of mass 42 g. When a certain mass of ice at 0 ° C is added to it, the final steady temperature of the mixture after the ice has melted, was found to be 10 °C. Find the mass of ice added. (Specific heat capacity of calorimeter =0.4 J g-1 $°C^{-1}$, Specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$, Latent heat capacity of ice =330 J g^{-1}) **[4]**

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