# II – PRE BOARD EXAMINATION

## CLASS : X (ICSE)
## SCIENCE PAPER–1
## PHYSICS

*Time Allowed: 2 hours*

*Maximum Marks: 80*

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*Answer to this paper must be written on the paper provided separately.*

*You will not be allowed to write during first 15 minutes.*

*This time must be spent in reading the question paper..*

*The time given at 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 the questions are given in the brackets [ ].*

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## SECTION – A

### (Attempt all questions from this section.)

Question 1                                                                        [15]

Choose the correct answers from the given options :

(i)     The energy possessed by a flying bird is :

   (a)     Kinetic energy

   (b)     Potential energy

   (c)     Both (a) and (b)

   (d)     None of these

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This paper consists of 10 printed pages.

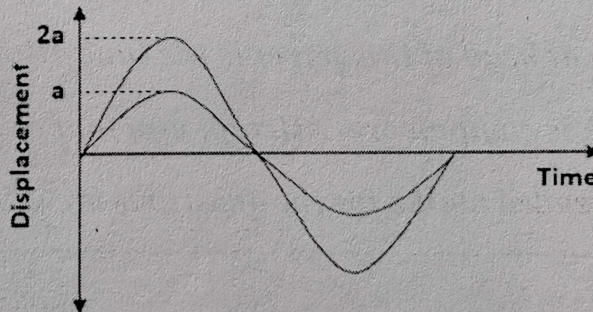(ii)    Essential characteristics of equilibrium is :

    (a)    Momentum equals to zero

    (b)    Acceleration equals to zero

    (c)    K.E. equals to zero

    (d)    Velocity equals to zero

(iii)    The SI unit of work is joule . It is expressed in terms of mass, length and

    time as :

    (a)    $kg\ m^2s^{-3}$                          (b)    $kg\ m^3s^{-2}$

    (c)    $kg\ m^2s^{-2}$                          (d)    $kg^2\ m^2s^{-2}$

(iv)    The ratio of loudness of wave A : Loudness of wave B is :

    (a)    $1:2$

    (b)    $2:1$

    (c)    $1:4$

    (d)    $4:1$

(v)    A boy has difficulty in reading his book, which lens will you advise him

    for his spectacles :

    (a)    convex lens                          (b)    planoconvex lens

    (c)    concave lens                          (d)    planoconcave lens

(vi)    The specific heat capacity of a substance :

    (a)    changes with the mass of given substance

    (b)    changes with the area or volume of substance

    (c)    change with rise or fall in temperature

    (d)    is a constant quantity for a given substance

(vii) An alternating voltage of frequency 50 Hz changes its direction at an interval of :

(a) $\frac{1}{100}$ second

(b) $\frac{1}{50}$ second

(c) $\frac{1}{25}$ second

(d) $\frac{1}{200}$ second

(viii) The resistivity of a substance decreases with the increase in temperature, it is :

(a) Silver

(b) Brass

(c) Germanium

(d) None of these

(ix) How many $\alpha$ (alpha) and $\beta$ (Beta) particles will be emitted when $^{202}_{80}X$ changes to $^{198}_{79}Y$ :

(a) 1 alpha and 1 beta

(b) 2 alpha and 1 beta

(c) 2 alpha and 2 beta

(d) only 2 alpha

(x) Wavelength range of an electromagnetic radiation is 0.1 Å to 100 Å. It can be used for :

(a) curing cancer

(b) studying atomic arrangement in crystals

(c) checking the purity of gems

(d) satellite communication

(xi) Which of the substance has the lowest specific heat capacity if equal masses of all are provided the heat by same source :

(a) A

(b) B

(c) All have equal

(d) C



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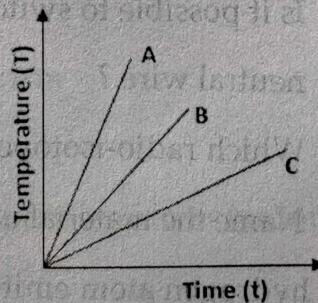
(xii) Light travels with speed 0.34 C in medium A and with speed 0.52 C in medium B, where C indicates the speed of light in vacuum. What way light should travel to suffer Total Internal Reflection (TIR) :

    (a)    A to B

    (b)    B to A

    (c)    Either (a) or (b)

    (d)    Neither (a) nor (b)

(xiii) Which relation is true for a Block and Tackle system with V.R. = 4

    (a)    $d_E = d_L$            (b)    $d_L = \frac{1}{4}d_E$

    (c)    $d_L = 4d_E$        (d)    None of these

(xiv) P and Q represents two straight wires carrying equal current in a direction normal to the plane of paper inwards. What is the magnetic field at point K (mid point) between P and Q.

    (a)    Half of the magnetic field caused by wire P

    (b)    Double of the magnetic field caused by P

    (c)    Zero

    (d)    Sum of the magnetic field caused by P and Q.

    $\boxed{X}$      $\bullet$      $\boxed{X}$

    P       K       Q
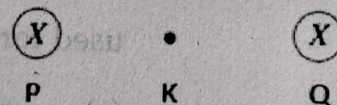
(xv) Which physical quantity is measured in electron volt (ev)

    (a)    Moment of couple     (b)    Power

    (c)    Force              (d)    None of these

## Question 2

    (i)    (a)    Is it possible to switch off an appliance by placing the switch in a neutral wire ?     [3]

         (b)    Which radio-isotope is used to kill the cancer cells.

         (c)    Name the material used for safety from radioactive radiation.

    (ii)    Can a hydrogen atom emit an alpha particle ? Justify you answer.     [2]

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(iii) A magnet kept at the centre of two coils A and B, is moved to and fro as shown in the figure. The two galvanometer show deflection. Which deflection is more x or y and why ? [2]



Coil A  Coil B
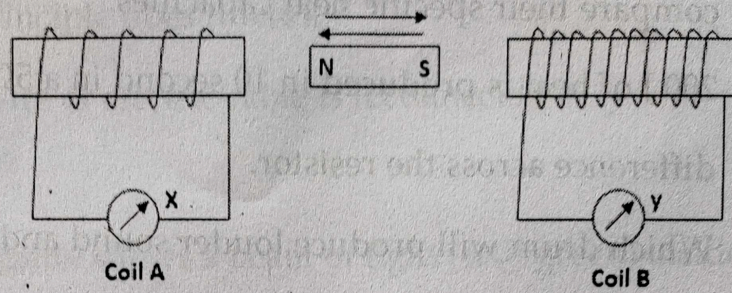
(iv) The refractive index of diamond is 2.42. What is meant by this statement ? [2]

(v) Find the value of x for the given solid cone. [2]
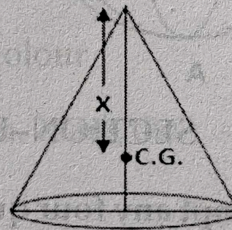


(vi) Define superconductivity. [2]

(vii) Find the equivalent resistance between P and Q. [2]

(D is the mid point of BC)
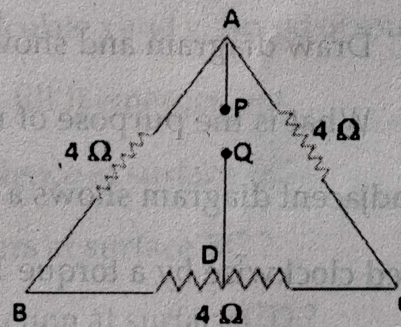


Question 3

(i) State the dependence of angle of deviation of light while passing through the prism on : [2]

(a) the refractive index of the prism

(b) the wavelength of light

(ii) Write the equation for the change taking place in nucleus to emit the beta particle. [2]

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(iii) Two metallic blocks P and Q having masses in ratio 2 : 1 are supplied with the same amount of heat. If their temperature rises by same degree, compare their specific heat capacities. [2]

(iv) 200 J of heat is produced in 10 second in a 5Ω resistor. Find the potential difference across the resistor. [2]

(v) Which drum will produce louder sound and why ? [2]



A        B
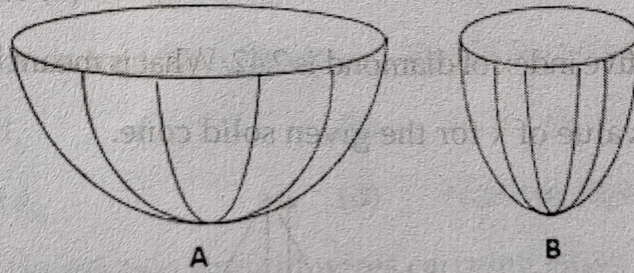
## SECTION-B

### (Attempt any four questions)

Questions 4

(i) A pulley system comprises of two pulleys, one fixed and the other movable. [3]

  (a) Draw diagram and show the direction of all the forces acting on it.

  (b) What is the purpose of using fixed pulley ?

(ii) The adjacent diagram shows a steering wheel of radius 0.25 m which is rotated clockwise by a torque 10 N-m produced due to a pair of equal and opposite force F. [3]
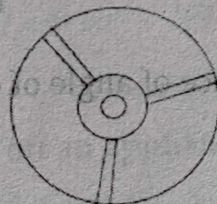


  (a) Calculate the magnitude of force F.

  (b) Show them on the diagram with their point of application.

  (c) What is such a pair of force known as ?

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(iii)  (a)    What is the purpose of fuse in an electric circuit ?    [4]

        (b)    Which material is used for making a fuse wire.

        (c)    On what principle does it work ?

        (d)    To which wire of electric cable is it connected ?

## Question 5

(i)    The diagram alongside shows a beam of light (red+green) incident normally on an equilateral triangular prism. If the critical angle for the material of prism is $60°$ for red light.    [3]

Complete the diagram showing the path of light of each colour emerging out of the prism. Mark the necessary angles.
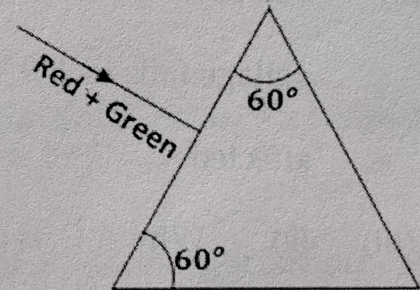


(ii)    A person standing at a distance x infront of a cliff fires a gun. Another person B standing behind the person A at distance y from the cliff hears two sounds of the fired shot after 2s and 3s. Calculate x and y. (speed of sound $= 320$ ms$^{-1}$)    [3]

(iii)  (a)    Complete the path of ray till it emerges out.    [4]

        (b)    What is the angle of incidence at surface BC

        (c)    Which phenomenon occurs at surface BC ?

        (d)    What is the angle of refraction at surface CD ?
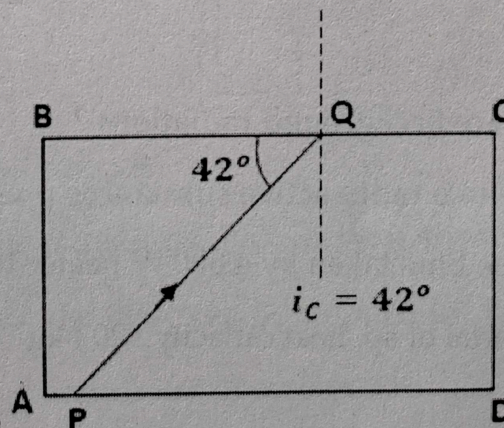
## Question 6

    (i)    An object is placed at a distance 24 cm in front of a convex lens of focal length 10 cm : [3]

        (a)    What is nature of image so formed ?

        (b)    Calculate the distance of image from the lens.

        (c)    Is the size of image bigger or smaller than object

    (ii)    Calculate the current through a 60 W lamp rated for 250 V. If the line voltage falls to 200 V, how is the power consumed by the lamp affected. [3]

    (iii)    (a)    Why A.C. is preferred over D.C. ? [4]

        (b)    A charged particles enters at right angle into a uniform magnetic field. what is the nature of charge on particle if it begins to move vertically upwards out of the page. Name the rule used by you.



Magnetic Field

Charged Particle
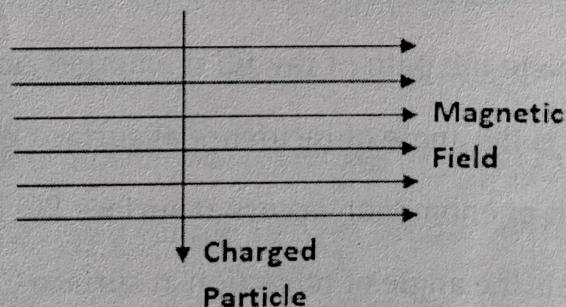
## Question 7

    (i)    (a)    What are background radiations ? [3]

        (b)    Name two radio-active substances present in our body.

    (ii)    Determine the time taken by a 500 W heater to raise the temperature of 50 kg of material of sp. heat capacity 920 J $kg^{-1}$ $K^{-1}$ from 18°C to 38°C. [3]

(iii) Calculate :  [4]

(a) Current through 8 Ω resistor

(b) Potential difference across the parallel combination

(c) Current through 6 Ω resistor
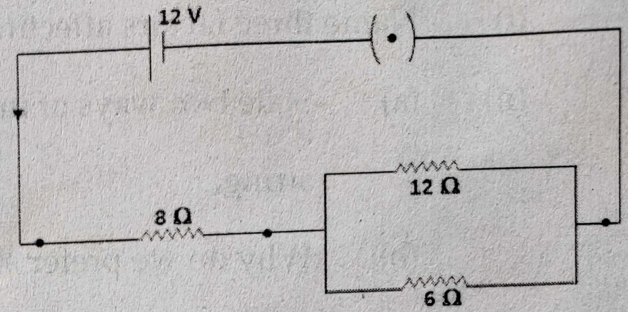


## Question 8

(i) A body of mass 'm' is allowed to fall freely from the roof of a building of height 'h'. Give the value of potential energy possessed by it when it is : [3]

(a) at the roof

(b) at the ground

(c) at a point in between the roof and ground at a distance x below the roof.

(ii) (a) Calculate the frequency of yellow light of wavelength 550 nm. The speed of light is $3 \times 10^8$ ms$^{-1}$. [3]

(b) How will the light bend if passes from crown glass to flint glass ?

(iii) The arrows show the path of radiation from a radioactive substance in a magnetic field (normal to the plane of paper inward) [4]
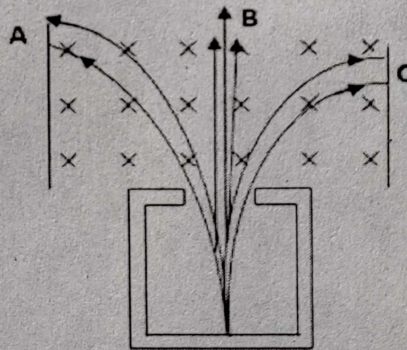


(a) Name the radiation B.

(b) Why does the radiation C deflect more than A ?

(c) Which among the three can be stopped by a sheet of paper

(d) Name the radiation used in carbon dating.

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**Turn Over**

## Question 9

(i)     Name three factors affecting the internal resistance of a cell.     [3]

(ii)     (a)     State two ways of increasing the frequency of vibration of a stretched string.     [3]

        (b)     Why do we prefer a short length flute ?

(iii)     (a)     What is the nature of V-I curve of a ohmic resistor.     [4]

        (b)     Emission of which radio-active radiation causes an isobar to form.

        (c)     Why ice is preferred than ice cold water to cool a drink ?

        (d)     Why do we polish the inner and outer surfaces of a calorimeter ?

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