KARNATAKA ICSE SCHOOLS ASSOCIATION

ICSE STD. X Preparatory Examination 2025

Subject: PHYSICS (SCIENCE PAPER 1)

Maximum Marks: 80 **Time Allowed: Two hours** **Date: _____**

General Instructions

Answers to this paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the Question Paper.
The time given at the head of this paper is the time allowed for writing the answers.

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

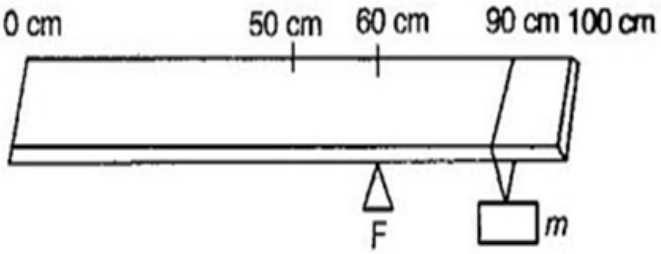
SECTION - A

(Attempt all questions from this Section.)

Question 1

Choose the correct answers to the questions from the given options.
(Do not copy the question, write the correct answers only) [15]

i) A uniform meter rule of weight 1.04 N balances at the 60 cm mark when a weight **m** is placed at 90 cm mark. What is the value of **m**?



(a) 1.04 N
(b) 0.347N
(c) 0.693N
(d) 0.578N

ii) Two objects of masses 2 g and 4 g have same kinetic energy. What will be the ratio of their linear momentum?
(a) 2:1
(b) 1:$\sqrt{2}$
(c) 1:2
(d) 1:16

iii) A device based upon conversion of light into electricity is:
   (a) Electric heater
   (b) Electric bulb
   (c) Photocell
   (d) Thermocouple

iv) Select the incorrect statement from the following:
   (a) A machine acts as a force multiplier as well as a speed multiplier simultaneously
   (b) A machine is used in changing the point of application of effort to a convenient point
   (c) A machine is used in changing the direction of effort to a convenient direction
   (d) A machine is used for obtaining gain in speed

v) Focal length of a convex lens will be maximum for:
   (a) Green light
   (b) Red light
   (c) Blue light
   (d) Violet light

vi) A, B and C are three optical media of respective critical angles C_1, C_2 and C_3. Total internal reflection occurs from A to B and also from B to C but not from C to A. Then the correct relation between the critical angles is:
   (a) $C_1 < C_2 < C_3$
   (b) $C_3 < C_1 < C_2$
   (c) $C_3 < C_2 < C_1$
   (d) $C_2 < C_3 < C_1$

vii) A coil is held in a magnetic field, such that plane of the coil is at right angles to that of the plane of permanent magnet. The force experienced by the coil on the passage of electric current will be:
   (a) Maximum
   (b) Zero
   (c) Weak
   (d) None of these

viii) What will be the wavelength of sound waves of frequency 550 Hz, if these waves are travelling with a speed of about 330 m/s?
   (a) 0.6 m
   (b) 1.67 m
   (c) 0.6 cm
   (d) 16.7 m

ix) Which one of the following statements is correct?

(a) Live wire has zero potential
(b) Fuse is connected with a neutral wire
(c) Potential of earth and neutral wire is always the same
(d) Neutral wire is used to prevent electric shock

x) **Assertion (A)**: The product of resistivity and conductivity of a conductor depends on the material of conductor.

Reason(R): Because each of resistivity and conductivity depends on the material of the conductor.

(a) Both assertion and reason are true and reason is the correct explanation of assertion
(b) Both assertion and reason are true but reason is not the correct explanation of assertion
(c) Assertion is true but reason is false
(d) Assertion is false but reason is true

xi) Two metallic wires made from copper have same length but the radius of wire **1** is half of that of wire **2**. The resistance of wire **1** is R. If both the wires are joined together in series, the total resistance becomes:

(a) 5 R
(b) $\frac{5R}{4}$
(c) 4R
(d) $\frac{1}{2}$R

xii) Which of the following parameters remain constant in primary and secondary coils of a step up transformer?

(a) Power
(b) Current
(c) Voltage
(d) Both (a) and (b)

xiii) Amount of heat energy required to melt 200 g of ice at 0 ^{0}C is:
[Specific latent heat of ice =336000 J kg^{-1}]

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

xiv) Two sounds S1 and S2 are produced by loudspeakers. The amplitude and frequency of each sound wave is given in the table.

	Amplitude	**Frequency**
S_1	1.3	480
S_2	2.0	240

(a) S_2 is louder and has a higher pitch
(b) S_2 is louder and has a lower pitch
(c) S_2 is quieter and has a higher pitch
(d) S_2 is quieter and has a lower pitch

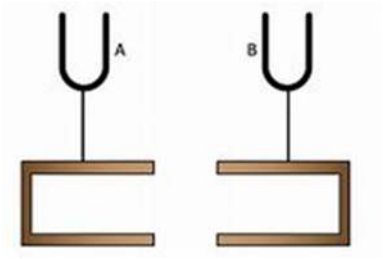
xv) A radioactive element forms its own isotope after 3 consecutive disintegrations. The particles emitted are:
(a) 2 α particles and 1 β particle
(b) 2 β particles and 1 γ particle
(c) 2 β particles and 1 α particle
(d) 3 β particles

Question 2

i) Complete the following by choosing the correct answers from the bracket: [6]
(a) To an Astronaut in a space ship, the earth appears ------. (black/blue/red)
(b) For a fuse, higher the current rating ----------(thicker/thinner) is the fuse wire.
(c) The direction of clockwise moment produced by a force is directed ---------- (inwards/outwards/perpendicular) along the axis of rotation.
(d) The type of energy possessed by the bob of a simple pendulum when it is at the mean position is ----------. (potential energy/kinetic energy /potential energy and kinetic energy)
(e) When a boy raises the weight of his body on his toes, the class of lever found in his body is----------. (Class I/Class II/Class III)
(f) The physical quantity remain constant in uniform circular motion is ---------. (velocity/acceleration/speed)

ii) A pulley system has a velocity ratio of 4 and efficiency 60%. Calculate the mechanical advantage. [2]

iii) Two tuning forks A and B of same frequencies are placed on two boxes in adjoining positions. Tuning fork A is set into vibrations. [2]



What would be your observations? State the principle illustrated by the experiment.

Question 3

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

ii) A stone placed at the bottom of a water tank appears raised by 80 cm. If the refractive index of water is 4/3, find the actual depth of water in the tank. [2]

iii) Two resistances when connected in series give 15 Ω resistance and when connected in parallel yield $\frac{10}{3}$ Ω. Calculate the value of two resistances. [2]

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

v) (a) A couple is formed by two equal and opposite forces of 40 N each. The distance between line of action of forces is 5 m. Calculate the moment of couple.
(b) If the point, about which rotation takes place, is shifted, will there be any change in moment of couple.? [2]

vi) (a) Represent the change in the nucleus of a radioactive element when a β -particle emitted. [2]
(b) What is the name given to elements with same mass number and different atomic number?

vii) (a) Two metallic blocks A and B of different metals having their masses in the ratio 2:3 are given same amount of heat. Their temperature rises by same amount. Compare their specific heat capacities. [3]
(b) What do you mean by the statement:
'The specific heat capacity of copper is 0.4 J g^{-1} °C^{-1} '

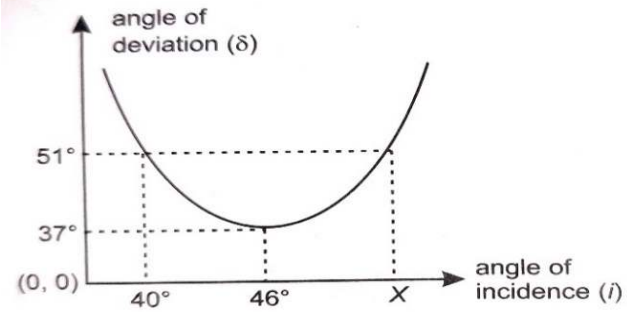
SECTION–B

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

Question 4

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

ii) The diagram (not drawn to the scale) below shows the graphical relation between angle of deviation and angle of incidence, when light passes through a triangular prism of angle 62^0 of a certain glass material. [3]



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

(b) Calculate the value of X.

iii) A lens of focal length 20 cm forms an inverted image at a distance 60 cm from the lens. [4]

(a) Identify the lens.

(b) How far is the lens present in front of the object?

(c) Calculate the magnification of the image.

Question 5

i) (a) State the relation between the critical angle and the absolute refractive index of a medium. [3]

(b)The critical angle for glass air interface is 45 ^{0}for yellow light. Will it be equal to, less than or greater than 45 ^{0} for

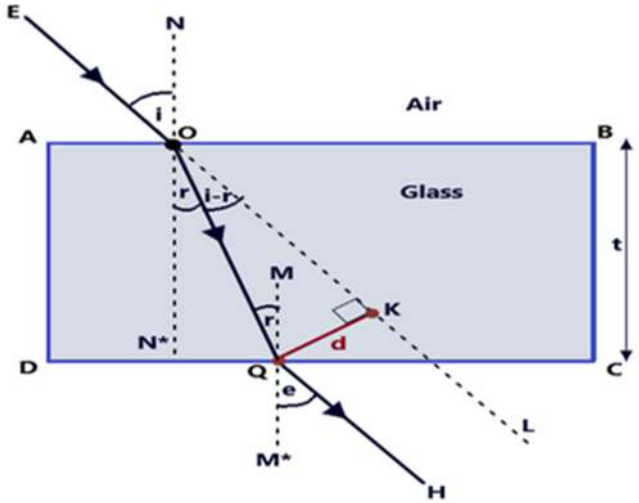
1) red light,
2) blue light?

ii) (a) Which property of light is responsible for the blue color of the sky? [3]

(b) Define the above-mentioned property stated by you.

(c) State the condition required for the occurrence of the phenomena.

iii) A ray of light is incident on a glass slab as shown below: [4]



(a) What is represented by '*d*' shown in the diagram?

(b) Define '*d'*

(c) How is '*d* 'related to the refractive index of the medium?

(d) What will happen to the value of '*d*' as the value of 't' (thickness) increases?

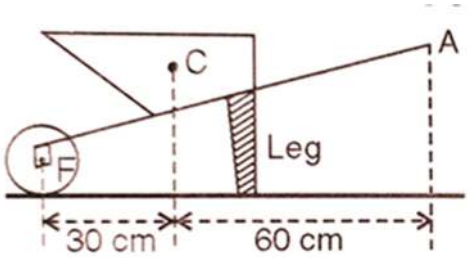
Question 6

i) (a) Write the relation between the commercial unit of electrical energy and the SI unit of energy. [1]

(b) A satellite revolves around a planet in a circular orbit. What is the work done by the satellite at any instant? Give a reason. [2]

ii) A ball is dropped from a height of 10m. If the energy of the ball reduces by 40% after striking the ground, how high can the ball bounce back? [3]
($g = 10\ ms^{-2}$)

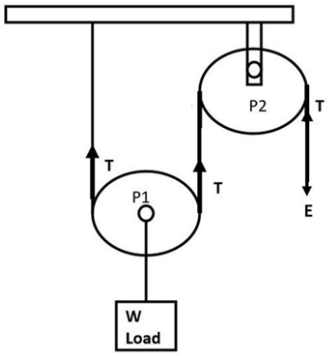
iii) The diagram alongside shows a wheel barrow with C as centre of gravity, such that its leg is in contact with ground. [4]



(a) Name the force acting at C and state its direction.
(b) What is the direction of minimum force at A to keep the leg off the ground? What is this force called?
(c) If the weight of wheel barrow is 10 kgf and it holds 90 kgf of sand, calculate the minimum force to keep the leg off the ground.

Question 7

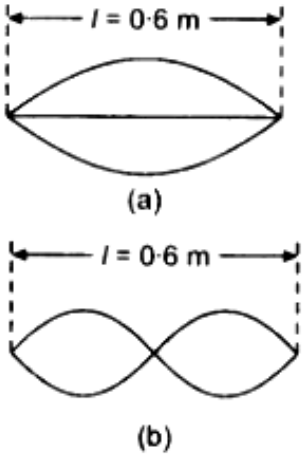
i) The figure below shows the combination of a movable pulley P1 with a fixed pulley P2 used for lifting up a load W. [3]



(a) State the function of the pulley P2.
(b) If the free end of the string moves through a distance x, what is the distance by which the load W is raised?
(c) Calculate the force to be applied at the end of the string to just raise the load W=50 kgf, neglecting the weight of the pulley P1 and friction.

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

iii) A 0.6 m long stretched wire is made to vibrate in two different modes as shown in figure. [2]



(a) If the frequency of note produced in (b) is *n*, what is the frequency in case (a)?
(b) In which case is the pitch higher? Give reason.

iv) Arrange α, β *and* γ rays in ascending order with respect to their: [2]
(a) Biological effect
(b) Ionizing power

Question 8

i) (a) A substance has its specific resistance of order $\mathbf{10^{-5}}$. Identify the substance. [3]
(b) How does its resistivity changes with the rise in temperature?
(c) Name a material which is used for making standard resistor.

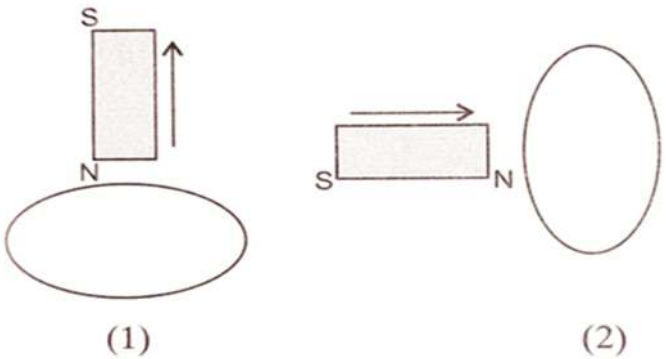
ii) (a) What determines the frequency of a.c produced in a generator? [3]
(b) State any two kinds of energy losses in a transformer. How are they minimized?

iii) An electric oven is marked 1000 W-200 V. Calculate: [4]
(a) Resistance of its element.
(b) Energy consumed by the oven in $\frac{1}{2}$ an hour in joules.
(c) Time in which it will consume 15 kWh of energy.

Question 9

i) (a) Why is the base of a cooking pan made thick and heavy? [3]
(b) State the effect of increase in impurities on the melting point of ice.

ii) (a) Copy the diagram and mark the directions of induced current in the following figures: [3]



(1) (2)

(b) Name the law which determines the direction of current induced in the coil.

(c) What is the source of energy associated with the current obtained in part (a).

iii) 104 g of water at 30° C is taken in a calorimeter made of copper of mass 42 g. When a certain mass of ice at 0 ° C is added to it, the final steady temperature of the mixture after the ice has melted, was found to be 10 °C. Find the mass of ice added. [4]

(Specific heat capacity of calorimeter =0.4 J g^{-1} $°C^{-1}$, Specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$, Latent heat capacity of ice =330 J g^{-1})

End