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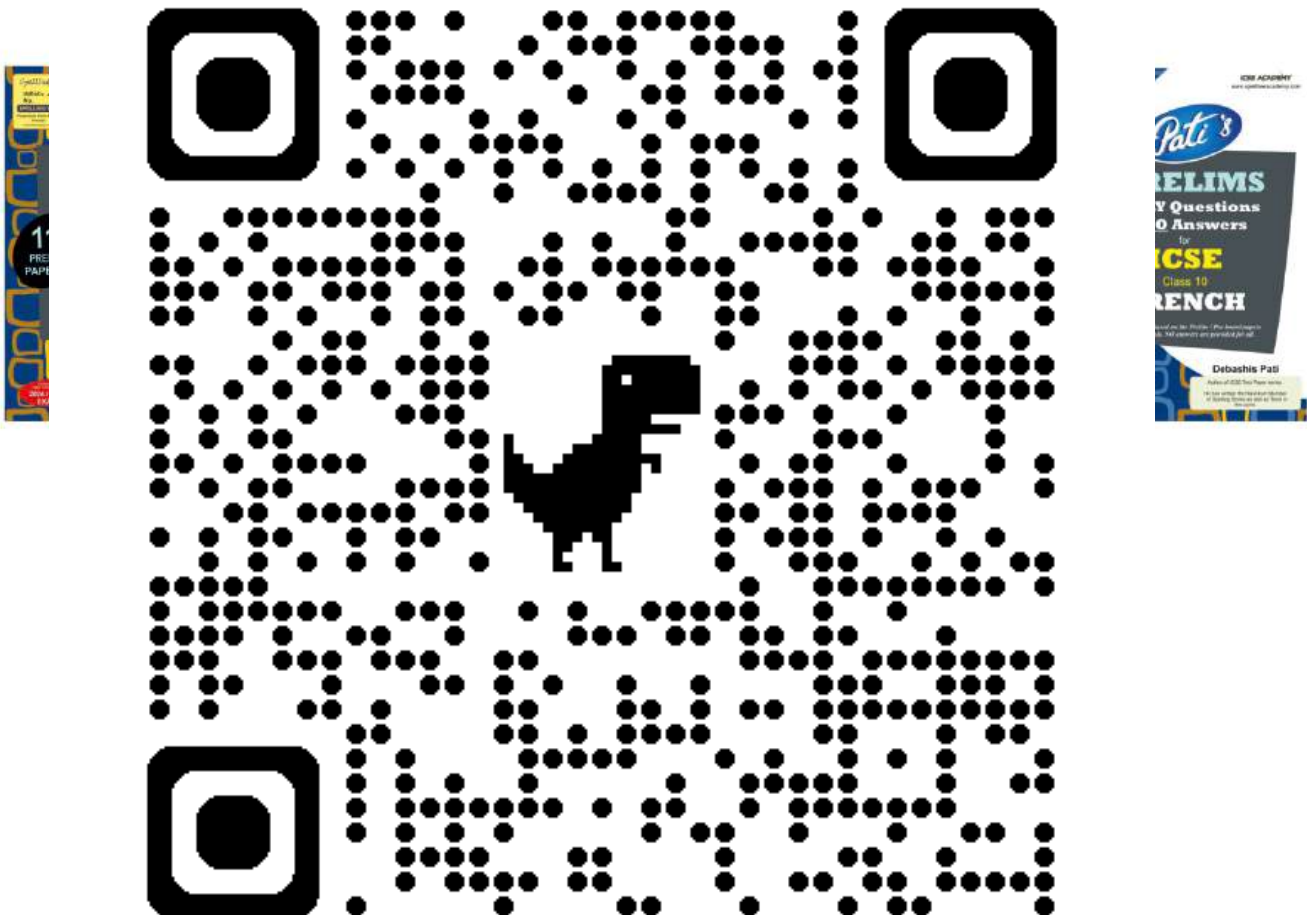
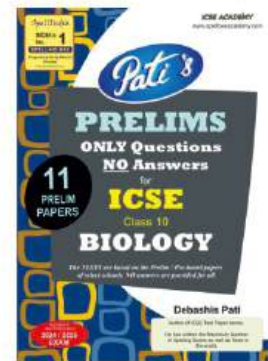
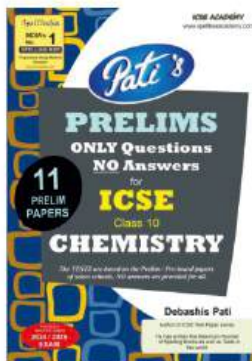
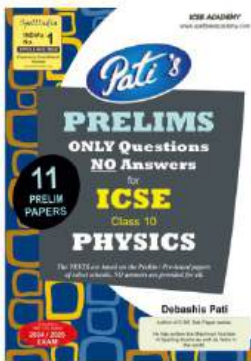
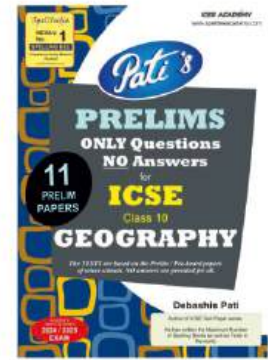
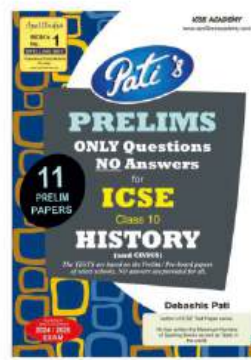
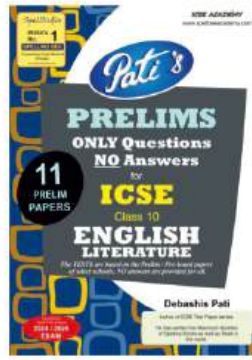
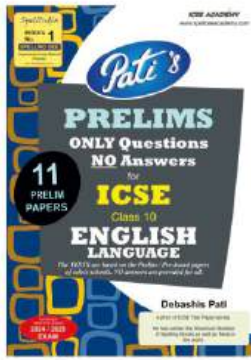
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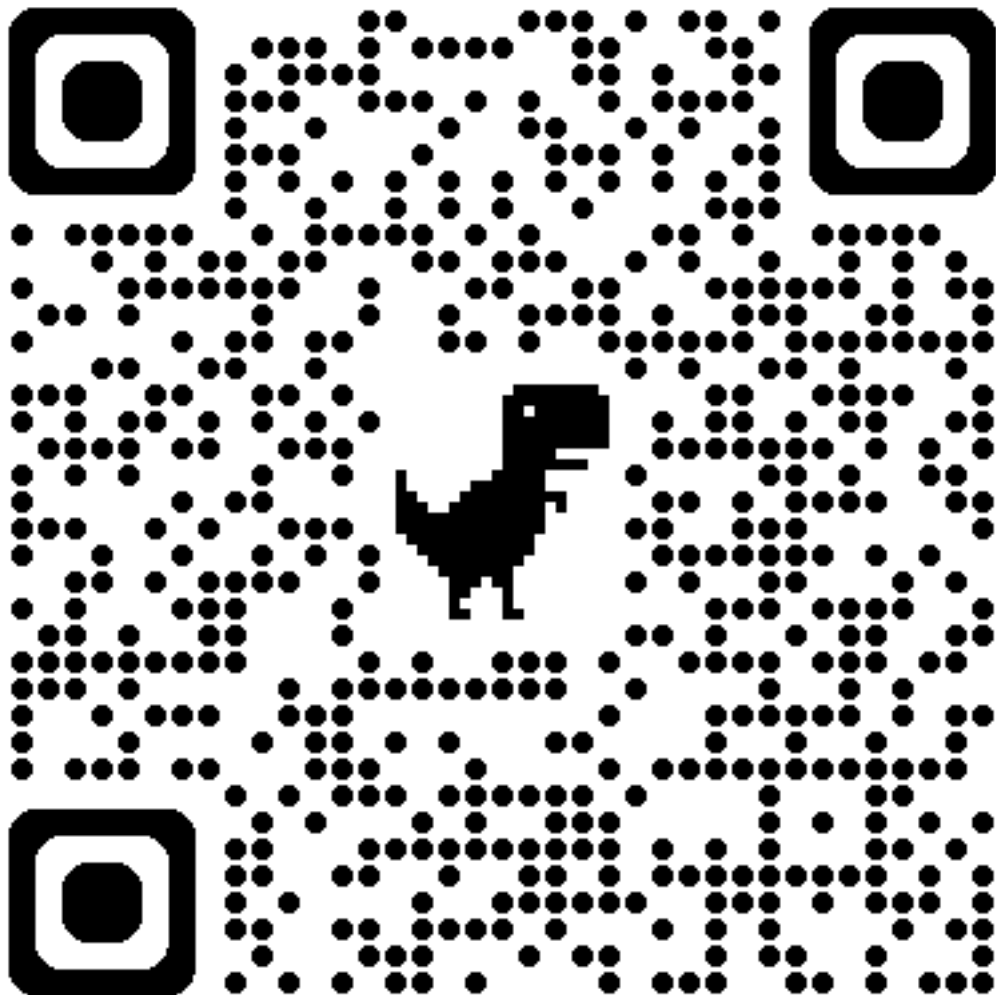




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ICSE 2026 EXAMINATION
SPECIMEN QUESTION PAPER
PHYSICS
(SCIENCE PAPER 1)

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 [].*

Instruction for the Supervising Examiner

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

SECTION A (40 Marks)

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

Question 1

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

[15]

(Do not copy the question, write the correct answers only.)

(i) A moment of couple has a tendency to rotate the body in an **anticlockwise** direction. The moment of couple is taken as:

- (a) positive
- (b) negative
- (c) maximum
- (d) zero

[Recall]

(ii) The kinetic energy of a given body depends on the:

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

[Understanding]

(iii) During power production in a coal-based thermoelectric power plant, the correct sequence of energy conversions taking place is:

- (a) heat \rightarrow mechanical \rightarrow chemical
- (b) heat \rightarrow mechanical \rightarrow electrical
- (c) chemical \rightarrow heat \rightarrow light
- (d) heat \rightarrow chemical \rightarrow electrical

[Recall]

(iv) Anita used a single movable pulley to lift a bucket of water from a well. She lubricates the pulley.

Which of the following statements is true regarding the performance of the pulley used?

- (a) Mechanical Advantage decreases and efficiency increases.
- (b) Velocity Ratio increases and efficiency decreases.
- (c) Mechanical Advantage remains unchanged and efficiency increases.
- (d) Velocity Ratio remains unchanged and efficiency increases.

[Application]

(v) Inside the prism, during the dispersion of white light, compared to blue, red light:

- (a) slows down less and refracts more.
- (b) slows down more and refracts less.
- (c) slows down more and refracts more.
- (d) slows down less and refracts less.

[Recall & Application]

(vi) When objects are viewed through the rising heat of a campfire they appear to shimmer. The optical phenomenon responsible for this effect is:

- (a) refraction
- (b) reflection
- (c) scattering
- (d) total internal reflection

[Recall]

(vii) A convex lens with a focal length of 12 cm has an object at a distance of 20 cm in front of the lens. A blurred image is obtained on the screen placed at a distance of 23 cm in front of the lens. In order to obtain a clear image, the screen has to be moved:

- (a) towards the lens.
- (b) away from the lens.
- (c) to a position very far from the lens.
- (d) either towards or away from the lens.

[Application]

Assertion(A): Soldiers avoid firing at a target in foggy weather conditions.

Reason(R): In foggy weather, light gets scattered by tiny water droplets, reducing visibility.

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

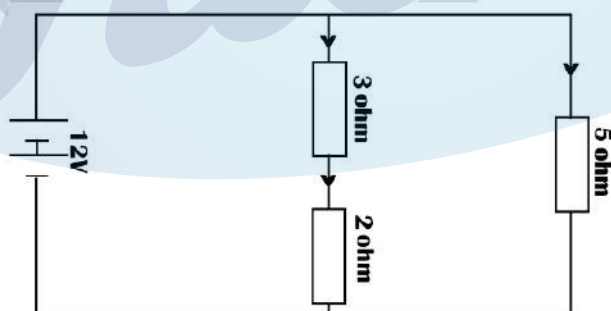
[Understanding
& Recall]

(ix) Two sound waves X and Y have the same amplitude and the same wave pattern but their frequencies are 60 Hz and 120 Hz respectively, then:

- (a) X will be shriller and Y will be grave.
- (b) X will be grave and Y will be shriller.
- (c) X will differ in quality than Y.
- (d) X is louder than Y.

[Understanding]

(x) In the circuit given below, identify the correct relation between the currents flowing through the $2\ \Omega$, $3\ \Omega$, and $5\ \Omega$ resistors:



- (a) current through $2\ \Omega >$ current through $3\ \Omega$
- (b) current through $5\ \Omega <$ current through $3\ \Omega$
- (c) current through $2\ \Omega =$ current through $5\ \Omega$
- (d) current through $5\ \Omega >$ current through $3\ \Omega$

[Understanding
& Recall]

(xi) According to the old convention, the colour of the earth wire is:

- (a) black
- (b) green
- (c) yellow
- (d) red

[Recall]

(xii) For an ideal step up transformer:

- (a) $\frac{\text{Voltage primary}}{\text{Voltage secondary}} > 1$
- (b) $\frac{\text{Current primary}}{\text{Current secondary}} < 1$
- (c) $\frac{\text{number of turns primary}}{\text{number of turns secondary}} = 1$
- (d) $\frac{\text{power primary}}{\text{power secondary}} = 1$

[Application]

(xiii) Heat capacity of a body is the:

- (a) energy needed to melt a body without change in its temperature.
- (b) energy needed to raise the temperature of a body by 1°C.
- (c) increase in volume of the body when its temperature increases by 1°C.
- (d) total amount of internal energy that is constant.

[Recall]

(xiv) The amount of heat energy required to melt a given mass of a substance at its melting point, without any rise in its temperature is called the:

- (a) specific heat capacity.
- (b) specific latent heat of fusion.
- (c) latent heat of fusion.
- (d) specific latent heat of freezing.

[Recall]

A nucleus of an atom consists of 146 neutrons and 95 protons. It decays after emitting an alpha particle. How many protons and neutrons are left in the nucleus after an alpha emission?

- (a) protons = 93, neutrons = 142
- (b) protons = 95, neutrons = 144
- (c) protons = 93, neutrons = 144
- (d) protons = 95, neutrons = 142

[Understanding]

Question 2

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

- (a) A _____ [Class II/Class III] lever will always have M.A. > 1.
- (b) A boy uses a GPS device to locate his missing friend in a crowded area; the system primarily uses _____ [ultraviolet waves / microwaves] to track the location.
- (c) Unit of specific heat capacity is _____. [$kg^2m^2s^{-2}K^{-1} / m^2s^{-2}K^{-1}$]
- (d) The threshold of hearing is _____. [0dB, 20Hz]
- (e) Two copper wires can have different resistivity if they have different _____. [lengths / temperatures]
- (f) The reaction responsible for the production of energy in the sun is _____. [Nuclear Fusion / Nuclear Fission]

[Recall & Understanding]

(ii) Match the movement of the body part in **Column A** to the class of lever in **Column B**. [2]

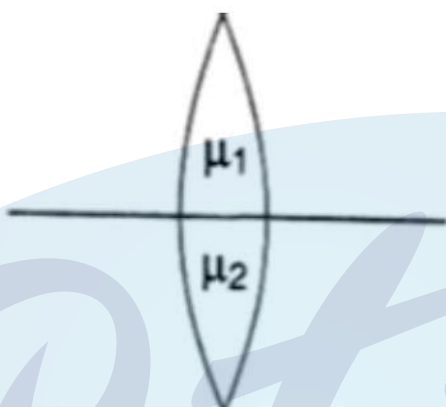
Movement of the body part Column A	Class of lever Column B
(a) Nodding head	• Class III
(b) Lifting body weight on your toes	• Class II
	• Class I

[Understanding]

- (iii) (a) Name the wave used for echo depth sounding. [2]
 (b) Give one reason why the waves mentioned in (a) is used for the above purpose. [Recall]

Question 3

- (i) (a) Refer to the diagram given below. A lens is made of two materials of different refractive indices (μ_1 , μ_2) as shown. If the rays are coming from a distant object, then how many images will be seen? [2] [Understanding]



- (b) A glass lens always forms a virtual, erect, and diminished image of an object kept in front of it. Identify the lens. [Recall]
- (ii) The image given below displays kilowatt-hour meter readings recorded at two distinct points in time. [2]

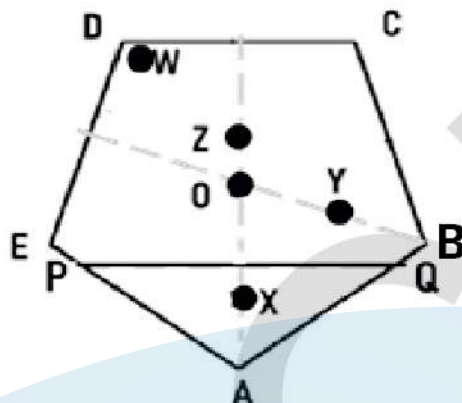


Assuming a **continuously running** 2000W air conditioner as the **sole** electrical device in use, calculate the time interval, **in hours**, between these two meter readings.

[Application]

(iii) ABCDE is a regular pentagon with its centre of gravity at O. What will be the **most probable position** (W, X, Y, Z or O) of the new centre of gravity: [2]

- (a) if a piece of clay is attached at point A?
 (b) if the pentagon is cut along the line PQ? (*Of the remaining part DCBQPE*)



[Understanding]

[Recall]

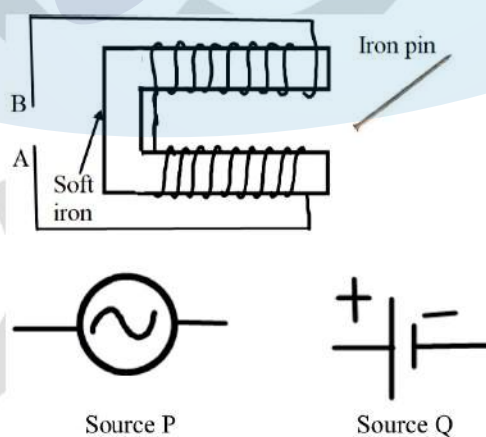
(iv) A solid of mass 60 g at 100°C is placed in 150 g of water at 20°C. The final steady temperature is 25°C. Calculate the heat capacity of the solid. [2]

[sp. heat capacity of water = 4.2 J g⁻¹ K⁻¹]

[Understanding
& Evaluate]

(v) The diagram given below shows a copper wire wound around a U-shape soft iron bar. An iron pin is brought near the arrangement. First Source P and then Source Q are connected across AB, each operating independently. [2]

[Recall]



(a) **State True or False:** Source P as well as Source Q, when connected across AB, can attract the iron pin.

(b) Justify your answer to (a) with a suitable reason.

(vi) (a) Name the radiation that is emitted during the decay of a nucleus that has the **highest** penetrating power. [2]
[Recall]

(b) Does the emission of the above-mentioned radiation result in a change in the mass number? [Understanding]

(vii) Advanced optical sensors in air-to-air missiles use fiber optic cables to transmit light signals with minimal loss. This relies on a physical phenomenon that confines light within the fibers, making the system very dependable for guiding the missile precisely. [3]

(a) Name the optical phenomenon that allows light signals to remain confined within the fiber optic cables during transmission. [Application]

(b) Explain the two main conditions necessary for this phenomenon to occur.

SECTION B (40 Marks)

(Attempt any four questions from this Section.)

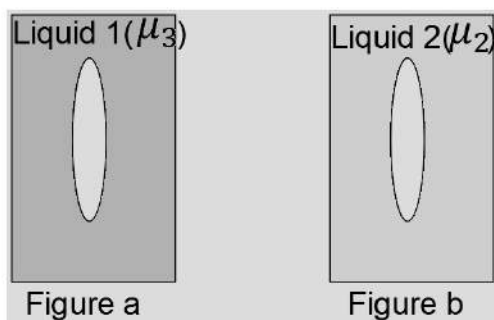
Question 4

(i) The diagram below shows a fish in the tank and its image seen on the surface of water. [3]



(a) Name the phenomenon responsible for the formation of this image. [Understanding & Recall]

- (b) A double convex lens with refractive index μ_1 is placed inside two liquids of refractive indices μ_2 and μ_3 as shown in the diagrams below. The refractive indices are such that $\mu_2 > \mu_1$ and $\mu_1 > \mu_3$.



How would a parallel incident beam of light refract when it comes out of the lens in each of the cases shown above?

(1) in Figure a.

(2) in Figure b.

[Application]

- (ii) A scientist lowers a metallic ruler vertically into a transparent oil tank. [3]

The ruler touches an object placed at the bottom of the tank and gets wet up to the 25 cm mark. If the refractive index of the glycerin is 1.25:

(a) up to which mark will the ruler get wet, if the scientist lowers it up to the image of the object?

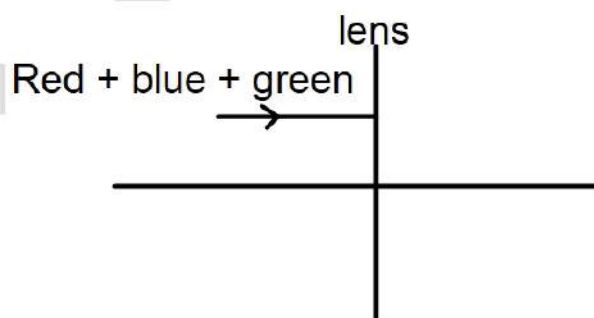
[Evaluate]

(b) how will this length in (a) change if another liquid of $\mu > 1.25$ is used?

[Understanding]

- (iii) (a) A mixture of red, blue, and green light rays is passed through a convex lens, as illustrated in the diagram below. State whether the ray passes through a single point or through different points on the principal axis after refraction. [4]

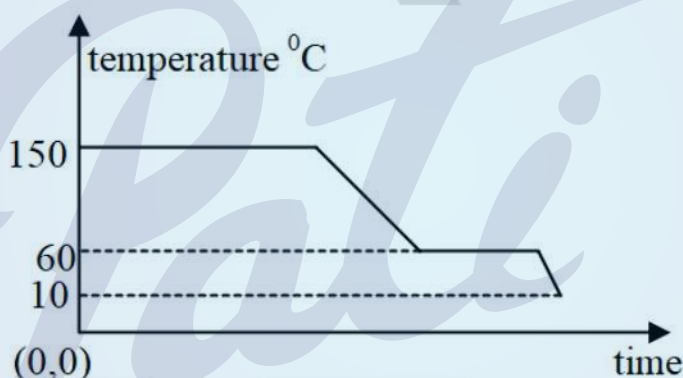
[Understanding]



- (b) Name the *invisible radiation* which is studied using the quartz prism. [Recall]
- (c) State one use of the radiation mentioned by you in (b) above. [Recall]
- (d) Name one type of radiation with a wavelength greater than that of the radiation mentioned by you in (b) above. [Recall]

Question 5

- (i) An object is placed at a distance of 24 cm in front of a convex lens of focal length 8 cm. [3]
- (a) What is the nature of the image so formed? [Understanding & Evaluate]
- (b) Calculate the distance of the image from the lens. [Understanding & Evaluate]
- (ii) The diagram below shows a cooling curve for a substance X: [3]



- (a) State the temperatures at which the substance condenses. [Recall]
- (b) Mention the temperature range in which the substance is in its liquid state. [Understanding]
- (c) **State True or False:** The amount of heat released when a substance is cooled by 10°C in its liquid state is greater than the heat released when it is cooled by the same amount in its solid state.

(iii)

In an experiment to measure the temperature of the flame of a Bunsen burner, a lump of copper of mass 0.12 kg is heated on the flame for a long time. The copper then is quickly transferred into a beaker of negligible heat capacity containing 0.84 kg of water and the temperature of the water rose from 15 °C to 35 °C. Calculate the temperature of the flame.

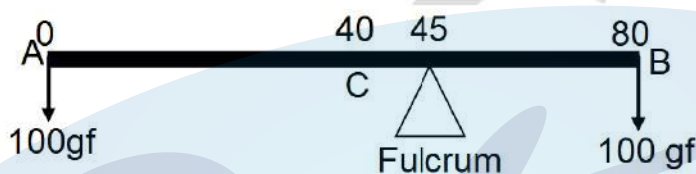
[4]

[Given sp. Heat capacity of copper = $0.4 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$,
Sp. Heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$.]

[Understanding
& Application]

Question 6

(i)



[3]

A metal rod AB of length 80 cm is balanced at 45 cm from the end A with 100 gf weights suspended from the two ends.

- (a) If this rod is cut at the centre C, then compare the weight of AC to the weight of BC. (Use $>$, $<$ or $=$)
- (b) Give a reason for your answer in (a).

[Understanding
& Application]

(ii)

For each of the following scenarios, state whether the work done by gravity is *positive, negative, or zero*.

[3]

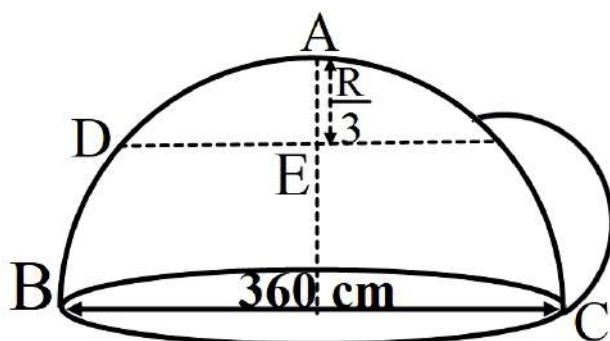
- (a) A person walks on a levelled road.
- (b) A person climbs a ladder.
- (c) A car in a neutral gear is coming down the slope.

[Understanding
& Recall]

(iii)

A, B, C and D are four points on a hemispherical cup placed inverted on the ground. Diameter BC = 360 cm and $AE = R/3$ (R is the radius of the cup). A small spherical mass 500 g at rest at the point A, slides down along the smooth surface of the cup. Assuming that there is no loss of energy, calculate its:

[4]



- (a) Potential Energy at A relative to B.
- (b) Speed at the point B (lowest point).
- (c) Kinetic Energy at D ($g = 10 \text{ ms}^{-2}$).

[Application & Evaluate]

Question 7

- (i) A block and tackle system of pulleys has velocity ratio 4. [3]

- (a) Draw a labelled diagram of the system indicating clearly, the direction of the load and effort.
- (b) Calculate the potential energy gained by load of 100 kgf, lifted by this pulley to a height of 5 m. ($g = 10 \text{ ms}^{-2}$)

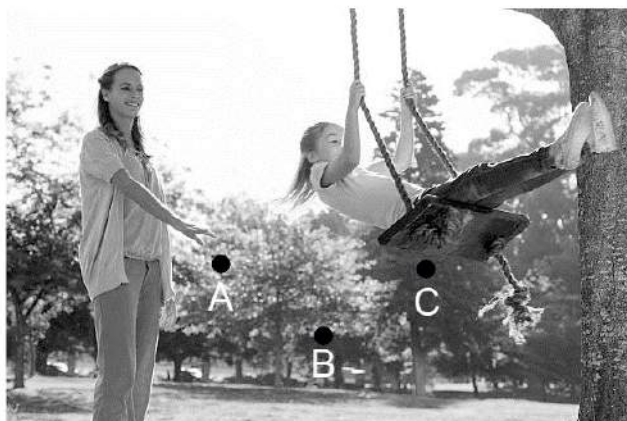
[Recall]

[Understanding & Evaluate]

- (ii) A person standing in front of a cliff fires a gun and hears its echo after 3s. *Speed of sound in air is 336 ms^{-1} :* [3]

- (a) Calculate the distance of the person from the cliff.
- (b) After moving a certain distance from the cliff, he fires the gun again and this time the echo is heard 1.5 s later than the first. Calculate the distance that the person has moved.

[Understanding & Evaluate]



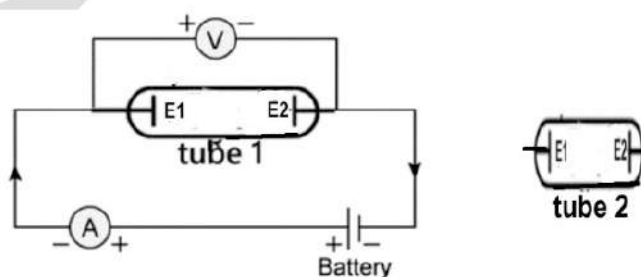
The above picture shows a mother pushing her daughter sitting on a swing. The swing is going through the positions A, B, C where A and C are extreme positions and B is the mean position.

- Which is the right position i.e. at A, B or C, for the mother to give a constant periodic push to the swing, every time in the forward direction, to increase the amplitude of the swing?
- Name the phenomenon involved in this.
- On the basis of this example, explain how this phenomenon helps to increase the amplitude of the swing.

[Application]

Question 8

- The circuit depicted in the figure is employed for studying Ohm's Law. Instead of using a standard resistor, a student opts for a glass tube filled with mercury (**tube 1**), connected to the circuit through two electrodes E1 & E2. He records the readings of the ammeter and voltmeter, thereby calculates the resistance. The student repeats the experiment by substituting **tube 1** with **tube 2**, where the same amount of mercury fills the **tube 2**.

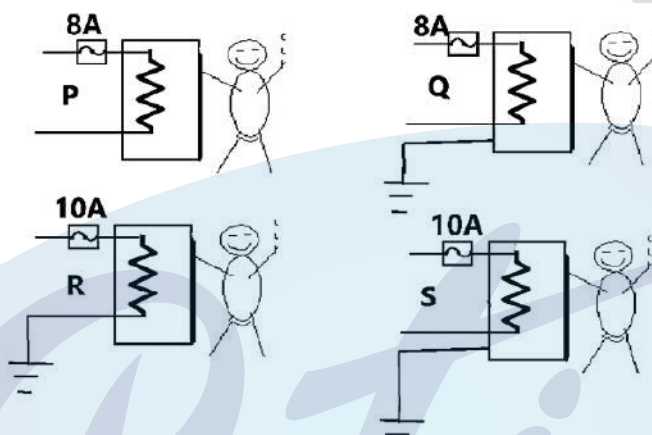


Neglecting internal resistance of the cell, use ($>$ or $<$ or $=$) to compare the following:

- Resistance in both cases.
- Voltmeter readings in both cases.
- Specific resistance in both cases.

[Understanding & Application]

- (ii) An appliance with a metal covering, rated at 2 kW, 220 V, is to be connected in a circuit. Given below are four diagrams (P, Q, R & S) depicting different circuit configurations, [3]



- Identify the safest circuit.
- Write two reasons, supported by mathematical calculations, where applicable, to justify your choice.

[Application & Evaluate]

- (iii) A nichrome wire X with length (l) & cross-sectional area (A) is connected to a 10 V source and another nichrome wire Y with length ($2l$) & cross-sectional area ($A/2$), is connected to a 20 V source. [4]

- Compare the resistances of wires X and Y. [Given that the resistivity of nichrome is (ρ).]
- Compare the electrical power consumed by each wire.
- Compare the masses of these wires. (Given that the density of nichrome is d .)
- State True or False:** Wire X and wire Y both show the same rise in temperature in the same time.

[Analyse & Evaluate]

Question 9

(i) Three bulbs of powers P_1 , P_2 and P_3 ($P_1 < P_2 < P_3$) are connected in a certain way that P_3 glows brightest. [3]

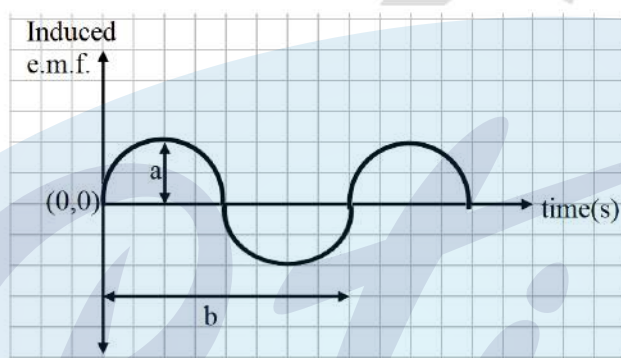
(a) What type of connection exists between these bulbs?

(b) Compare the voltage across these bulbs. (*Use >, < or =*)

(c) Will the circuit still function if one of the bulbs is fused?

[Recall]

(ii) The given diagram shows the output of an AC generator. If the speed of the generator coil is doubled, then: [3]



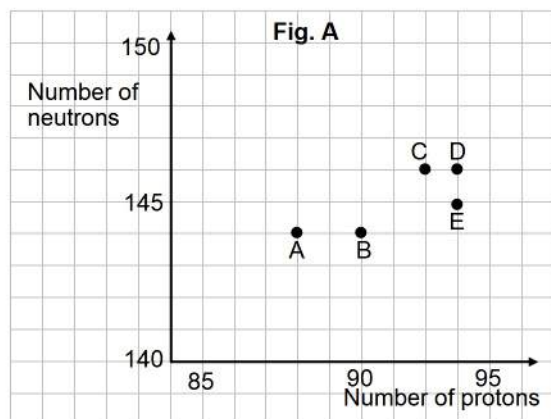
(a) what is the effect on the physical quantity indicated by 'a'?

(b) what is the effect on the physical quantity indicated as 'b'?

(c) give reason for your answer in (b).

[Understanding]

(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. [4]



[Understanding]

- Identify the radioactive radiation emitted when element C decays into element E. Represent this using a nuclear reaction.
- What is the special name given to elements D and E?
- If element C transforms into element B by emitting a radioactive ray, how will this ray behave in an electric field?

DRAFT MARKING SCHEME – PHYSICS (SCIENCE PAPER 1)

Question 1

[1x15]

- (i) (a) positive
- (ii) (c) momentum
- (iii) (b) heat → mechanical → electrical
- (iv) (d) Velocity Ratio remains unchanged and efficiency increases.
- (v) (d) slows down less and refracts less
- (vi) (a) refraction
- (vii) (b) away from the lens
- (viii) (c) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (ix) (b) X will be grave and Y will be shriller
- (x) (c) current through 2 Ω = current through 5 Ω
- (xi) (b) green
- (xii) (d) $\frac{\text{power primary}}{\text{power secondary}} = 1$
- (xiii) (b) energy needed to raise the temperature of a body by 1°C
- (xiv) (c) latent heat of fusion
- (xv) (c) protons = 93, neutrons = 144

Question 2

- (i) (a) Class II [1]
- (b) microwaves [1]
- (c) $\text{m}^2\text{s}^{-2}\text{K}^{-1}$ [1]
- (d) 0dB [1]
- (e) temperature [1+1]
- (f) Nuclear fusion
- (ii) (a) Nodding head → Class I [1]
- (b) Lifting body weight on your toes → Class II [1]
- (iii) (a) Ultrasonic waves [1]
- (b) They travel long distance without deviation / not easily absorbed by the medium [1]
OR can be confined to a narrow beam.

- (i) (a) 2 images will be seen. [1]
 (b) concave lens. [1]
- (ii) Energy spent = 1567 - 856 = 711 kWh [1]
 Time in hours = 711/2 = 355.5 hours [1]
- (iii) (a) X [1]
 (b) Z [1]
- (iv) By principle of mixtures [1]
 Heat lost = heat gained
 $(m \times c \times \Delta T)_{\text{metal}} = (m \times c \times \Delta T)_{\text{water}}$ [1]
 $c' \times 75 = 150 \times 4.2 \times 5$
 $c' = 42 \text{ J K}^{-1}$
- (v) (a) True [1]
 (b) Both currents AC & DC produce magnetic field around it. [1]
- (vi) (a) gamma / γ [1]
 (b) No. [1]
- (vii) (a) total internal reflection [1]
 (b) 1. Light ray should travel from denser to rarer medium [1]
 2. Angle of incidence must be greater than critical angle. [1]

Question 4

- (i) (a) Total internal reflection. [1]
 (b) 1. Converge [1]
 2. Diverge [1]
- (ii) (a) Real depth = 25 cm [1+1]
 Refractive index = 1.25
 Apparent depth = Real depth / refractive index
 $25/1.25 = 20 \text{ cm.}$
 (b) length will decrease [1]
- (iii) (a) Different points. [1]
 (b) Ultraviolet radiation [1]
 (c) Sterilization purposes / Detecting purity of gems, eggs/ in producing vitamin D [1]
 (d) Visible or infra-red or microwaves or radio waves. [1]

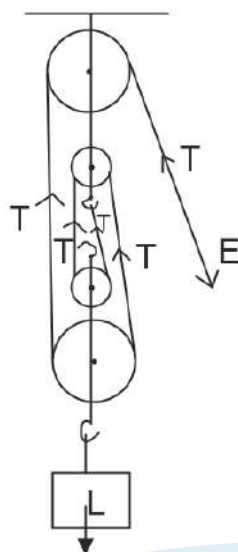
- (i) (a) Real, inverted [1]
 (b) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \therefore \frac{1}{v} - \frac{1}{-24} = \frac{1}{8}$ [1]
 (identifying 'U' and 'f' with correct sign convention) [1]
 $\frac{1}{v} = \frac{3-1}{24} \therefore v = 12 \text{ cm}$ [1]
- (ii) (a) 150°C - [1+1]
 (b) 150°C to 60°C
 (c) True. [1]
- (iii) Heat lost by Cu = $0.12 \times 400 \times (t - 35)$ [1x4]
 Heat gained by water = $0.84 \times 4200 \times (35 - 15)$
 $t - 35 = \frac{0.84 \times 4200 \times 20}{0.12 \times 400} = 7 \times 42 \times 5 = 1470^{\circ}\text{C}$
 $t = 1470 + 35 = 1505^{\circ}\text{C}$

Question 6

- (i) (a) Weight of AC < weight of BC [1]
 (b) Even though the weights present are the same at both ends, the torque arm of B is less than the torque arm of A. [2]
 This means the moment of the weight of the rod acts from side B and the C.G. lies beyond 40. Thus, more weight is concentrated between C to B.
- (ii) (a) No work is done. [1]
 (b) Negative work is done. [1]
 (c) Positive work is done. [1]
- (iii) (a) Potential energy at A relative to B [1]
 $\text{PE}_A = mgh$
 $= 0.5 \times 10 \times 1.8 = 9\text{J}$
 (b) Speed at point B (lowest point) [1]
 Using energy conservation
 $\text{PE at A} = \text{KE at B} \Rightarrow mgh = \frac{1}{2} mv^2$
 $v = \sqrt{2gh} = \sqrt{2 \times 10 \times 1.8}$
 $= 6\text{m/s}$
 (c) Kinetic and Potential energy at D [1+1]
 Therefore, height above B = $2R/3$
 $= 1.2\text{m}$
 $\text{P.E. at D} = mgh$
 $= 0.5 \times 10 \times 1.2 = 6\text{J}$
 $\text{K.E. at D} = \text{TE} - \text{PE at D} = 9 - 6 = 3\text{J}$

Question 7

(i)



(a) Pulleys drawn correctly with support
Correct connection of tackle, Marking load, effort with correct direction and tension [1+1]

(b) $U = mgh = 100 \times 10 \times 5$
 $U = 5000 \text{ J}$ [1]

(ii) (a) $d = (s \times t) / 2 \quad \therefore d = (336 \times 3) / 2$
 $d = 168 \times 3 = 504 \text{ m}$ [1+1]

(b) $d = (s \times t) / 2$
 $\therefore d = (336 \times 1.5) / 2 = 168 \times 1.5 = 252 \text{ m}$
Distance moved = $504 - 252 = 252 \text{ m}$ [1]

(iii) (a) At A [1]

(b) Resonance [1]

(c) The natural frequency of the swing will match the frequency of the force applied by mother this will increase the amplitude. [1+1]

Question 8

(i) (a) Resistance of the tube 2 < resistance of the tube 1 [1]

(b) The voltmeter reading for tube 1 is the same as the voltmeter reading for tube 2. [1]

(c) The specific resistance in both the cases is the same. [1]

(ii) (a) S [1]

(b) metal body of appliance is earthed [1+1]

$I = PV = 2000 / 220 = 9.09 \text{ A}$ 10A fuse is appropriate

(iii) (a) $R_{of\ X} = \frac{\rho l}{A}$ $R_{of\ Y} = \frac{\rho 2l}{\frac{A}{2}} = 4 \frac{\rho l}{A}$ $R_X : R_Y = 1 : 4$ [1+1]

(b) $P_X = \frac{v^2 t}{R} = \frac{10^2}{R}$ $P_Y = \frac{v^2 t}{R} = \frac{20^2}{4R}$ $\therefore P_X : P_Y = 1 : 1$ [1+1]

(c) $mass\ of\ X = A \times l \times d = mass\ of\ Y = \frac{A}{2} \times 2l \times d \therefore m_X : m_Y = 1 : 1$

(d) True

$$Q_X = mc\Delta T = Al \times c \times 8 = \frac{v^2 t}{R} = P_X \times t \rightarrow eq\ 1$$

$$Q_Y = mc\Delta T = Al \times c \times \Delta T = \frac{v^2 t}{R} = P_Y \times t \rightarrow eq\ 2$$

Eq1/eq2 = 1 (rise in temperature will be same in both wires)

Question 9

(i) (a) parallel [2+1]

(b) $V_1 = V_2 = V_3$

(c) Yes

(ii) (a) It will be doubled. [1]

(b) It will be halved. [1]

(c) If speed is doubled, it means time of a cycle will be halved. [1]

(iii) (a) $\beta : {}_{92}^{238}C \rightarrow {}_{93}^{238}E + {}_{-1}^0\beta$ [1]

(b) isotopes [1]

(c) It will shift towards the negative plate [1+1]



ICSE ACADEMY

Specimen Papers

- 2025

ICSE 2025 EXAMINATION
SPECIMEN QUESTION PAPER

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 [].

Instruction for the Supervising Examiner

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

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 question, write the correct answers only.)

(i) A moment of couple has a tendency to rotate the body in an anticlockwise direction. Then the moment of couple is taken as:

- (a) positive
- (b) negative
- (c) maximum
- (d) zero

[Recall]

(ii) The kinetic energy of a given body depends on the:

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

[Understanding]

(iii) For burning of coal in a thermoelectric station, the energy conversion taking place is:

- (a) chemical to heat to mechanical
- (b) chemical to heat to mechanical to electrical
- (c) chemical to heat to light
- (d) heat to chemical to mechanical

[Recall]

- (iv) The adjacent diagram shows the movable block of a block and tackle system with effort in a convenient direction. From the diagram we can conclude that the number of pulleys used in the fixed block are _____.



- (a) 1
(b) 3
(c) 2
(d) 4

[Analysis & Application]

- (v) White light is dispersed by a prism. Inside the prism, compared to the blue light, the red light

- (a) slows down less and refracts more
(b) slows down more and refracts less
(c) slows down more and refracts more
(d) slows down less and refracts less

[Recall & Application]

- (vi) An endoscope uses optic fiber to transmit high resolution images of internal organs without loss of information. The principle of light that is used by the optic fiber is based on:

- (a) refraction
(b) reflection
(c) scattering
(d) total internal reflection.

[Recall]

- (vii) A convex lens has focal length 12 cm with an object at a distance of 20 cm in front of the lens. He obtains a blurred image on the screen placed at a distance of 23 cm in front of the lens. In order to obtain the clear image, he has to move the screen

- (a) towards the lens.
(b) away from the lens.
(c) to a position very far away from the lens.
(d) either towards or away from the lens.

[Application]

(viii) **Assertion(A):** Infrared radiations travel long distance through a dense fog and mist.

Reason(R): Infrared radiations undergo minimal scattering in earth's atmosphere.

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

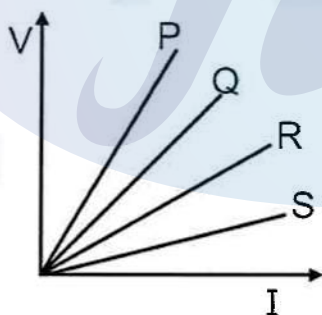
[Understanding
& Recall]

(ix) Two sound waves X and Y have the same amplitude and the same wave pattern but their frequencies are 60 Hz and 120 Hz respectively, then

- (a) X will be shriller and Y will be grave
- (b) X will be grave and Y will be shriller
- (c) X will differ in quality than Y
- (d) X is louder than Y.

[Understanding]

(x) The graph of voltage vs current for four different materials is shown below.



Which of these four materials would be used for making filament of a bulb?

- (a) Q
- (b) S
- (c) P
- (d) R

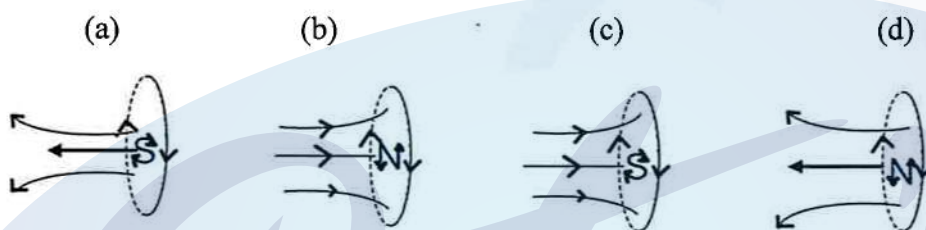
[Understanding
& Recall]

(xi) According to the old convention, the colour of the earth wire is:

- (a) black
- (b) green
- (c) yellow
- (d) red

[Recall]

(xii) Current is flowing through a coil as shown in the figure. Which one of the given figures will correctly depict the magnetic polarity and the direction of the lines of force along the axis of the coil.



[Application]

(xiii) Heat capacity of a body is the:

- (a) energy needed to melt a body without change in its temperature.
- (b) energy needed to raise the temperature of a body by 1°C
- (c) increase in volume of the body when its temperature increases by 1°C
- (d) total amount of internal energy that is constant.

[Recall]

(xiv) The amount of heat energy required to melt a given mass of a substance at its melting point without any rise in its temperature is called as the:

- (a) specific heat capacity
- (b) specific latent heat of fusion
- (c) latent heat of fusion
- (d) specific latent heat of freezing

[Recall]

(xv) A nucleus of an atom consists of 146 neutrons and 95 protons. It decays after emitting an alpha particle. How many protons and neutrons are left in the nucleus after an alpha emission?

- (a) protons = 93 , neutrons = 142
- (b) protons = 95 , neutrons = 144
- (c) protons = 93 , neutrons = 144
- (d) protons = 95 , neutrons = 142

[Understanding]

Question 2

(i) Complete the following by choosing the correct answers from the bracket:

[6]

- (a) A _____ [*class I/class II/Class III*] lever will always have M.A. > 1.
- (b) In a block and tackle system, increase in the weight of the movable block _____ [*decreases, does not affect, increases*] the efficiency of the pulley system.
- (c) If the mass as well as the velocity of a body is doubled then the kinetic energy of the body _____ [*is doubled/becomes eight times / becomes four times*] the initial kinetic energy.
- (d) Unit of power used in mechanical engineering is _____ [*watt / horse power / erg per second*]
- (e) Two copper wires can have the different _____ [*resistivity / resistance*] but will have same _____ [*resistance / resistivity*]

[Recall & Understanding]

(ii) Draw a graph of potential energy vs height for a body thrown vertically upwards. [Assume no friction is present.]

[2]

[Understanding]

(iii) (a) Name the waves used for echo depth sounding.

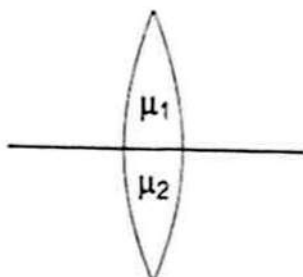
[2]

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

[Recall]

Question 3

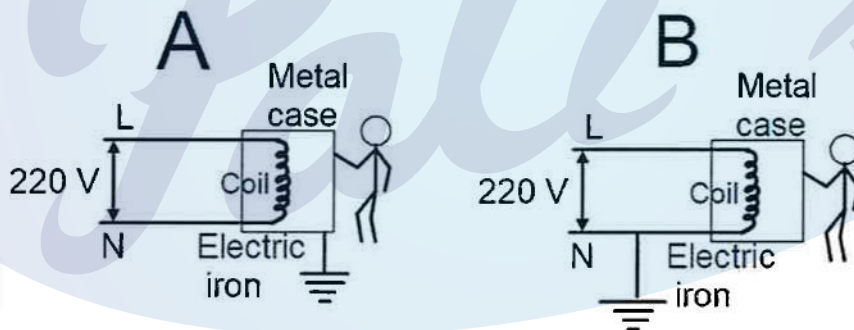
- (i) (a) Refer to the diagram given below. A lens with two different refractive indices is shown. If the rays are coming from a distant object, then how many images will be seen? [2]



[Understanding]

- (b) A glass lens always forms a virtual, erect and diminished image of an object kept in front of it. Identify the lens. [Recall]

- (ii) If live wire makes an accidental contact with the metal case, which circuit (A or B) in the diagram, illustrating an electric iron, is considered safe for the user (Assuming the fuse is present in the live wire in both circuits)? Justify your answer. [2]



[Application]

- (iii) A transformer is used to change a high alternating e.m.f. to a low alternating e.m.f. of the same frequency. [2]

- (a) Identify the type of transformer used for the above purpose.
 (b) State whether the turns ratio of the above transformer is $=1$ or >1 or <1 . [Understanding]

[Recall]

- (iv) A solid of mass 60 g at 100°C is placed in 150 g of water at 20°C . The final steady temperature is 25°C . Calculate the heat capacity of solid. [2]

[Understanding

[sp. heat capacity of water = $4.2 \text{ J g}^{-1} \text{ K}^{-1}$]

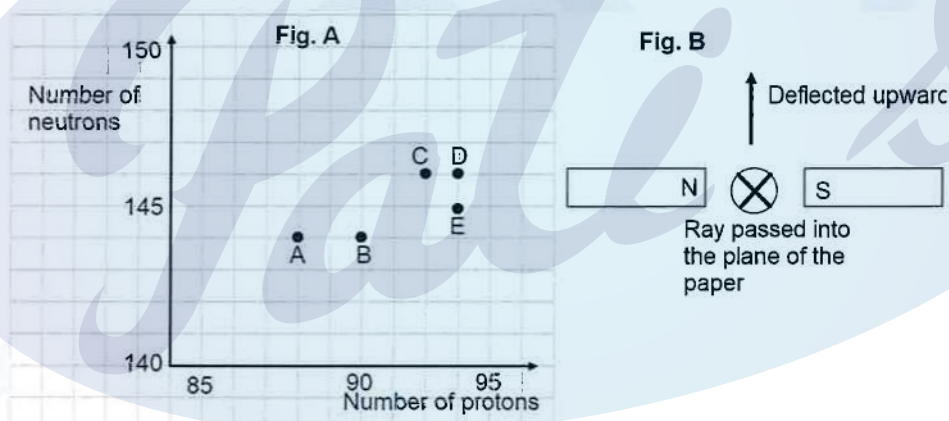
& Evaluate]

- (v) (a) Name the principle of AC generator. [2]
(b) State its one use. [Recall]

- (vi) (a) Name the radiations that are emitted during the decay of a nucleus, which has highest penetrating power? [2]
[Recall]

- (b) Does the emission of the above-mentioned radiation result in a change in the mass number? [Understanding]

- (vii) 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. When the element C, depicted in the graph, undergoes radioactive decay, it releases radioactive rays. When these rays are directed **into the plane of the paper** in the presence of a magnetic field, as indicated in the fig B, they experience deflection, causing them to move upwards.



- (a) Name the radioactive radiations emitted by the element C.
(b) Identify the daughter element from the graph.
(c) Name the law used to identify the radioactive radiations emitted by the element.

[Application]

SECTION B

(Attempt any four questions from this Section.)

Question 4

- (i) The diagram below shows a fish in the tank and its image seen in the surface of water. [3]



- (a) Name the phenomenon responsible for the formation of this image.

[Understanding
& Recall]

- (b) A double convex lens with refractive index μ_1 inside two liquids of refractive indices μ_2 and μ_3 are shown in the diagrams below. The refractive indices are such that $\mu_2 > \mu_1$ and $\mu_1 > \mu_3$.



Figure a



Figure b

How would a parallel incident beam of light refract when it comes out of the lens in each of the cases shown above?

(1) in Fig a.

(2) in figure b.

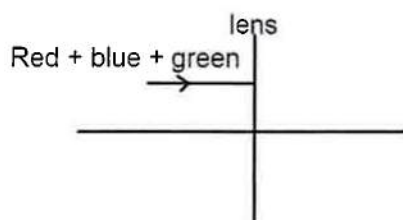
[Application]

- (ii) The refractive index of water is 1.33 at a certain temperature. When the temperature of water is increased by 40°C , the refractive index changes to 'x'. [3]

- (a) State whether $x < 1.33$ or $x > 1.33$.
- (b) State two differences between normal reflection and total internal reflection.

[Understanding
& Recall]

- (iii) (a) Mixture of red+blue+green is passed through a convex lens as shown in the diagram below. State whether the ray passes through a single point or through different points on the principal axis after refraction. [4]
[Understanding]

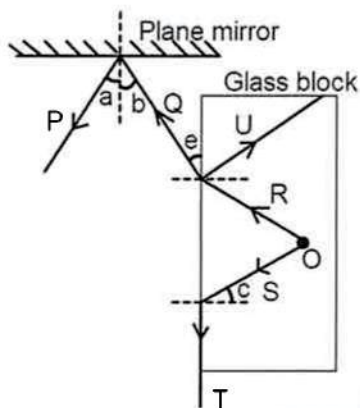


- (b) Name the invisible radiations which are studied using the quartz prism. [Recall]
- (c) State one use of these radiations. [Recall]
- (d) Name one radiation having the wavelength longer than the wavelength of these radiations. [Recall]

Question 5

- (i) An object is placed at a distance 24 cm in front of a convex lens of focal length 8 cm. [3]
- (a) What is the nature of the image so formed? [Understanding]
- (b) Calculate the distance of the image from the lens. [Evaluate]
- (ii) When sunlight passes through water droplets in the atmosphere it gets dispersed into its constituent colours forming a rainbow. A similar phenomenon is observed when white light passes through a prism. [3]
- (a) Which colour will show the maximum angle of deviation and which colour will show the minimum angle of deviation? [Recall]
- (b) If Instead of sunlight, a green-coloured ray is passed through a glass prism. What will be the colour of the emergent ray? [Understanding]

- (iii) O is a luminescent particle trapped inside a glass block. A student traces the path of rays coming out of it and reflecting over a plane mirror as shown in the diagram below. [4]

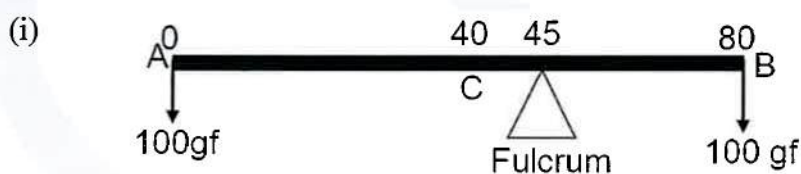


Complete the table, using the labels from the figure. The first label is done for you.

Sr. No	Description	Label
a.	an angle of reflection on the mirror	a
b.	a partially reflected ray in the glass slab	
c.	a critical angle	
d.	a refracted ray	
e.	an angle of refraction of the ray R	

[Understanding & Application]

Question 6



A metal rod AB of length 80 cm is balanced at 45 cm from the end A with 100 gf weights suspended from the two ends.

- (a) If this rod is cut at the centre C, then compare the weight of AC to the weight of BC.
 (b) Give a reason for your answer in (a)

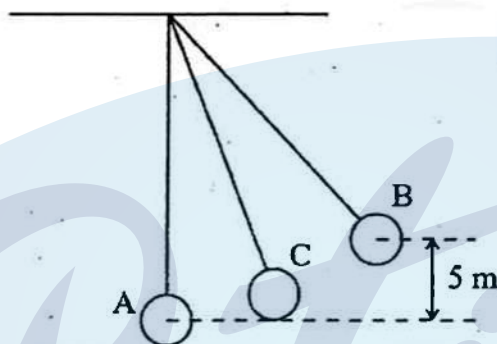
[Understanding & Application]

(ii) For each of the following scenarios, state whether the work done by gravity is positive, negative, or zero. [3]

- (a) a person walks on a levelled road.
- (b) a person climbs a ladder.
- (c) a car in neutral gear is coming down the slope.

[Understanding & Recall]

(iii) The figure below shows a simple pendulum of mass 200 g. It is displaced from the mean position A to the extreme position B. The potential energy at the position A is zero. At the position B the pendulum bob is raised by 5 m. [4]



- (a) What is the potential energy of the pendulum at the position B?
- (b) What is the total mechanical energy at point C?
- (c) What is the speed of the bob at the position A when released from B?

[Recall]

[Recall]

[Application & Evaluate]

(Take $g = 10 \text{ ms}^{-2}$ and given that there is no loss of energy.)

Question 7

(i) A block and tackle system of pulleys has velocity ratio 4. [3]

- (a) Draw a labelled diagram of the system indicating clearly, the direction of the load and effort.
- (b) Calculate the potential energy of the load 100 kgf lifted by this pulley to a height 5 m. ($g = 10 \text{ ms}^{-2}$)

[Recall]

[Understanding & Evaluate]

- (ii) A person standing in front of a cliff fires a gun and hears its echo after 3s. If the speed of sound in air is 336 ms^{-1} [3]
- (a) Calculate the distance of the person from the cliff.
- (b) After moving a certain distance from the cliff, he fires the gun again and this time the echo is heard 1.5 s later than the first. Calculate the distance that the person moved. [Understanding & Evaluate]

- (iii) [4]



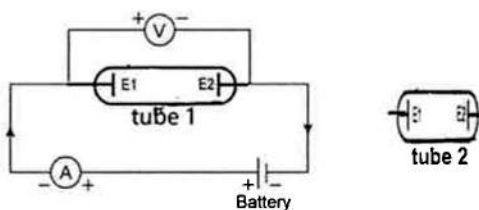
The above picture shows a mother pushing her daughter sitting on a swing. The swing is going through the positions A, B, C where A and C are extreme positions and B is the mean position.

- (a) Which is the right position i.e. at A, B or C, for the mother to give a constant periodic push to the swing every time in the forward direction to increase the amplitude of the swing?
- (b) Name the phenomenon involved in this.
- (c) Explain with this example how this phenomenon helps to increase the amplitude of the swing. [Application]

Question 8

- (i) The circuit depicted in the figure is employed for studying Ohm's Law. [3]
- Instead of using a standard resistor, a student opts for a glass tube **filled** with mercury (*tube 1*), connected to the circuit through two electrodes E1 & E2. He records the readings of the ammeter and voltmeter, thereby calculates the resistance. The student repeats the experiment by

substituting *tube 1* with *tube 2*, where the same amount of mercury fills the *tube 2*.



Neglecting internal resistance of the cell use ($>$ or $<$ or $=$) to compare

- the resistance in both the cases.
- the voltmeter readings in both the cases.
- the specific resistance in both the cases.

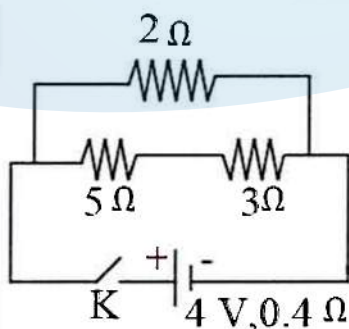
[Understanding
& Application]

- (ii) A radioactive nucleus X emits an alpha particle followed by two beta particles to form nucleus Y. [3]

- With respect to the element X, where would you position the element Y in the periodic table?
- What is the general name of the elements X and Y?
- If the atomic number of Y is 80 then what is the atomic number of X?

[Understanding
& Recall]

- (iii) Observe the given circuit diagram and answer the questions that follow: [4]



- Calculate the resistance of the circuit when the key K completes the circuit.
- Calculate the current through 3Ω resistance when the circuit is complete.

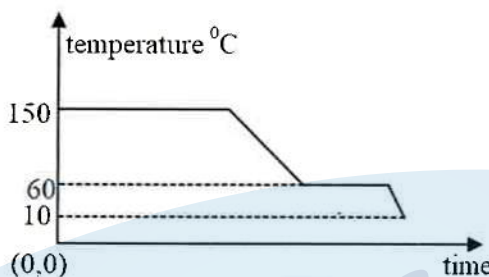
[Understanding
& Evaluate]

Question 9

- (i) What mass of ice at 0°C added to 2.1 kg water, will cool it down from 75°C to 25°C ? Given Specific heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ }^{\circ}\text{C}^{-1}$, Specific latent heat of ice = 336 Jg^{-1} . [3]
[Understanding & Evaluate]

- (ii) The diagram below shows a cooling curve for a substance:

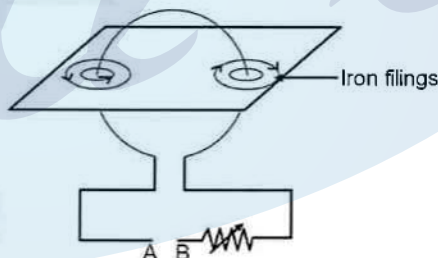
- (a) State the temperatures at which the substance condenses. [3]
(b) The temperature range in which the substance is in liquid state.



- (c) Why do we prefer ice to ice-cold water for cooling a drink? [Understanding & Recall]

- (iii) The diagram below shows a cardboard on which iron filings are kept. A wire bent in the form of a loop is seen passing through the cardboard. When current flows through it the iron filings arrange themselves as shown below with the direction of magnetic field. [4]

- (a) State the polarities of the battery at A and B.



- (b) State the effect on the magnetic field if an iron rod is held along the axis of the coil.

- (c) State one way to:

1. change the polarity of the coil.
2. decrease the strength of the magnetic field around the coil.

[Understanding & Application]

[Understanding & Recall]

DRAFT MARKING SCHEME – PHYSICS (SCIENCE PAPER 1)

Question 1

[1x15]

- (i) (a) positive
- (ii) (c) momentum
- (iii) (b) chemical to heat to mechanical to electrical
- (iv) (c) 2
- (v) (d) slows down less and refracts less
- (vi) (d) total internal reflection
- (vii) (b) away from the lens
- (viii) (a) both A and R are true and R is the correct explanation of A.
- (ix) (b) X will be grave and Y will be shriller
- (x) (c) P
- (xi) (b) green
- (xii) (c)



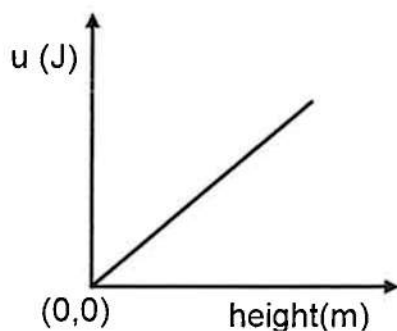
- (xiii) (b) energy needed to raise the temperature of a body by 1°C
- (xiv) (c) latent heat of fusion
- (xv) (c) protons = 93 , neutrons = 144

Question 2

- (i) (a) Class II [1]
- (b) decreases [1]
- (c) becomes eight times [1]
- (d) horse power [1]
- (e) resistance, resistivity [1+1]

for proper labelling of axis U (J) and h(m) and
for nature of graph

[1]
[1]



- (iii) (a) ultrasonic waves [1]
(b) they travel long distance without deviation / not easily absorbed by the medium [1]
OR can be confined to a narrow beam.

Question 3

- (i) (a) 2 images will be formed. [1]
(b) concave lens. [1]

- (ii) Circuit in A [1]
In circuit A, metal case is earthed so the person won't get an electric shock but in circuit B metal case is not earthed so the circuit will be completed through the body of the person giving him a shock.. [1]

- (iii) (a) Step down transformer [1]
(b) less than 1 [1]

- (iv) By principle of mixtures [1]
Heat lost = heat gained
 $(m \times c \times \Delta T)_{\text{metal}} = (m \times c \times \Delta T)_{\text{water}}$ [1]
 $c' \times 75 = 150 \times 4.2 \times 5$
 $c' = 42 \text{ J K}^{-1}$

- (v) (a) Faraday's first law or principle of electromagnetic induction. [1]
(b) It is used as a back-up for the lifts in tall buildings in case of electricity failure. / (any use) [1]

- (vi) (a) gamma / γ [1]
(b) No. [1]

(vii)

- (a) Beta [1]
- (b) E [1]
- (c) Flemings left hand rule [1]

Question 4

- (i) (a) Total internal reflection. [1]
- (b) 1. Converge [1]
- 2. Diverge [1]

- (ii) (a) $X < 1.33$ [1]
- (b) [1+1]

Reflection	TIR
Takes place in any medium, denser or rarer	Takes place only in a denser medium
Takes place for any angle of incidence.	Takes place only when the angle of incidence is greater than critical angle.

- (iii) (a) Different points. [1]
- (b) Ultraviolet radiations [1]
- (c) Sterilization purposes / Detecting purity of gems, eggs/ in producing vitamin D [1]
- (d) Visible or infra-red or microwaves or radio waves. [1]

Question 5

- (i) (a) Real, inverted [1]
- (b) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \therefore \frac{1}{v} - \frac{1}{-24} = \frac{1}{8}$ [1]
- (identifying 'U' and 'f' with correct sign convention) [1]
- $\frac{1}{v} = \frac{3-1}{24} \therefore v = 12 \text{ cm}$ [1]

- (ii) (a) Violet shows maximum angle of deviation [1+1]
- red shows minimum angle of deviation.
- (b) Green [1]

Sr. No	Description	Label
a.	angle of incidence on the mirror	a
b.	a partially reflected ray in glass slab	U
c.	a critical angle	C
d.	a refracted ray	Q / T
e.	angle of refraction	$90 - e$

[1x4]

Question 6

- (i) (a) Weight of AC < weight of BC [1]
 (b) Even though the weights present are the same at both ends the torque arm of B is less than the torque arm of A. [2]

This means the moment of the weight of the rod acts from side B and the C.G. lies beyond 45. Thus, more weight is concentrated between C to B.

- (ii) (a) No work is done. [1]
 (b) Negative work is done. [1]
 (c) Positive work is done. [1]

- (iii) (a) $U = mgh = 0.2 \times 10 \times 5 = 10\text{J}$ [1]
 (b) 10 J [According to Pr. of conservation of energy] [1]
 (c) By principle of conservation of energy [1+1]

U at the top = K at the bottom

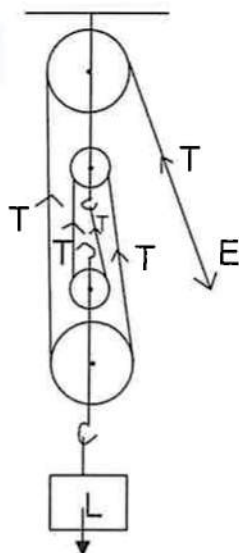
$$\therefore 10 = \frac{1}{2} \times 0.2 \times v^2$$

$$\therefore v^2 = 100$$

$$\therefore v = 10 \text{ m s}^{-1}$$

Question 7

(i)



- (a) Pulleys drawn correctly with support [1+1]
 Correct connection of tackle, Marking load, effort with correct direction and tension
- (b) $U = mgh = 100 \times 10 \times 5$ [1]
 $U = 5000 \text{ J}$
- (ii) (a) $d = (s \times t) / 2 \quad \therefore d = (336 \times 3) / 2$ [1+1]
 $d = 168 \times 3 = 504 \text{ m}$
- (b) $d = (s \times t) / 2$ [1]
 $\therefore d = (336 \times 1.5) / 2 = 168 \times 1.5 = 252 \text{ m away.}$
- (iii) (a) At A [1]
 (b) Resonance [1]
 (c) The natural frequency of the swing will match the frequency of the force applied by mother this will increase the amplitude. [1+1]

Question 8

- (i) (a) Resistance of the tube 2 < resistance of the tube 1 [1]
 (b) The voltmeter reading for tube 1 is the same as the voltmeter reading for tube 2. [1]
 (c) The specific resistance in both the cases is the same. [1]
- (ii) (a) At the same place [1]
 (b) Isotopes. [1]
 (c) 80 [1]
- (iii) (a) $R_1 = 5 + 3 = 8\Omega \quad R_2 = \frac{8 \times 2}{8 + 2}$ [1+1]
 $R_2 = 1.6\Omega \quad \therefore R = 1.6 + 0.4 = 2\Omega$ [1+1]
- (b) $I = \frac{E}{R} = \frac{4}{2} = 2A$
 $I_{3\Omega} = \frac{2 \times 2}{10} = 0.4A$

Question 9

- (i) Heat lost = heat gained [2+1]
 $m c \Delta t = m l + m c \Delta t$
 $\therefore 2100 \times 4.2 \times (75 - 25) = m \times 336 + m \times 4.2 \times (25 - 0)$ ---- (each side 1M)
 $\therefore 2100 \times 4.2 \times 50 = m \times 4.2 (80 + 25)$
 $\therefore 2100 \times 50 = 105 \times m$
 $\therefore m = (2100 \times 50) / 105$
 $= (100 \times 50) / 5$
 $\therefore m = 1000 \text{ g}$

- (ii) (a) 150°C - [1]
(b) 150°C to 60°C [1]
(c) Every gram of ice can absorb 336 J heat more than ice-cold water due to its high specific latent heat. [1]
- (iii) (a) A : positive and B : Negative [1]
(b) Magnetic field becomes stronger / strength increases/magnetic flux increases /intensity of magnetic field increases or implied. [1]
(c) 1. Interchange the polarity of the terminals of A and B / reversing the direction of the current (through the coil) [1+1]
2. Decreasing the strength of the current through the coil





ICSE ACADEMY

Specimen Papers

- 2024

ICSE 2024 EXAMINATION
SPECIMEN QUESTION PAPER

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]

(Do not copy the question, write the correct answers only.)

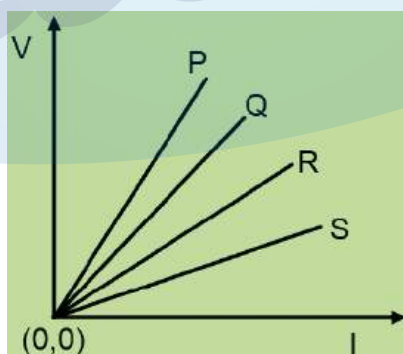
- (i) A moment of couple has a tendency to rotate the body in an anticlockwise direction.

Then the moment of couple is taken as:

- (a) positive
- (b) negative
- (c) maximum
- (d) zero

- (ii) The kinetic energy of a given body depends on the:
- (a) position
 - (b) centre of gravity of the body.
 - (c) momentum
 - (d) displacement
- (iii) For burning of coal in a thermoelectric station, the energy conversion taking place is:
- (a) chemical to heat to mechanical
 - (b) chemical to heat to mechanical to electrical
 - (c) chemical to heat to light
 - (d) heat to chemical to mechanical
- (iv) A nucleus of an atom consists of 146 neutrons and 95 protons. It decays after emitting an alpha particle. How many protons and neutrons are left in the nucleus after an alpha emission?
- (a) protons = 93, neutrons = 144
 - (b) protons = 95, neutrons = 142
 - (c) protons = 89, neutrons = 144
 - (d) protons = 89, neutrons = 142
- (v) Assertion: Infrared radiations travel long distances through dense fog and mist.
Reason: Infrared radiations undergoes minimal scattering in earth's atmosphere
- (a) both assertion and reason are true.
 - (b) both assertion and reason are false.
 - (c) assertion is false but reason is true.
 - (d) assertion is true reason is false.

- (vi) For a convex lens, the minimum distance between an object and its real image in terms of focal length (f) of a given lens must be:
- (a) $1.5 f$
 - (b) $2.5 f$
 - (c) $2 f$
 - (d) $4 f$
- (vii) Two sound waves X and Y have same amplitude and same wave pattern, but their frequencies are 60 Hz and 120 Hz respectively, then:
- (a) X will be shriller and Y will be grave
 - (b) X will be grave and Y will be shriller
 - (c) X will differ in quality than Y
 - (d) X is louder than Y.
- (viii) Vibrations produced in a body under the influence of the periodic force is;
- (a) forced vibrations
 - (b) resonant vibrations
 - (c) damped vibrations
 - (d) sympathetic vibrations
- (ix) The graph of voltage vs current for four different materials is shown below.



Which of these four materials would be used for making the coil of a toaster?

- (a) Q
- (b) S
- (c) P
- (d) R

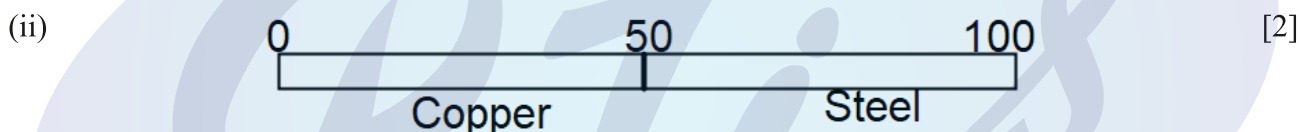
- (x) According to the old convention the colour of the earth wire is:
- (a) black
 - (b) green
 - (c) yellow
 - (d) red
- (xi) Lenz's law is based on the law of conservation of:
- (a) force
 - (b) charge
 - (c) mass
 - (d) energy
- (xii) Heat capacity of a body is:
- (a) the energy needed to melt the body without the change in its temperature
 - (b) the energy needed to raise the temperature of the body by 1°C
 - (c) the increase in the volume of the body when its temperature increases by 1°C
 - (d) the total amount of internal energy that is constant.
- (xiii) The amount of heat energy required to melt a given mass of a substance at its melting point without rise in its temperature is called:
- (a) specific heat capacity
 - (b) specific latent heat of fusion
 - (c) latent heat of fusion
 - (d) specific latent heat of freezing
- (xiv) When a ray of light enters from a denser medium to a rarer medium then:
- (a) the light ray bends towards the normal
 - (b) the speed of light increases
 - (c) the angle of incidence is greater than the angle of refraction
 - (d) its wavelength decreases.

(xv) An endoscope uses optical fiber to transmit high resolution images of internal organs without loss of information. The phenomenon of light that governs the functioning of the optical fiber is:

- (a) refraction
- (b) reflection
- (c) scattering
- (d) total internal reflection.

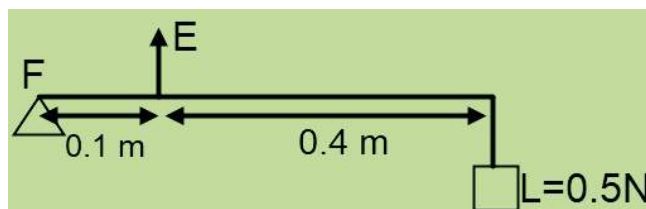
Question 2

- (i) (a) Name the principle on which a lever works. [3]
- (b) Which radiations that are emitted during the decay of a nucleus, having highest penetrating power?
- (c) Does the emission of the above-mentioned radiation result in a change in the mass number?



A metre rod made of copper and steel as shown in the diagram. Weights of copper and steel are 10 N and 8 N respectively.

- (a) On which part does the centre of gravity lie (0 to 50 or 50 to 100).
 - (b) Justify your answer.
- (iii) A lever is shown below. [2]



- (a) Identify the type of lever.
- (b) Calculate its mechanical advantage.

- (iv) Two bodies A and B have same kinetic energies. Compare their velocities if mass of A is four times the mass of B. [2]
- (v) Draw a graph of potential energy vs height from the ground for a body thrown vertically upwards. [2]
- (vi) Two copper wires A and B are of the same thickness and are at the room temperature. If the length of A is twice the length of B then: [2]
- (a) Compare their resistances
- (b) Compare their resistivities
- (vii) (a) Name the waves used for echo depth sounding. [2]
- (b) Give one reason for their use in the above application.

Question 3

- (i) (a) Refer to the diagram given below. A lens with two different refractive indices is shown. If the rays are coming from a distant object, then how many images will be seen? [2]
- The diagram shows a biconvex lens with a horizontal principal axis. The lens is divided into two vertical sections by a vertical line through its center. The upper section is labeled with the refractive index μ_1 and the lower section is labeled with μ_2 . The lens is symmetric about the principal axis.
- (b) A glass lens always forms a virtual, erect and diminished image of an object kept in front of it. Identify the lens.
- (ii) It is observed that the house circuits are arranged in a parallel combination. Give two advantages of this arrangement. [2]
- (iii) A transformer is used to change a high alternating e.m.f. to a low alternating e.m.f. of the same frequency. [2]
- (a) Identify the type of transformer used for the above purpose.
- (b) State whether the turns ratio of the above transformer is $=1$ or >1 or <1 .

- (iv) A solid of mass 60 g at 100°C is placed in 150 g of water at 20°C. The final steady temperature is 25°C. Calculate the heat capacity of solid. [2]
 [sp. heat capacity of water = 4.2 J g⁻¹ K⁻¹]
- (v) What is a nuclear waste? State one method to dispose it safely. [2]

SECTION B

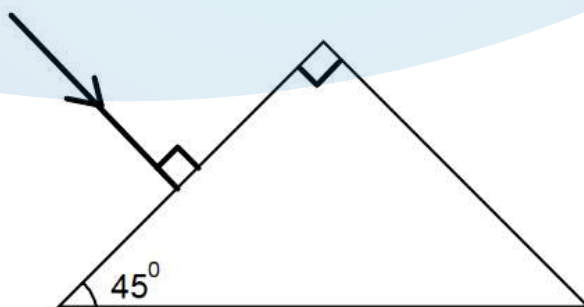
(Attempt *any four* questions.)

Question 4

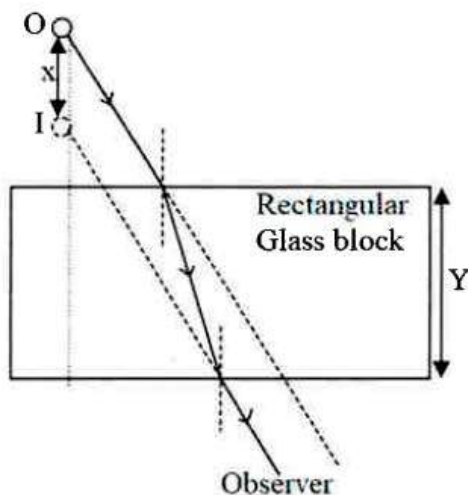
- (i) The diagram below shows a fish in the tank and its image seen in the surface of water. [3]



- (a) Name the phenomenon responsible for the formation of this image.
- (b) Complete the path of the ray through the glass prism of critical angle 42° till it emerges out of the prism.



- (ii) (a) The refractive index of water is 1.33 at a certain temperature. When the temperature of water is increased by 40°C, the refractive index changes to 'x'. State whether $x < 1.33$ or $x > 1.33$. [3]
- (b) State two differences between normal reflection and total internal reflection.



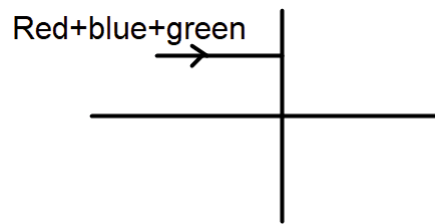
The above diagram shows that an observer sees the image of an object O at I.

- (a) Name and define the phenomenon responsible for seeing the image at a different position.
- (b) State the effect on X when:
 1. Y increases
 2. Y decreases

Question 5

- (i) An object is placed at a distance 24 cm in front of a convex lens of focal length 8 cm. [3]
 - (a) What is the nature of the image so formed?
 - (b) Calculate the distance of the image from the lens.
- (ii) When sunlight passes through water droplets in the atmosphere it gets dispersed into its constituent colours forming a rainbow. A similar phenomenon is observed when white light passes through a prism. [3]
 - (a) Which colour will show the maximum angle of deviation and which colour will show the minimum angle of deviation?
 - (b) If instead of sunlight, a green coloured ray is passed through a glass prism. What will be the colour of the emergent ray?

- (iii) (a) Mixture of red+blue+green is passed through a convex lens as shown in the diagram below. State whether the ray passes through a single point or through different points on principle axis after refraction. [4]



- (b) Name the invisible radiations which can be obtained using quartz prism? State one use of these radiations.
- (c) Name one radiations having wavelength longer than the wavelength of these radiations.

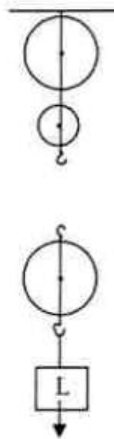
Question 6

- (i)  [3]

Sumit and Sachin went for a trek and during the journey they visited a cottage. They suspended their bags to the two ropes hanging from P and Q on a wheel capable of rotating around O. Sumit suspended his bag to the rope Q and Sachin suspended his bag from the rope P. The wheel remained in equilibrium.

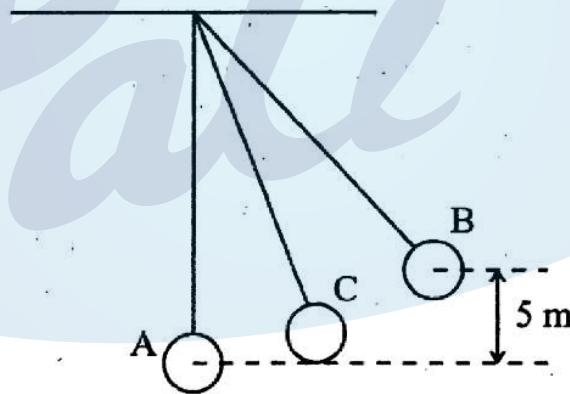
- (a) State with a reason who is carrying a heavier bag.
- (b) Based on the principle of moments, write a mathematical relation that can be used to determine the weight (W) of Sachin's bag given that the weight of Sumit's bag is 18 kgf.

(ii) The diagram below shows a block and tackle system. [3]



- (a) Copy and complete the labelled diagram showing the correct connection of the tackle, the direction of the forces involved to obtain maximum V.R. with the convenient direction.
- (b) Calculate the M.A. of this pulley system if its efficiency is 80%.

(iii) The figure below shows a simple pendulum of mass 200 g. It is displaced from the mean position A to the extreme position B. The potential energy at the position A is zero. At the position B the pendulum bob is raised by 5 m. [4]



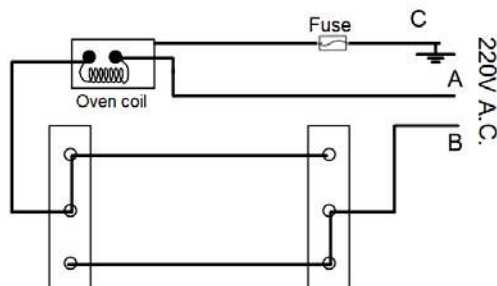
- (a) What is the potential energy of the pendulum at the position B?
- (b) What is the total mechanical energy at point C?
- (c) What is the speed of the bob at the position A when released from B?
- (Take $g = 10 \text{ ms}^{-2}$ and given that there is no loss of energy.)

Question 7

- (i) A person standing in front of a cliff fires a gun and hears its echo after 3s. If the speed of sound in air is 336 ms^{-1} . [3]
- Calculate the distance of the person from the cliff.
 - After moving a certain distance from the cliff, he fires the gun again and this time the echo is heard 1.5 s later than the first. Calculate distance moved by the person.
- (ii) A radioactive nucleus X emits an alpha particle followed by two beta particles to form nucleus Y. [3]
- With respect to the element X, where would you position the element Y in the periodic table?
 - What is the general name of the element X and Y.
 - If the atomic number of Y is 80 then what is the atomic number of X?
- (iii) A boy tunes a radio channel to a radio station 93.5 MHz. [4]
- Name and define the scientific wave phenomenon involved in tuning the radio channel.
 - Name the important characteristics of sound that is affected during this phenomenon.
 - Convert 93.5 MHz to SI unit.

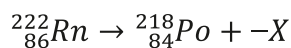
Question 8

- (i) Purvi's friend Tim wants to connect a fuse to his oven. He wants to control the oven from two different locations. Shown below is his circuit diagram. [3]



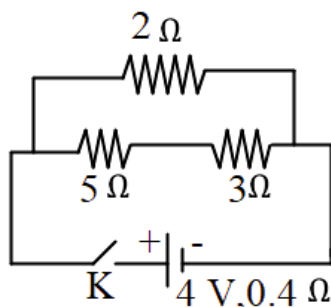
- Which one of the two, A or B should be a live wire?
- In the event of an overload, will the fuse serve its purpose?
- What is the meaning of the statement that the bulb is rated 600W, 220 V?

- (ii) (a) Copy and complete the following nuclear reaction. [3]



- (b) What will be the effect on the radiation X, emitted in the above reaction when it is allowed to pass through an electric field?

- (iii) Observe the given circuit diagram and answer the questions that follow: [4]



- (a) Calculate the resistance of the circuit when the key K completes the circuit.
 (b) Calculate the current through 3Ω resistance when the circuit is complete.

Question 9

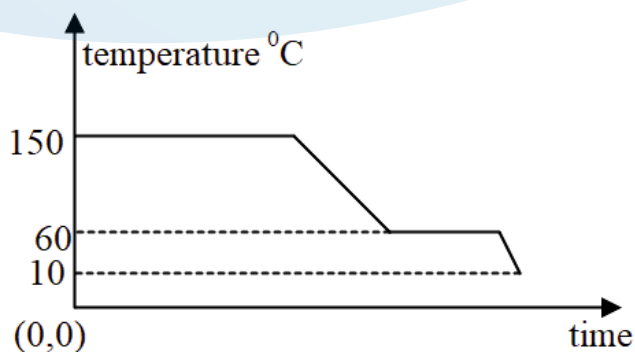
- (i) What mass of ice at 0°C added to 2.1 kg water, will cool it down from 75°C to 25°C ? [3]

Given Specific heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ }^\circ\text{C}^{-1}$,

Specific latent heat of ice = 336 Jg^{-1} .

- (ii) The diagram below shows a cooling curve for a substance: [3]

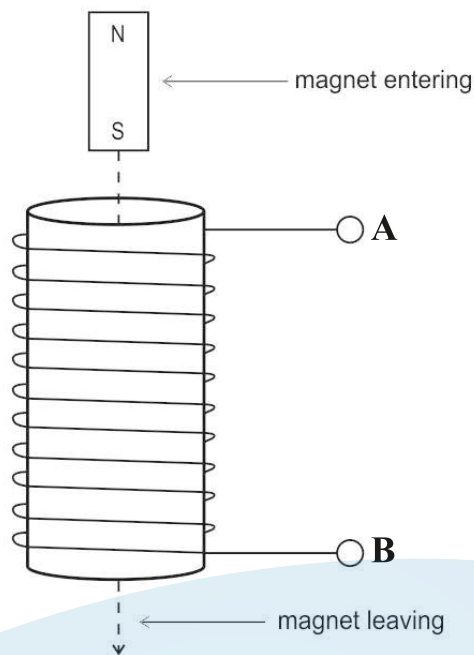
- (a) State the temperatures at which the substance condenses.
 (b) The temperature range in which the substance is in liquid state.



- (c) Why do we prefer ice to ice-cold water for cooling a drink?

(iii) A magnet is released along the axis of a copper coil as shown in the diagram.

[4]



- (a) State the polarity at the top end of the coil when the magnet leaves the coil.
- (b) The direction of the current is from A to B when magnet enters the coil. What will be the direction of the current when the magnet leaves the coil.
- (c) Name the law which can be used to determine the direction of the induced current in the coil?
- (d) State one way to increase the magnitude of the induced current in the coil?



ICSE ACADEMY

Specimen Papers

A large, dark blue oval graphic that overlaps the bottom of the 'Specimen Papers' text and the 'Pati's' logo. It contains the year '- 2023' in white text.

- 2023

ICSE 2023 EXAMINATION
SPECIMEN QUESTION PAPER

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]

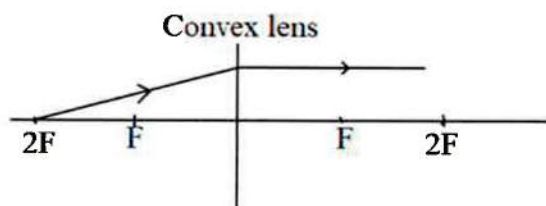
(i) S.I. unit of moment is:

- (a) kgf.m
- (b) Nm
- (c) gf.m
- (d) Ncm

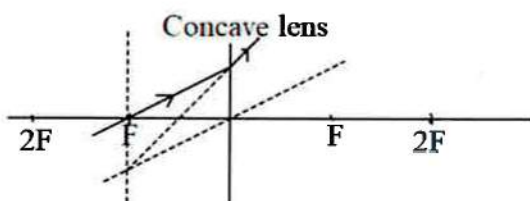
- (ii) Which of the following is the correct expression for gain in kinetic energy, if initial velocity is not zero?
- (a) $k = \frac{1}{2}mv^2$
- (b) $k = \frac{mv^2}{4}$
- (c) $k = \frac{mv^2}{2t}$
- (d) $k = \frac{1}{2}m(v^2 - u^2)$
- (iii) The energy conversion, when an oscillating pendulum moves from mean to extreme position is:
- (a) Kinetic to potential
- (b) Potential to kinetic
- (c) Potential to kinetic to potential
- (d) Kinetic to potential to kinetic
- (iv) Which of the following nuclear radiations can be stopped by a sheet of paper?
- (a) Alpha
- (b) Beta
- (c) Gamma
- (d) None of these
- (v) When seven spectral colours pass through a glass block from air, then which one of the following statements is correct.
- (a) In the glass block, speed of blue light > speed of yellow light.
- (b) In the glass block, speed of green light > speed of orange light.
- (c) In the glass block, speed of violet light > speed of red light.
- (d) In the glass block, speed of orange light > speed of indigo light.

(vi) In which of the following diagrams is the refraction **not** correct:

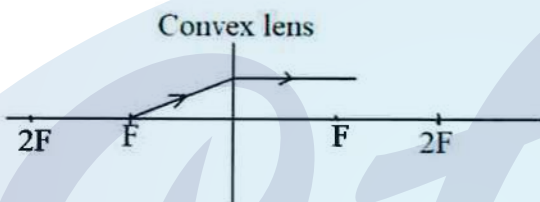
(a)



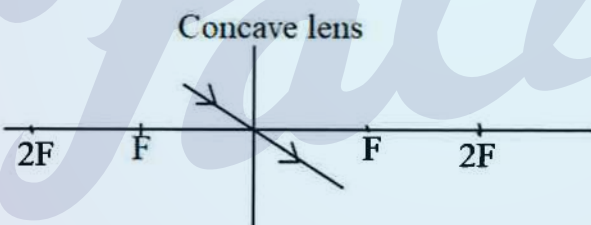
(b)



(c)



(d)



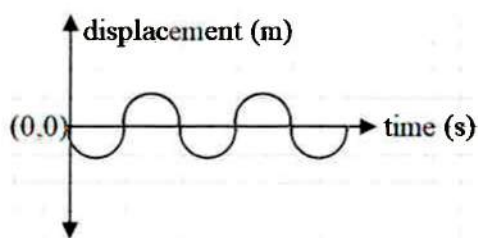
(vii) The characteristics of sound which enables to differentiate between two sounds of different intensity is:

- (a) Quality
- (b) Amplitude
- (c) Pitch
- (d) Loudness

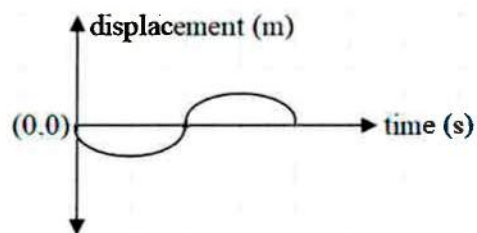
(viii)

The ratio of the wavelength of A : wavelength of B is:

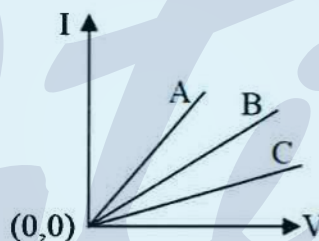
A.



B.



- (a) 5:2
 - (b) 1:2
 - (c) 2:1
 - (d) 2:3
- (ix) The graph shows I against V relation for three conductors A, B and C. Choose the correct relation for the resistors of A, B and C.

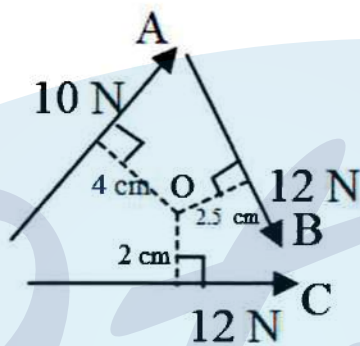


- (a) $R_A > R_B > R_C$
 - (b) $R_B > R_C < R_A$
 - (c) $R_C > R_B < R_A$
 - (d) $R_C > R_B > R_A$
- (x) Which of the following is the correct colour code of the three wires live, neutral and earth?
- (a) Live: Green Neutral: Red Earth: Yellow
 - (b) Live: Brown Neutral: Red Earth: blue
 - (c) Live: Brown Neutral: blue Earth: Yellow
 - (d) Live: Blue Neutral: Brown Earth: Green

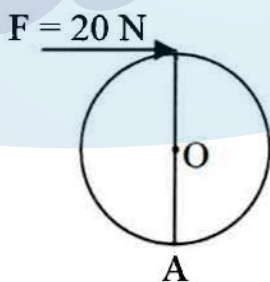
- (xi) When a conductor carrying current is placed in a magnetic field, perpendicular to it then the direction of the force experienced can be found out using:
- (a) Lenz's law
 - (b) Fleming's left hand rule
 - (c) Flemings right hand rule
 - (d) Right hand thumb rule
- (xii) Choose the correct statement.
Latent heat absorbed:
- (a) is independent of the mass of the substance.
 - (b) is directly proportional to the increase in the temperature of the substance.
 - (c) is directly proportional to the specific heat capacity of the substance.
 - (d) is directly proportional to the specific latent heat of the substance.
- (xiii) Which of the following liquids is most suitable for radiators in cars?
- (a) Liquid P with specific heat capacity $4000 \text{ Jkg}^{-1}\text{K}^{-1}$.
 - (b) Liquid Q with specific heat capacity $2000 \text{ Jkg}^{-1}\text{K}^{-1}$.
 - (c) Liquid R with specific heat capacity $1500 \text{ Jkg}^{-1}\text{K}^{-1}$.
 - (d) Liquid S with specific heat capacity $2100 \text{ Jkg}^{-1}\text{K}^{-1}$.
- (xiv) While entering from medium A to medium B if light slows down then:
- (a) $\angle i < \angle r$
 - (b) $\angle i = \angle r$
 - (c) $\angle i > \angle r$
 - (d) $\angle i \leq \angle r$
- (xv) The phenomenon of light that causes the diamond to glitter is:
- (a) Refraction
 - (b) Total internal reflection.
 - (c) Reflection.
 - (d) Absorption.

Question 2

- (i) (a) How many pulleys are there in a movable block of a block and tackle system with velocity ratio 5? [3]
- (b) A radioactive nucleus emits a beta particle. Does the position of daughter nucleus change in a periodic table as compared to the parent nucleus?
- (c) To which electrically charged plate the beta radiations will deflect while passing through an electric field?
- (ii) (a) Name the force which produces maximum moment about. [2]
- (b) Calculate this moment in SI unit.



- (iii) State two factors that affects the centre of gravity of the body. [2]
- (iv) If the moment of F about the centre of a wheel O is 6Nm then calculate the moment of F about A. [2]



- (v) If kinetic energy of a moving body is 40J then what will be its kinetic energy when its velocity is doubled? [2]
- (vi) A freely suspended pendulum in air is disturbed once and left to oscillate on its own: [2]
 - (a) Name the type of vibrations.
 - (b) State one way to decrease the frequency of this vibration.

- (vii) Two copper wires A and B are of same length present at temperature 30°C . Radius of A is twice the radius of B. [2]
- (a) Which wire has greater resistance?
- (b) Which wire will have greater resistivity?

Question 3

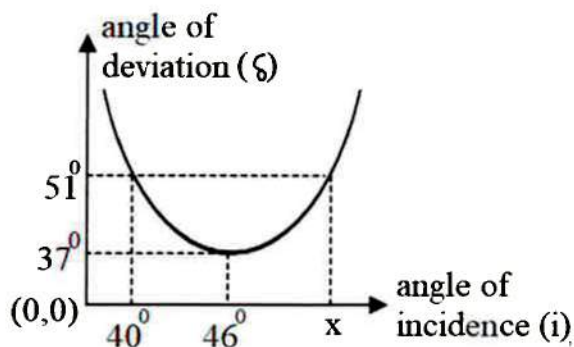
- (i) A lens X can form an image on the screen. [2]
- (a) Name the lens X.
- (b) Is it possible for this lens to form magnified image?
- (ii) (a) Is it possible to switch off an appliance by placing the switch in a neutral wire? [2]
- (b) Is it possible for current to flow between a neutral and an earth wire?
- (iii) State two factors that affect the strength of an electromagnet. [2]
- (iv) Calculate the heat absorbed by 200 g ice at 0°C to change to water at 60°C . [Specific heat capacity of ice = $2100\text{ J kg}^{-1}\text{ K}^{-1}$, Specific heat capacity of water = $4200\text{ J kg}^{-1}\text{ K}^{-1}$, Specific latent heat of ice = 336000 Jkg^{-1}]. [2]
- (v) What are background radiations? [2]

SECTION B

(Attempt **any four** questions.)

Question 4

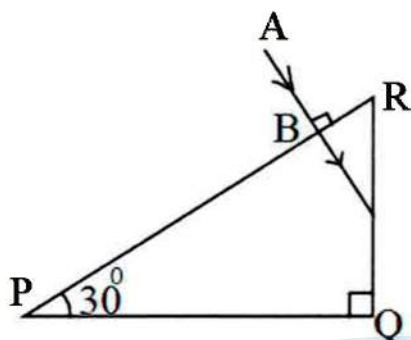
- (i) The diagram (not drawn to the scale) below shows the graphical relation between angle of deviation and angle of incidence, when light passes through a triangular prism of angle 62° of a certain glass material. [3]



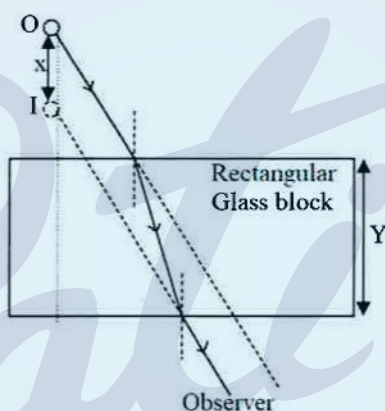
(a) State the angle of minimum deviation of this prism and the corresponding angle of incidence.

(b) Calculate the value of X.

(ii) Redraw and complete the path of the ray AB till it emerges out of the prism of critical angle 42° . [3]



(iii) [4]



The above diagram shows that an observer sees the image of an object O at I.

(a) Name and define the phenomenon responsible for seeing the image at a different position.

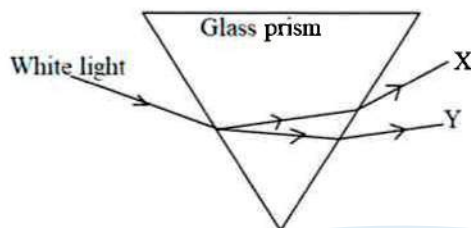
(b) State the effect on X when:

1. Y increases
2. Y decreases

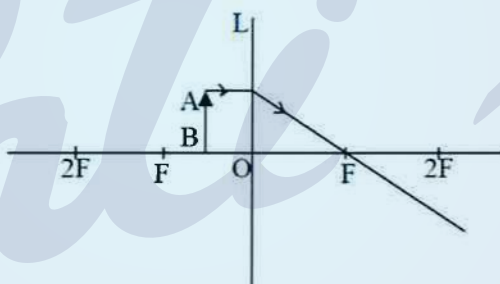
Question 5

- (i) An object of height 20 cm is placed in front of a lens at a distance of 50 cm. Its virtual, diminished image is formed at a distance of 15 cm. [3]
- (a) Identify the type of the lens.
- (b) Calculate the focal length of the lens.

- (ii) The diagram below shows the extreme colours of a visible spectrum (X and Y). [3]



- (a) Identify the colours X and Y.
- (b) Which colour has greater speed in vacuum?
- (iii) The diagram below shows an object AB kept in front of the lens. The path of one ray coming from the object is shown. [4]

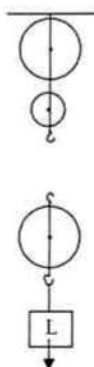


- (a) Name the lens L.
- (b) Redraw and complete the ray diagram showing the formation of the image.
- (c) In which optical instrument is this kind of image formed?

Question 6

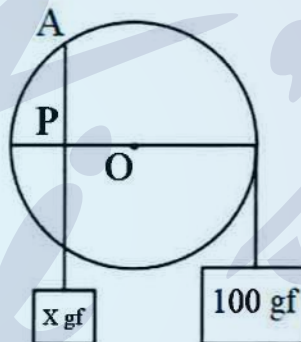
- (i) The diagram below shows a block and tackle system: [3]
- (a) Copy and redraw the labelled diagram showing the correct connection of tackle, direction of the forces involved to obtain the maximum V.R. and convenient direction.

- (b) Calculate the M.A. of this pulley system if its efficiency is 80%.



- (ii) The adjacent diagram shows a wheel of diameter 40 cm fixed on a wall capable of rotating around its centre O. If the wheel rotates in an anticlockwise direction, then: [3]

- (a) Calculate the clockwise moment.
 (b) State whether $X = 100 \text{ gf}$ or $X < 100 \text{ gf}$ or $X > 100 \text{ gf}$.
 (c) Give a reason for your answer.



- (iii) A coconut of mass 450 g falls from the top of an 80 m high tree. [4]
- (a) Calculate the potential energy possessed by the coconut when it is at the top of the tree.
- (b) Without calculation, state the kinetic energy with which it strikes the ground and state the principle involved to arrive at the answer in i). $g = 10 \text{ ms}^{-2}$

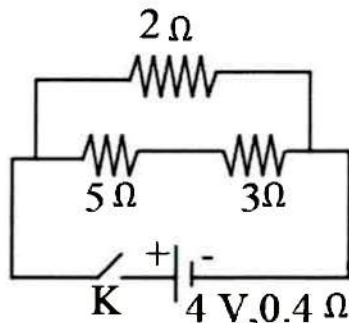
Question 7

- (i) A person standing in front of a cliff fires a gun and hears its echo after 3s. If the speed of sound in air is 336 ms⁻¹. [3]
- (a) Calculate the distance of the person from the cliff.
- (b) After moving a certain distance from the cliff he fires the gun again and this time the echo is heard 1.5 s later than the first. Calculate distance moved by the person.

- (ii) (a) A radioactive nucleus X emits an alpha particle followed by two beta particles and forms nucleus Y. What is the general name of the elements X and Y? [3]
- (b) If the atomic number of Y is 80 then what is the atomic number of X?
- (c) If the atomic mass number of Y is 189 then what is the atomic mass number of X?
- (iii) A boy tunes a radio channel to a radio station 93.5 MHz. [4]
- (a) Name and define the scientific wave phenomenon involved in tuning the radio channel.
- (b) Now, what is the frequency of the channel? Convert this frequency into S.I. unit.

Question 8

- (i) (a) What is the meaning of the statement 'the power rating of an appliance is 60W, 220V.'? [3]
- (b) In which wire is the fuse connected in a circuit?
- (c) State the function of main switch in an electric circuit.
- (ii) (a) Copy and complete the following nuclear reaction. [3]
- $${}_{86}^{222}\text{Rn} \rightarrow {}_{82}^{218}\text{Po} + {}_2^4\alpha$$
- (b) What will be the effect on the radiation emitted in the above reaction when it is allowed to pass through an electric field? [Be specific in your answer]
- (iii) Observe the given circuit diagram and answer the questions that follow: [4]



- (a) Calculate the resistance of the circuit when the key K completes the circuit.
- (b) Calculate the current through 3Ω resistance.

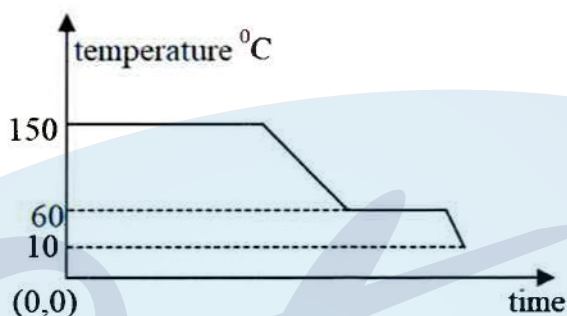
Question 9

(i) A metal piece present at 120°C is quickly dropped in a calorimeter of mass 80 g [3]
 containing 200 g of water at 30°C . The final temperature attained by the mixture is 40°C . Calculate the thermal capacity of the metal piece. [Specific heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ }^{\circ}\text{C}^{-1}$, Specific heat capacity of calorimeter = $0.4 \text{ Jg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

(ii) The diagram below shows a cooling curve for a substance: [3]

(a) State the temperatures at which the substance condenses and solidifies respectively.

(b) The temperature range in which the substance is in liquid state.



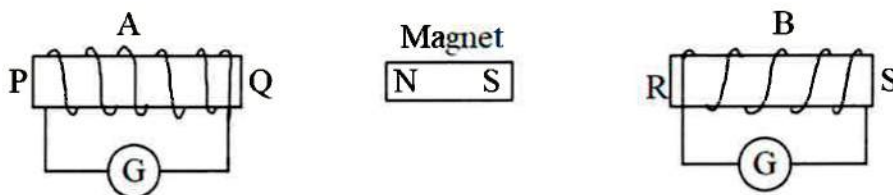
(c) Why do we prefer ice to ice-cold water for cooling a drink?

(iii) The diagram below shows a magnet placed between two coils A and B. The magnet is moved along the axis towards coil B. [4]

(a) State the polarities induced at the ends Q and R of the coil due to the motion of the magnet.

(b) Name the phenomenon due to which the current is induced in the coils.

(c) Name the law which helps to find the polarities at the ends Q and R.





ICSE ACADEMY

Specimen Papers

- 2022

Semester 2

ICSE SEMESTER 2 EXAMINATION
SPECIMEN QUESTION PAPER
PHYSICS
(SCIENCE PAPER 1)

Maximum Marks: 40

Time allowed: One and a half hours

Answers to this Paper must be written on the paper provided separately.

You will not be allowed to write during the first 10 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 three** questions from **Section B**.*

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

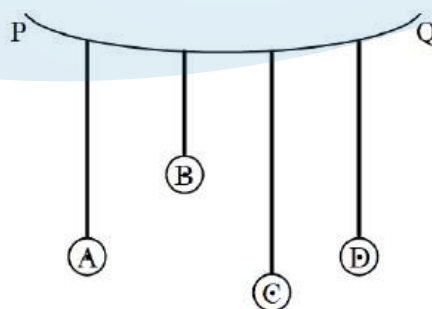
SECTION A

*(Attempt **all** questions.)*

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.)

- (i) Pendulums A, B, C and D are tied to a flexible string PQ and are at rest. Pendulum C is disturbed. Which of the following statements is true? [1]



- (a) Only pendulum C will start vibrating.
- (b) Pendulums A, B, and D will also start vibrating but A and D will vibrate with the maximum amplitude.
- (c) Pendulums A, B, and D will also start vibrating.
- (d) Vibrations of pendulum C are forced vibrations.

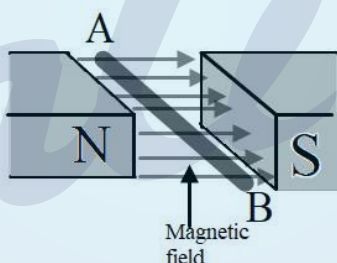
(ii) Which of the following is **not** a characteristic of parallel combination of resistors? [1]

- (a) If one resistor is fused, the circuit does not become open.
- (b) The total resistance R is given by the formula $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots\dots$
- (c) The total resistance becomes less than the least resistor, present in the combination.
- (d) The current through each resistor always remains the same.

(iii) Which one of the following statements is correct? [1]

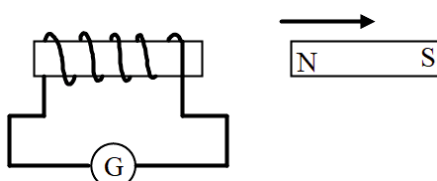
- (a) Live wire has zero potential.
- (b) Fuse is connected in a neutral wire.
- (c) Potential of live and earth wire is always the same.
- (d) Earth wire is used to prevent electric shock.

(iv) The diagram below shows a free conductor AB is kept in a magnetic field and is carrying current from A to B. (To avoid confusion complete path of the circuit is not shown) The direction of the force experienced by the conductor will be: [1]

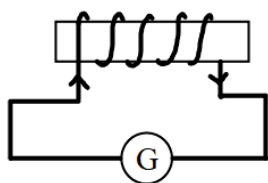


- (a) Up
- (b) Down
- (c) Towards N
- (d) Towards S

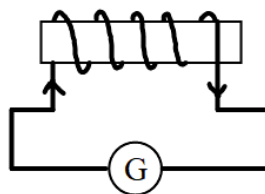
(v) The diagram below shows a magnet moved near a coil along its axis. Which of the diagram shows correct flow of current during this motion? [1]



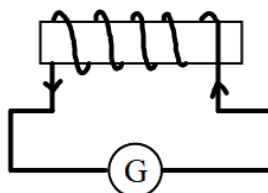
(a)



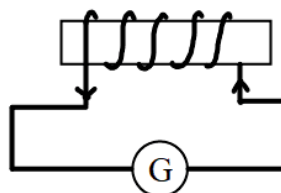
(b)



(c)



(d)



(vi) The meaning of the statement 'Specific heat capacity of water is $4200 \text{ J kg}^{-1} \text{ K}^{-1}$ ' is: [1]

- (a) Water needs 4200 J heat to raise its temperature by 1 kelvin.
- (b) To raise the temperature of water 4200 J of heat is absorbed.
- (c) 1 kg water absorbs 4200J heat to increase its temperature by 1 kelvin.
- (d) 1 kg Water needs 1 kelvin temperature to absorb 4200 J heat.

(vii) 200 g of ice at 0°C needs _____ heat to melt. [Specific latent heat of ice = 336000 J kg^{-1}] [1]

- (a) 6720 J
- (b) 67200 J
- (c) 672000 J
- (d) 67.2 J

(viii) The radiation with maximum penetrating power is: [1]

- (a) γ
- (b) β
- (c) X-radiation
- (d) α

Resonance is:

[1]

- (a) A forced vibration in which amplitude remains constant.
- (b) A forced vibration in which frequency of forced vibration is greater than the free vibrations of the body.
- (c) A forced vibration, in which frequency of forced vibration is equal to the free vibrations of the body.
- (d) A forced vibration, in which frequency of forced vibration is less than the free vibrations of the body.

(x) The nuclear radiation which gets deflected towards negatively charged plate in an electric field is:

[1]

- (a) Gamma
- (b) Ultraviolet
- (c) Beta
- (d) Alpha

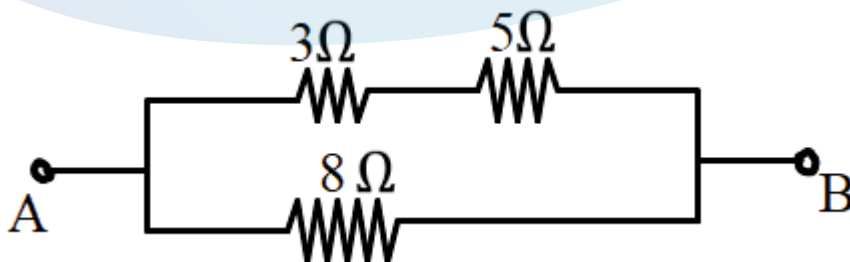
SECTION B

(Attempt any three questions from this Section.)

Question 2

(i) (a) Calculate the total resistance across AB.

[3]



(b) If a cell of e.m.f 2.4 V with negligible internal resistance is connected across AB then calculate the current drawn from the cell.

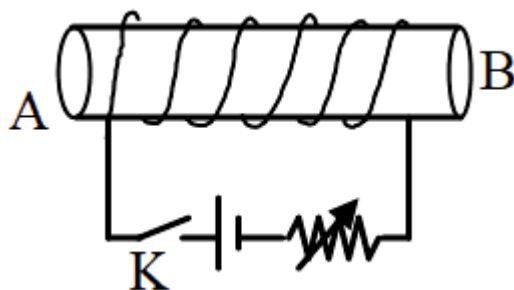
(ii) (a) Which will absorb more heat, 10 g of ice at 0°C or 10 g of water at 0°C ?

[3]

(b) For the same mass of ice and ice cold water, why does ice produce more cooling than ice-cold water?

The diagram below shows an insulated copper wire wound around a hollow cardboard cylindrical tube. Answer the questions that follow:

[4]

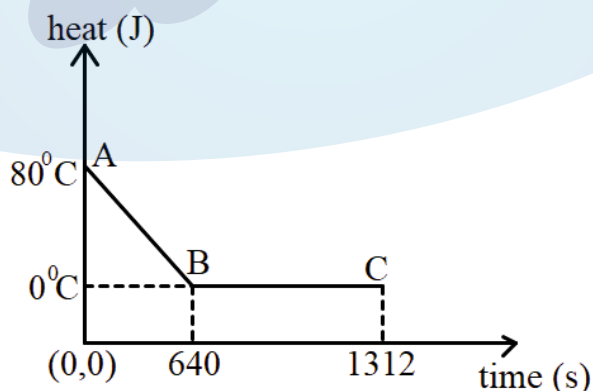


- (a) What are the magnetic poles at A and B when the key K is closed?
- (b) State two ways to increase the strength of the magnetic field in this coil without changing the coil.
- (c) If we place a soft iron bar at the centre of the hollow cardboard and replace the DC source by an AC source then will it attract small iron pins toward itself when the current is flowing through the coil?

Question 3

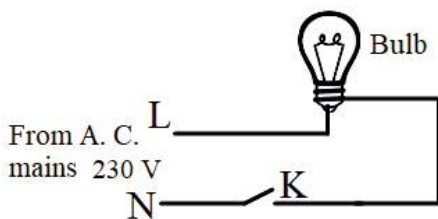
- (i) The diagram below shows a cooling curve for 200 g of water. The heat is extracted at the rate of 100 Js^{-1} . Answer the questions that follow:

[3]



- (a) Calculate specific heat capacity of water.
- (b) Heat released in the region BC.

- (a) Observe the diagram given below and state whether the bulb will glow or not when we switch on K. [3]



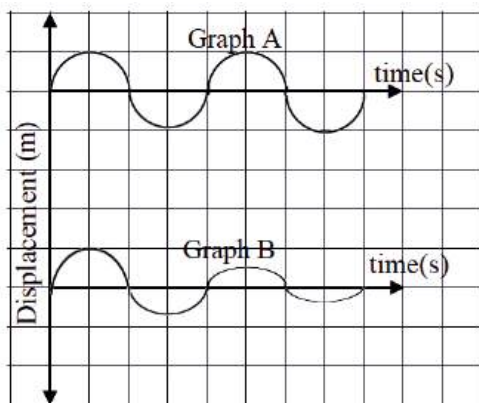
- (b) Is it safe to handle the bulb when the switch is OFF?
 (c) Give a reason for your answer in (b).

- (iii) Two metals A and B have specific heat capacities in the ratio 2:3. If they are supplied same amount of heat then [4]

- (a) Which metal piece will show greater rise in temperature given their masses are the same?
 (b) Which metal piece will have greater mass if the rise in temperature is the same for both metals?
 (c) If the mass ratio of metal A and metal B is 3:5 then calculate the ratio in which their temperatures rise.
 (d) If specific heat capacity of metal A is $0.26 \text{ Jg}^{-1} \text{ } ^\circ\text{C}^{-1}$ then calculate the specific heat capacity of metal B

Question 4

- (i) (a) Which one of the following graphs A or B shows free vibrations in vacuum and which one shows free vibrations in a medium? [3]
 (b) How did you come to this conclusion.



- (ii) (a) State the Faraday's laws of electromagnetic induction [3]
 (b) Name one electrical device which works on this principle.

(iii) A nucleus ${}^{194}_{82}X$ emits an alpha particle [4]

- What will be the atomic number of the daughter nucleus Y?
- What will be the number of neutrons in the daughter nucleus Y?
- Write a nuclear reaction showing the emission of this particle.

Question 5

(i) (a) Name the electrical appliance shown in the diagram below. [3]



- Name the material of the wire used in this device.
- Name two important characteristics of this wire.

(ii) (a) Define pitch. [3]

- Two wires AB and CD of same length are stretched by same amount. Which wire will produce sound of greater pitch on plucking?
- Give a reason for your answer.

A ————— B

C ————— D

(iii) (a) Why is water used as a coolant in radiators of a car? [4]

- Name the radioactive isotope used to find age of fossils . Name the radioactive radiation which it emits?

Question 6

- (i) A beam of α , β and γ rays is travelling through a certain region in space. [3]
- (a) Arrange them in ascending order of ionising power.
 - (b) Which of the above will pass undeviated if subjected to an electric field?
 - (c) With respect to your answer to part (b) above, what will be the change in the nucleus of an atom after such a ray is emitted.
- (ii) A change in amplitude of a sound wave is noticed. [3]
- (a) Which characteristic of sound is affected due to the above change?
 - (b) How is amplitude related to your answer to part (a) above?
 - (c) What happens to the quality of the sound?
- (iii) An electric bulb is rated '240 V, 100 W'. [4]
- (a) What information can you get from the above statement?
 - (b) What will happen if this bulb is connected across 220 V?
 - (c) Calculate the resistance of the bulb.
 - (d) Also find the energy consumed by the bulb in 10 minutes.



ICSE ACADEMY

Specimen Papers

- 2022

Semester 1

ICSE SEMESTER 1 EXAMINATION
SPECIMEN QUESTION PAPER
PHYSICS
SCIENCE Paper – 1

Maximum Marks: 40

Time allowed: One hour (inclusive of reading time)

ALL QUESTIONS ARE COMPULSORY

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

Select the correct option for each of the following questions.

Question 1

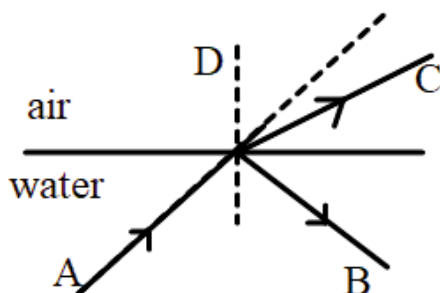
(a) Choose the correct statement with respect to Refraction of light [1]

1. The frequency always changes when light enters from one optical medium to another.
2. Absorption of light when it strikes the surface of a medium is refraction.
3. Speed of light changes when it enters from one optical medium to another of different optical density.
4. Speed of light does not change when it enters from one optical medium to another of different optical density.

(b) When a light ray enters from a denser medium to a rarer medium [1]

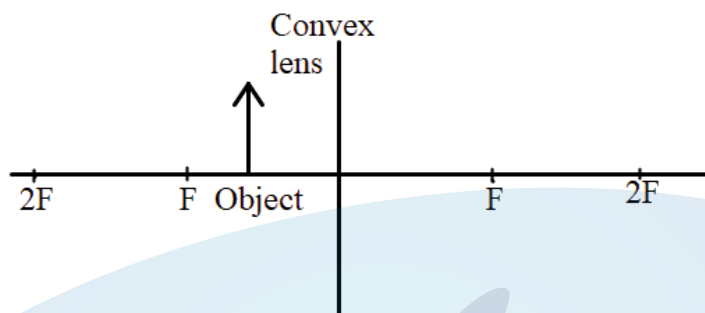
1. The light ray bends towards the normal.
2. Angle of incidence is less than angle of refraction.
3. Speed of light decreases.
4. Speed of light remains unchanged.

(c) In the diagram shown below: [1]



1. B is incident ray and C is refracted ray.
2. A is incident ray and B is refracted ray.
3. C is incident ray and B is refracted ray.
4. A is incident ray and C is refracted ray.

(d) From the diagram shown below, identify the characteristics of the image that will be formed. [1]



1. Real.
2. Diminished.
3. Formed within the focal length.
4. Virtual.

(e) The wavelength of light in a medium A is 600 nm. The wave enters medium B of refractive index 1.5 with respect to medium A [2]

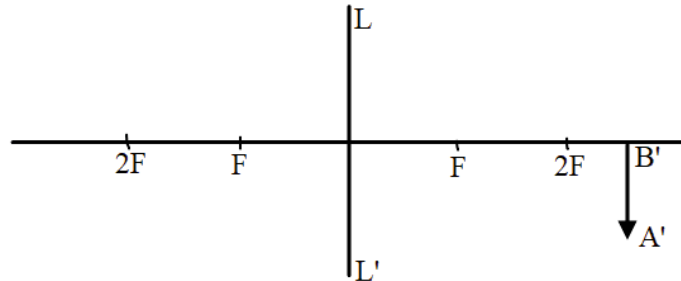
(i) Select the correct option from the following.

1. the wavelength of light becomes 1.5 times the initial wavelength.
2. the wavelength of light decreases.
3. the wavelength becomes half of initial wavelength.
4. the wave bends away from the normal.

(ii) The wavelength in medium B will be

1. 400 nm
2. 900 nm
3. 300 nm
4. Information is insufficient to calculate.

- (f) The diagram below shows an image formed at a distance 36 cm from the lens LL' of focal length 12 cm. With respect to this answer the questions that follow. [4]



- (i) The position of the object on the left-hand side should be
1. between 12 cm to 30 cm from the lens.
 2. beyond 24 cm from the lens.
 3. between 12 cm to 24 cm from the lens.
 4. within 12 cm from the lens.
- (ii) Power of this lens is
1. - 8.33 D
 2. + 8.4 D
 3. + 8.33 D
 4. - 8.4 D
- (iii) The object distance with sign convention is
1. - 18 cm
 2. - 15 cm
 3. - 9 cm
 4. + 18 cm
- (iv) If the lens LL' is replaced by another lens of same type but focal length 15 cm then for the same object distance
1. the size of the image decreases.
 2. the size of the image increases.
 3. the size of the image remains the same.
 4. information is insufficient to conclude.

Question 2

(a) The usable form of mechanical energy is [1]

1. Elastic potential energy
2. Kinetic energy
3. Gravitational potential energy
4. None of the given options.

(b) One horsepower is equal to [1]

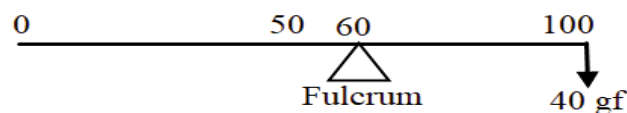
1. 100 W
2. 735 W
3. 764 W
4. 746 W

(c) If A and B of the same mass can climb the third floor of the same building in 3 minutes and 5 minutes respectively, then the ratio of their powers of A is to B in an ideal situation is [1]

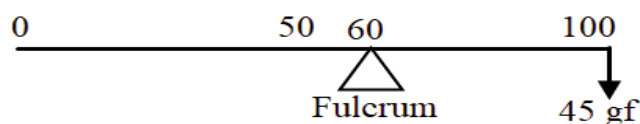
1. 1:1
2. 3:5
3. The information is insufficient to form a conclusion.
4. 5:3

(d) If the centre of gravity of a metre scale of mass 80 g lies at the 45 cm mark, then which one of the following diagrams will show the balanced position of the scale. [1]

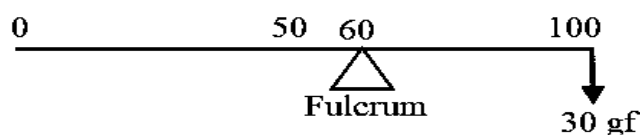
1.



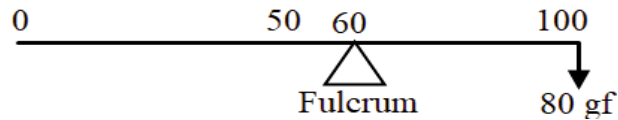
2.



3.



4.



(e) A body has kinetic energy 2500 J. If the mass of the body is 500 g. [2]

(i) The velocity of the body is

1. $\sqrt{10}$ m/s
2. 10 ms⁻¹
3. 20 ms⁻¹
4. 100 m/s

(ii) The momentum of the body will be

1. 10 kgms⁻¹
2. $500\sqrt{10}$ kgms⁻¹
3. 50 kg ms⁻¹
4. 5 kgms⁻¹

(f) A girl at rest at gate of her society which is 3.2 m above the road comes down the slope AB on a cycle without paddling. [g = 10 N/kg] [4]



(i) The mechanical energy possessed by the girl at B is

1. Vibrational kinetic energy.
2. Translational kinetic energy
3. Elastic potential energy.
4. Gravitational potential energy.

(ii) The velocity with which girl reaches point A is

1. 32 m/s
2. 10 m/s
3. 8 m/s
4. Insufficient information to calculate velocity.

(iii) If the mass of the girl is 40 kg then the kinetic energy of the girl at A is
[Assuming no loss of energy.]

1. 1280 J
2. 1600 J
3. 400 J
4. 3200J

(iv) The potential energy of the girl (of mass 40 kg) when she reaches the midpoint of the slope of AB

1. 800 J
2. 200 J
3. 1600 J
4. 640 J

Question 3

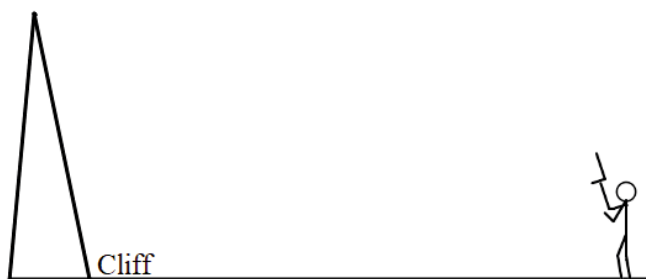
(a) Mechanical advantage (M.A.), load(L), and effort(E) are related as [1]

1. $M.A. = L \times E$
2. $M.A. = E/L$
3. $M.A. \times E = L$
4. $M.A. \times L = E$

(b) Which one of the following statements is correct? [1]

1. A machine is used to have more output energy as compared to input energy.
2. Mechanical advantage of a machine can never be greater than 1.
3. If a machine gives convenience of direction, then its mechanical advantage should be greater than 1.
4. For a given design of a machine, even if the mechanical advantage increases, the velocity ratio remains the same.

- (c) If a block and tackle system with convenient direction has 3 movable pulleys, [1]
then its velocity ratio
1. is either 6 or 7
 2. should be 6
 3. should be 7
 4. is 3
- (d) Work done by a body moving on a circular track is zero at every instant because [1]
1. displacement is zero.
 2. displacement is perpendicular to the centripetal force.
 3. there is no force acting.
 4. reason is not mentioned in the other options.
- (e) Identify the conditions required to hear a clear and distinct echo by humans, [2]
in air
1. The reflecting surface should be rough.
 2. The size of the reflecting surface should be smaller than the wavelength of sound.
 3. Sound should not be reflected back within 0.1 s.
 4. The incident sound should have frequency more than 25000 Hz.
 5. The size of the reflecting surface should be larger than the wavelength of sound.
- (f) A person standing in front of a vertical cliff fires a gun and hears its echo in [4]
3s. The speed of sound in air is 340 m/s.

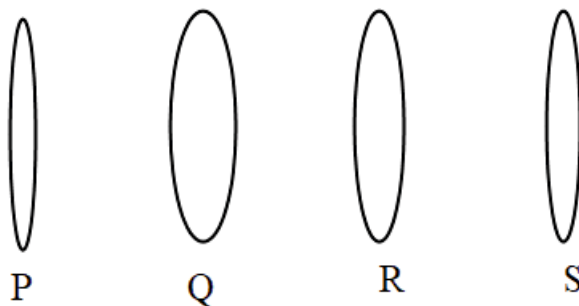


- (i) The distance at which the person is standing in front of the cliff is
1. 1020 m
 2. 510 m
 3. 340 m
 4. 680 m

- (ii) If the person wants to hear the echo 0.5 s earlier, then how much distance should he move, toward or away from the cliff?
1. 595 m away from the cliff
 2. 255 m towards the cliff
 3. 85 m towards the cliff
 4. 255 m away from the cliff.
- (iii) Another person stands behind this person, in the same line with him and the cliff, at a distance of 170 m and fires a gun in the air. What are the consecutive intervals of time at which the first person hears two sounds?
1. 0.5 s and 3 s
 2. 1 s and 3 s
 3. 1 s and 4 s
 4. 0.5 s and 3.5 s
- (iv) If the speed of sound changes to 350 m/s then how much distance should the person move towards or away from the cliff, in order to hear the echo in the same time? (i.e. in 3 s)?
1. 25 m away
 2. 7.5 m away
 3. 20 m away
 4. 15 m away

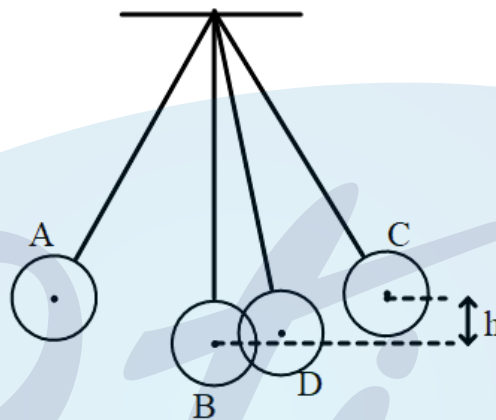
Question 4

- (a) Assuming all lenses shown below are of the same material, state which lens [1]
has the maximum power.



1. R
2. P
3. Q
4. S

- (b) In an electric cell while in use, the change in energy is from: [1]
1. Chemical to mechanical
 2. Chemical to electrical
 3. Electrical to mechanical
 4. Electrical to chemical
- (c) The diagram below shows a pendulum having a bob of mass 80 g. A and C are extreme positions and B is the mean position. The bob has velocity 5 m/s at position B. [g = 10N/kg] [2]



- (i) Which one of the following statements is correct?
1. At point A the bob has only kinetic energy.
 2. At point B the bob will have only potential energy.
 3. At point B the bob will have maximum kinetic energy.
 4. At point D the bob will have more potential and less kinetic energy.
- (ii) The height h is
1. 1.25 cm
 2. 125 m
 3. 1.25 m
 4. 0.125 m

(d) (i) Select correct options for Total internal reflection in a medium. [2]

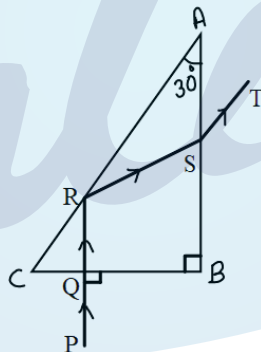
1. Can take place in an optically denser medium as compared to an optically rarer medium.
2. Takes place for any angle of incidence greater than 42 degree.
3. This reflection does not obey the laws of reflection.
4. Can take place if the angle of incidence in a denser medium is less than the critical angle.

(ii) Diamonds glitter in the dark because

1. They emit light.
2. They have a very small critical angle due to very high refractive index.
3. Due to the fluorescence.
4. Chemical reaction in the diamond produces light energy.

(e) The diagram shows the path of light through a right-angled prism of critical angle 42° . [4]

Observe the diagram and answer the questions that follow.



(i) The phenomenon at the surface AC is

1. Refraction
2. Partial reflection
3. Total internal reflection
4. Scattering.

(ii) The angle of incidence at the surface AC is

1. 30°
2. 45°
3. 60°
4. 90°

(iii) The angle of incidence at the surface AB is

1. 30°
2. 45°
3. 60°
4. 90°

(iv) Which of the following statement is **wrong**?

1. Speed of light ray PQ is equal to the speed of light ray ST.
2. Speed of light ray QR is equal to the speed of light ray RS.
3. Speed of light ray PQ is greater than the speed of light ray RS.
4. Speed of light ray RQ is greater than the speed of light ray ST.



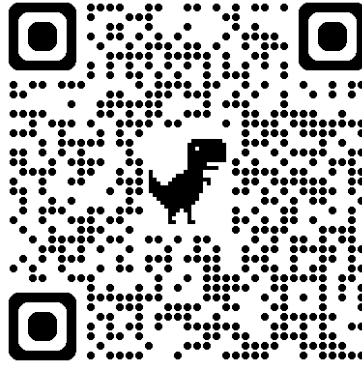


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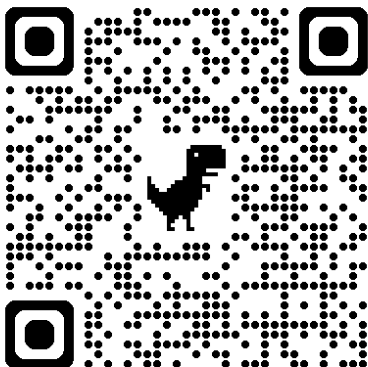
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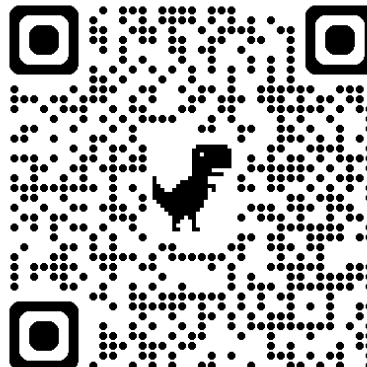
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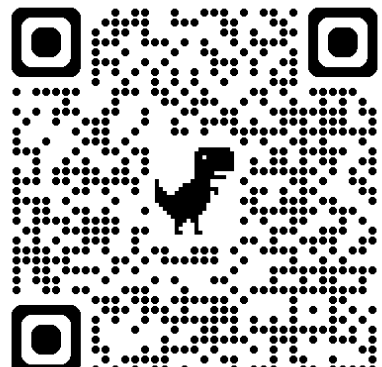
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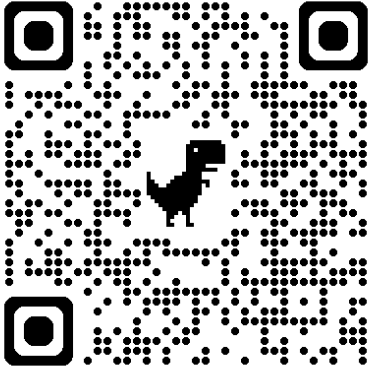
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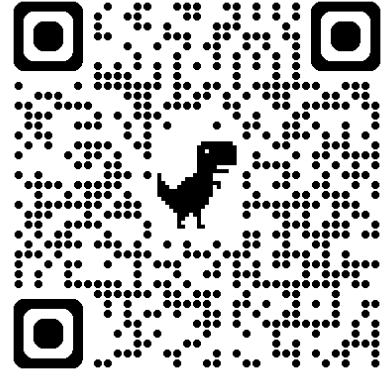
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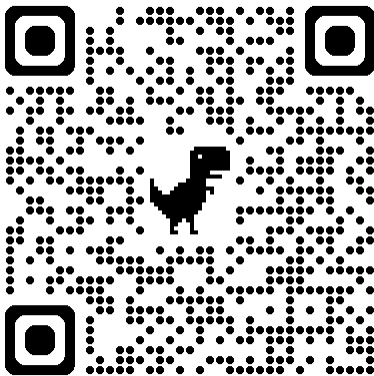
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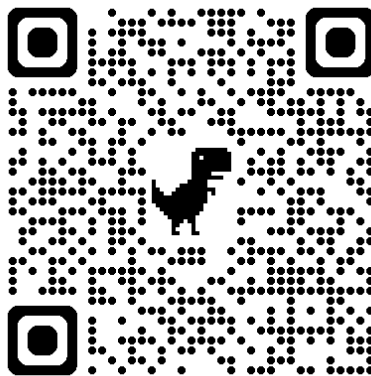
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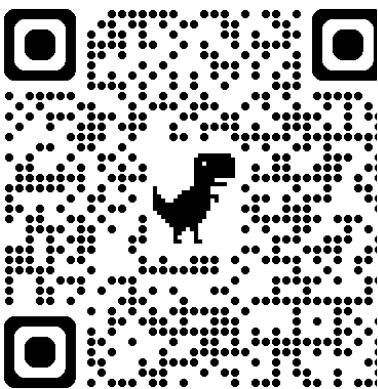
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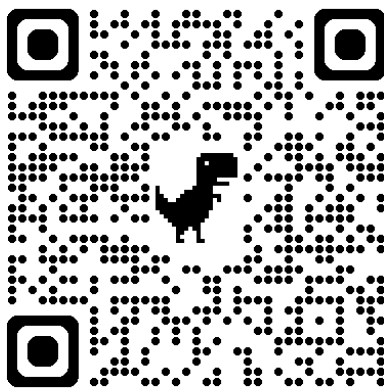
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