PAWAR PUBLIC SCHOOL, BHANDUP.

Class	Subject	Exam	Marks	Date	Duration	No. of printed sides
X	Physics	Prelim II	80	10.01.19	2 hrs.	4

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 I is compulsory. Attempt any four questions from Section II
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION I (40 Marks)
Attempt all questions from this Section.

Question 1

(a) (i) Where is the centre of gravity of a uniform ring situated? [2]

(ii) Name the force required for a body to perform circular motion.

(b) A ball of mass 200 g falls from a height of 5 m. What will be its kinetic energy when it just reaches the ground? ($g = 9.8\ ms^{-2}$) [2]

(c) Scissors for cutting cloth and shear for cutting metals both belong to the same class of lever. In what respect do they differ from each other? [2]

(d) A certain amount of heat Q will warm 1 g of material X by 3^0C and 1 g of material Y by 5^0C. [2]
(i) Which material has greater heat capacity?
(ii) Which material is an effective coolant?

(e) (i) Define power of a lens. [2]

(ii) The focal length of a thin convex lens is _____ than that of a thick convex lens.

Question 2

(a) (i) Explain why weather becomes cold after a hail storm? [2]

(ii) The specific heat capacity of iron is $483\ J\ kg^{-1}K^{-1}$. Explain the meaning of the statement.

(b) Of the three connecting wires in a household circuit: [2]
(i) Which wire is the switch connected to?
(ii) The colour code of wire which is used for safety of appliances.

(c) State two differences between resistance and resistivity. [2]

(d) A nucleus of an element X which has the symbol $^{214}_{84}X$ emits an alpha particle and then a beta particle. Find the mass number and atomic number of the final product. [2]

(e) A satellite revolves around the earth in a circular orbit. What is the work done by the gravitational force? Give a reason for your answer. [2]

(33)

Question 3

(a) A bucket kept under a running tap is getting filled with water. A person sitting at a distance is able to get an idea when the bucket is about to be filled. [2]

(i) Which characteristic of sound enables us to identify this?

(ii) Why does this characteristic of sound change?

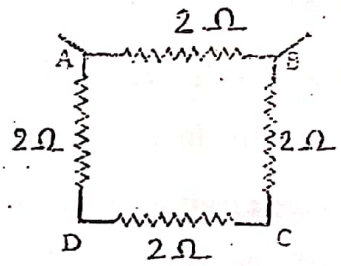
(b) Two waves A and B have wavelengths 0.01 Å and 9000 Å respectively. [4]

(i) Name the wave B.

(ii) Compare the speed of these waves when they travel in vacuum.

(c) Four resistors each of resistance 2.0 Ω are joined as shown. [2]

Calculate the equivalent resistance of the combination between A and B.



(d) Give reason: [2]

(i) The primary coil of a step up transformer has thicker wires as compared to secondary coil.

(ii) Transformers work only on ac voltage.

(e) Write two differences between nuclear fusion and nuclear fission reaction. [2]

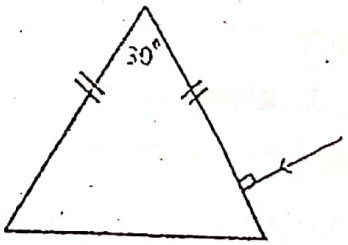
Question 4

(a) (i) Define radioactivity. [2]

(ii) State the change inside a radioactive nucleus during beta emission in equation form.

(b) A ray of light is incident normally on the surface of a prism as shown in the diagram. Complete the path of the ray. [2]

(critical angle for glass-air interface is 42^0)



(c) State your observation: [2]

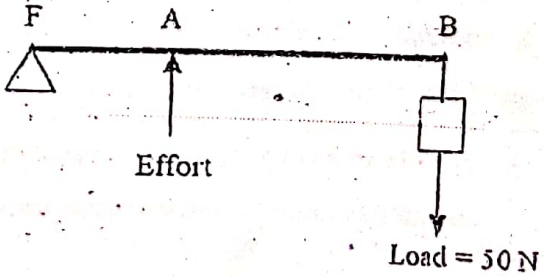
(i) increase in pressure on melting point of ice.

(ii) addition of impurities on boiling point of water.

(d) The diagram shows the use of a lever. [2]

(i) Give an example of this class of lever.

(ii) If FA = 10 cm, AB = 500 cm, calculate the minimum effort required to lift the load.



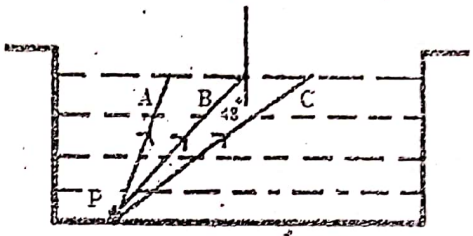
(e) State the Faraday's laws of electromagnetic induction. [2]

SECTION II (40 Marks)

Attempt any four questions from this Section

Question 5

(a) Three rays A, B and C are starting from P as shown in the figure. Copy and complete the path of the refracted rays. The ray B is incident at an angle of 48^0. The critical angle for water-air surface is 48^0. [3]



(b) (i) What are damped vibrations? [3]

(ii) Draw a displacement – time graph for damped vibrations.

(iii) Give an example of a body executing damped vibrations.

(c) An electrical appliance is rated 1500 W, 250 V. Calculate [4]

(i) the current drawn.

(ii) the resistance offered.

(iii) the electrical energy consumed in 60 hours.

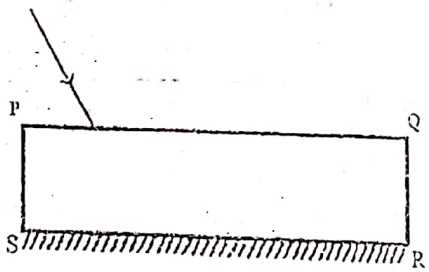
(iv) the cost of electrical energy consumed at the rate of ₹5 per kWh.

Question 6

(a) (i) Define echo. [3]

(ii) A child hears an echo from a cliff 4 seconds after the sound from a powerful cracker is produced. How far away is the cliff from the child? Velocity of sound in air is 344 ms^{-1}.

(b) The figure alongside shows a ray of light incident on a rectangular glass blocks PQRS, which is silvered at the surface RS. The ray is partly reflected and partly refracted. [3]



(i) Show at least two rays emerging from the surface PQ after reflection from the surface RS.

(ii) How many images are formed in general?

(c) A block and tackle pulley system has a velocity ratio 3 and an efficiency of 80%. [4]

(i) Draw a labelled diagram of this arrangement.

(ii) Find the M.A of the system.

(iii) Find the effort required to raise a load of 300 N.

Question 7

(a) (i) A coin at the bottom of a trough containing water to a depth of 15 cm appears to be raised by 3.75 cm from the bottom. Calculate the refractive index of water [3]

(ii) State one factor on which lateral displacement depends.

(b) (i) Draw a diagram to show the wave pattern of high pitch note and a low pitch note, but of same loudness. [3]

(ii) State the factor on which pitch of a sound depends.

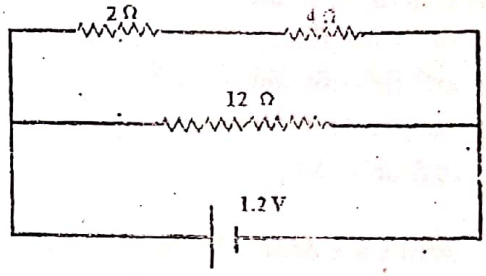
(c) A cell of emf 1.2 V is connected across the combination of resistors as shown. Calculate: [4]

(i) the total resistance in the circuit.

(ii) the total current drawn.

(iii) the current in 12 Ω resistor.

(iv) potential difference across 2 Ω.



Question 8

(a) (i) Define equilibrium. [3]

(ii) State two conditions for a body to be in equilibrium.

(b) An object is placed in front of a lens between its optical centre and the focus and forms a virtual, erect and diminished image. [3]

(i) Name the lens.

(ii) Draw a ray diagram to show the formation of image with the above characteristics.

(c) 250 g of water at 30^0C is present in a copper vessel of mass 50 g. Calculate the mass of ice required to bring down the temperature of the vessel and its contents to 5^0C. [4]

L_{ice} =336000 Jkg^{-1}; C_{copper} = 400 $Jkg^{-1}{}^0C^{-1}$; C_{water} =4200 $Jkg^{-1}{}^0C^{-1}$.

Question 9

(a) The focal length of a camera lens is 20 cm. An object located at a distance 100 cm from the lens is to be captured. Find (i) the position of the image and (ii) magnification [3]

(b) (i) State the work-energy theorem. [3]

(ii) State the energy change in (1) charging a battery and (2) D C motor

(c) (i) Name the material used for making a calorimeter. [4]

(ii) State two reasons for using the above mentioned material to make a calorimeter.

(iii) Explain how heat loss due to radiation is minimized in a calorimeter.

Question 10

(a) A uniform metre scale rests horizontally on a knife edge at the 55 cm mark when a mass of 10 g is suspended from one end. [3]

(i) Draw a diagram of the arrangement.

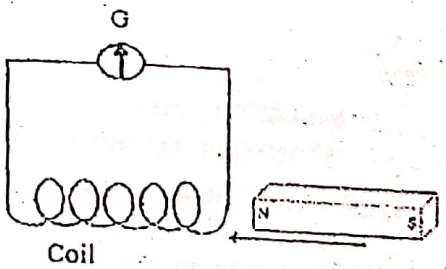
(ii) Find the mass of the metre scale.

(b) The diagram given shows a coil of several turns of copper wire connected to a galvanometer G. [3]

(i) Describe the observation if the coil is rapidly moved in the direction of the arrow.

(ii) How would the observation be altered if the coil has twice as many turns?

(iii) Describe the observation if the coil and the bar magnet are moved together with the same speed in the same direction.



(c) (i) Name the nuclear radiations having:

(1) highest ionizing power (2) highest penetrating power

(ii) State two similarities between gamma rays and X- rays. [4]

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