



PHYSICS | SAMPLE PAPER

ICSE CLASS – 10

Maximum Marks: 80

Duration: 2.0 Hrs.

General Instructions:

- 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

- Choose the correct answers to the questions from the given options. (Do not copy the question, write the correct answers only.) [15]
 - Which of the following particles will describe the smallest circle when projected with same velocity perpendicular to the magnetic field? [1]

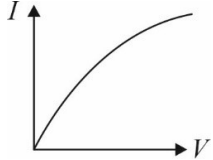
(a) Electron	(b) Proton
(c) α -particle	(d) Deuteron
 - A 30 cm high bucket is completely filled with a liquid. A coin at its bottom appears to be raised by 12 cm. The refractive index of the liquid is: [1]

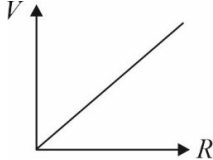
(a) 3	(b) 1.33
(c) 1.67	(d) 1.25
 - 1 erg is equal to: [1]

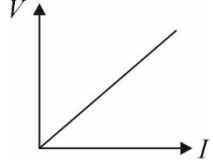
(a) 10^{-5} J	(b) 10^5 J
(c) 10^{-7} J	(d) 10^7 J
 - In the below reaction, the value of X is: [1]

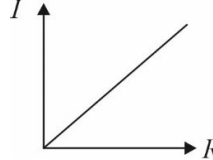
$${}_{92}^{238}\text{U} \rightarrow {}_X^{90}\text{Th} + {}_2^4\text{He}$$

(a) 232	(b) 236
(c) 234	(d) 235

- (v) **Assertion (A):** When a moving car slides on the road after applying brakes, the work done by friction is negative.
Reason (R): Friction always does negative work. [1]
- (a) Both (A) and (R) true and (R) is the correct explanation of (A).
 (b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
 (c) (A) is true but (R) is false.
 (d) (A) is false but (R) is true.
- (vi) Which radiation has no mass? [1]
- (a) α - rays (b) β - rays
 (c) γ - rays (d) Both (a) and (b)
- (vii) Echo cannot be heard in a room of size ($v = 340 \text{ m/s}$) [1]
- (a) 25 m (b) 26 m
 (c) 15 m (d) 20 m
- (viii) A source of sound sends a wave of frequency 500 Hz and wavelength 0.4m. The time taken by this wave to travel a distance of 600 m is: [1]
- (a) 3s (b) 6s
 (c) 8s (d) 9s
- (ix) Which of the following graphs show Ohm's Law? [1]
- (a) 

(c) 

(b) 

(d) 
- (x) Core of transformer is made up of: [1]
- (a) Iron (b) Steel
 (c) Alnico (d) Soft iron
- (xi) A machine has a velocity ratio of 10. If it is used to raise a load of 2000 N by using an effort of 250 N, then its MA is: [1]
- (a) 2 (b) 4
 (c) 6 (d) 8
- (xii) Liquids A and B are at 30°C and 20°C respectively. When mixed in equal masses, the temperature of the mixture is found to be 26°C . The ratio of their specific heats is: [1]
- (a) 1 : 1 (b) 1 : 2
 (c) 3 : 2 (d) 4 : 3
- (xiii) The lower fixed point of Fahrenheit scale is: [1]
- (a) -32°F (b) 32°F
 (c) 273°F (d) -212°F

- (xiv) If λ_v, λ_x and λ_m represent the wavelengths of visible light, x-rays and microwaves respectively, then [1]

- (a) $\lambda_m > \lambda_x > \lambda_v$ (b) $\lambda_v > \lambda_m > \lambda_x$
 (c) $\lambda_m > \lambda_v > \lambda_x$ (d) $\lambda_v > \lambda_x > \lambda_m$

- (xv) For a real extended object if the image formed by a single lens is inverted, then the [1]

- (a) Image is virtual.
 (b) Lens is diverging.
 (c) Image must be formed on the same side of the object.
 (d) Image is either diminished or enlarged.

2. Answer the following questions: [15]

- (i) A block and tackle system of pulleys has *velocity ratio* 2.
 (a) Draw a labelled diagram of the system indicating clearly, the direction of the load and the effort.
 (b) What is the value of the mechanical advantage of the given pulley system if it is an ideal pulley system? [3]

- (ii) A metre scale of weight 50 gf can be balanced at 40 cm mark without any weight suspended on it.

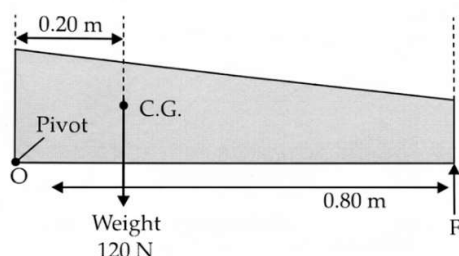
- (a) If this ruler is cut at its centre then state which part [0 to 50 cm or 50 to 100 cm] of the ruler will weigh more than 25 gf.



- (b) What minimum weight placed on this metre ruler can balance this ruler when it is pivoted at its centre? [2]

- (iii) (a) What is the position of centre of gravity of a triangular lamina?
 (b) When this triangular lamina is suspended freely from any one vertex, what is the moment of force produced by its own weight in its rest position? [2]

- (iv) A non-uniform beam of weight 120 N pivoted at one end is shown in the diagram below. Calculate the value of F to keep the beam in equilibrium. [2]



- (v) Sumit does 600 J of work in 10 min and Amit does 300 J of work in 20 min. Calculate the ratio of the powers delivered by them. [2]
 (vi) A geyser is rated 240 W –220 V'. Explain the meaning of this statement. [2]
 (vii) Rohan conducted experiments on echo in different media. He observed that a minimum distance of 'x' metres is required for the echo to be heard in oxygen and 'y' metres in benzene. Compare 'x' and 'y'. Justify your answer.

Speed of sound in oxygen: 340 ms^{-1}

Speed of sound in benzene: 200 ms^{-1}

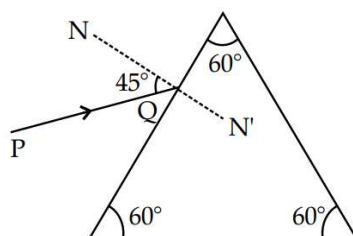
[2]

3. Answer the following questions: [10]
- (i) (a) Is it possible for a concave lens to form an image of size two times that of the object? Write Yes or No.
- (b) What will happen to the focal length of the lens if a part of the lens is covered with an opaque paper? [2]
- (ii) (a) Which electrical component protects the electric circuit in case of excess current and which can also be used as a switch?
- (b) Name the wire to which this electrical component is connected in an electric circuit. [2]
- (iii) Calculate the amount of heat absorbed by 200 g of paraffin wax to melt completely at its melting point [Specific latent heat of fusion of paraffin wax = 146 Jg^{-1}] [2]
- (iv) (a) Which of the two, alternating current or direct current, produces a varying magnetic field when it flows through a conductor?
- (b) State the frequency of the alternating current supply in India. [2]
- (v) Copy and complete the nuclear reaction by filling in the blanks. [2]
- $${}_{92}\text{U}^{235} + {}_0\text{n}^1 \longrightarrow {}_{56}\text{Ba}^{\dots\dots\dots} + \dots\dots\text{Kr}^{92} + 3 {}_0\text{n}^1$$

Section – B

Attempt any 4 questions

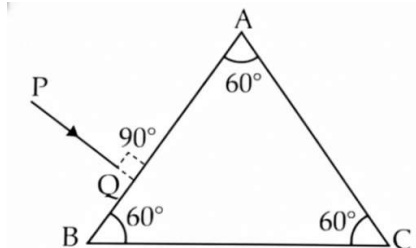
4. Answer the following questions: [10]
- (i) A submarine in the sea, sends ultrasonic ping and a stopwatch is started simultaneously. The stopwatch stops on receiving the reflected wave from an obstacle and reads 1 minute 40 seconds. Calculate the distance of the obstacle from the submarine (Speed of sound in water 1500 ms^{-1}) [3]
- (ii) Light travels a distance of '10x' units in time ' t_1 ' in vacuum and it travels a distance of 'x' units in time ' t_2 ' in a denser medium. Using this information answer the question that follows:
- (a) 'Light covers a distance of '20x' units in ' t_1 ' in diamond. State true or false.
- (b) Calculate the refractive index of the medium in terms of ' t_1 ' and ' t_2 '. [3]
- (iii) A monochromatic ray of light is incident on an equilateral prism placed at minimum deviation position with an angle of incidence 45° as shown in the diagram.



- (a) Copy the diagram and complete the path of the ray PQ.
- (b) State two factors on which the angle of deviation depends. [4]

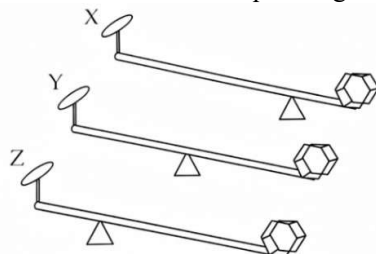
5. Answer the following questions: [10]

- (i) A convex lens of focal length 10 cm is placed at a distance of 60 cm from a screen. How far from the lens should an object be placed so as to obtain a real image on the screen? [3]
- (ii) (a) A coin kept inside water $\left[\mu = \frac{4}{3}\right]$ when viewed from air in a vertical direction appears to be raised by 3.0 mm. Find the depth of the coin in water. [3]
- (b) How is the critical angle related to the refractive index of a medium? [3]
- (iii) (a) State the conditions for TIR. [4]
- (b) Copy the diagram given below and complete the path of the light ray PQ , as it emerges out of the prism by marking necessary angles. The critical angle of glass is 42° .

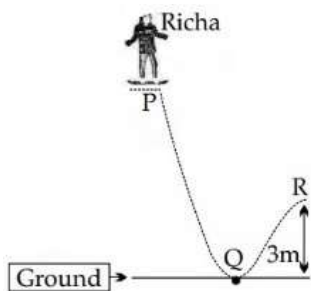


6. Answer the following questions: [10]

- (i) A car of mass 120 kg is moving at a speed 18 km/h and it accelerates to attain a speed of 54 km/h in 5 seconds. Calculate the work done by the engine. [3]
- (ii) Three levers X , Y , Z of equal lengths are shown in the diagram.



- (a) Which class of lever do these belong to? [3]
- (b) Among these (X , Y or Z) which one will give the maximum mechanical advantage? Justify your answer. [3]
- (iii)

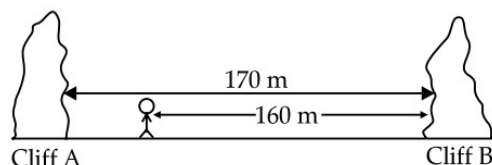


Richa weighing 40 kgf leaves point P on her skateboard and reaches point Q on the ground with velocity 10ms^{-1} . Calculate.

- (a) The kinetic energy of Richa at point Q . [4]
- (b) The vertical height of point P above the ground. (use g as 10m/s^2 and neglect friction)
- (c) The kinetic energy of Richa at point R . (While moving from Q to R , she loses 500 J of energy against friction.)

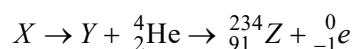
7. Answer the following questions: [10]

- (i) (a) Name the waves used in SONAR.



- (b) In the above diagram Lata stands between two cliffs and claps her hands. Determine the time taken by her to hear the first echo. (Speed of sound in air 320 ms^{-1} .) [3]

- (ii) (a) Complete the following radioactive reaction:



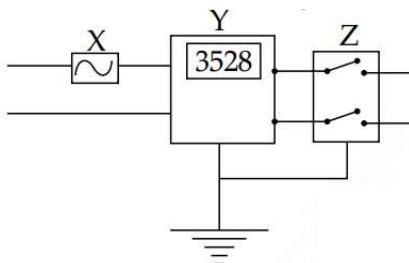
- (b) Uranium is available in two forms U-235 and U-238. Which of the two isotopes of Uranium is more fissionable? [3]

- (iii) We are able to see the T.V. channels clearly when we set T.V. on auto-tuning.

- (a) Which *phenomenon* led to the clear visibility of the channels, due to auto tuning?
 (b) Define the above phenomenon mentioned by you.
 (c) Give *any* one more example of this phenomenon. [4]

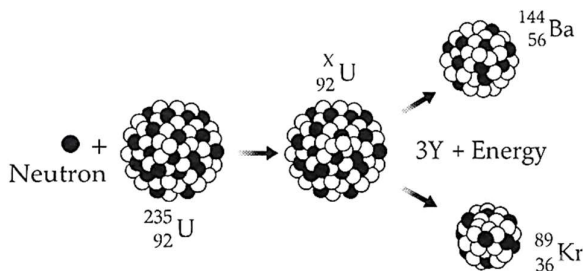
8. Answer the following questions: [10]

- (i) The diagram shows wiring in a meter room of a building.



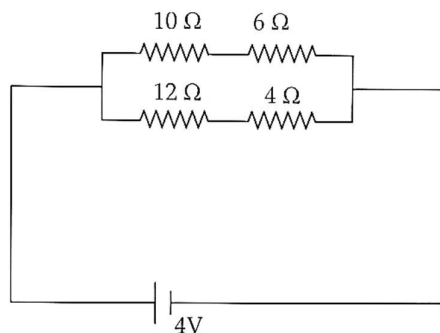
- (a) What is the current rating of device X?
 (b) What is the difference between the switch Z shown in the diagram and the switches you use to operate different appliances at home?
 (c) What is the unit of the physical quantity displayed in Y? [3]

- (ii) Study the diagram given below and answer the questions that follow



- (a) Name the process depicted in the diagram.
 (b) What is the value of X?
 (c) Identify Y, the missing product of the reaction. [3]

(iii) Study the diagram:



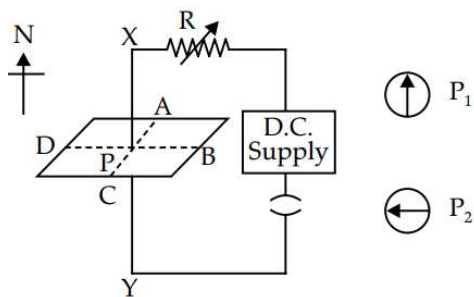
- Calculate the total resistance of the circuit.
- Calculate the current drawn from the cell.
- State whether the current through $10\ \Omega$ resistor is greater than, less than or equal to the current through the $12\ \Omega$ resistor. [4]

9. Answer the following questions: [10]

- 30 g of ice at 0°C is used to bring down the temperature of a certain mass of water at 70°C to 20°C . Find the mass of water [Specific heat capacity of water = $4.2\text{ Jg}^{-1}^\circ\text{C}^{-1}$ and specific latent heat of ice = 336 Jg^{-1}] [3]

- State the principle of calorimetry.
 - Name the material used for making a calorimeter.
 - Write one characteristic property of the material chosen for making a calorimeter. [3]

- Given below is a circuit to study the magnetic effect of electric current. $ABCD$ is a cardboard kept perpendicular to the conductor XY . A magnetic compass is placed at the point P of the cardboard. P_1 and P_2 are the positions of the magnetic compass, before and after passing a current through XY respectively.



- Name the rule that is used to predict the direction of deflection of the magnetic compass.
- State the direction of current in the conductor (X to Y or Y to X) when the circuit is complete.
- If resistance R is increased, then what will be the effect on the magnetic lines of force around the conductor? [4]