shishuvan

SCIENCE (Std -X)

Paper I (Physics)

(Two hours)

Answer 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 answer.

Attempt all the questions from Section I and four questions from Section II.
The intended marks for questions or parts of questions, are given in brackets [ ]
There are 4 printed pages.

SECTION I (40 Marks)

Attempt all questions from this section

Question 1

a) Can the moment of force be zero even if the force is not zero? Give reason for your answer. [2]
b) State the factors on which centre of gravity of a body depend. [2]
c) State two points of difference between a single fixed pulley and a single movable pulley. [2]
d) Why is a calorimeter made of thin sheet of copper? [2]
e) Give two applications of total internal reflection. [2]

Question 2

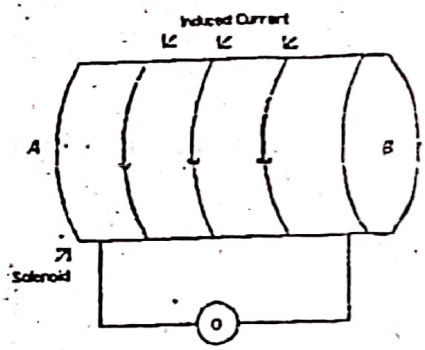
a) State the class of levers the following belong to (i) nut cracker (ii) pliers. [2]
b) Draw a diagram to show two sounds of same amplitude and same frequency but of different waveforms. [2]
c) There are only three connecting wires in a household circuit: (i) which two wires are at the same potential? (ii) In which of the three wires should the fuse be connected. [2]
d) Under what condition the work done by a force is (i) zero (ii) minimum. [2]
e) A pond appears to be 2.7 m deep. Calculate the depth of the pond, if the refractive index of water is 4/3. [2]

31

Question 3

a) Can you hear an echo, if the distance between the source of sound and reflector is 10m? Why? [2]

b) You are provided with a solenoid AB connected to a cell as shown in the figure.
(i) What is the polarity at the end A?-
(ii) Give one advantage of electromagnet over a permanent magnet. [2]



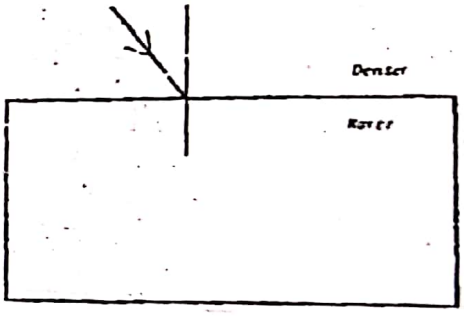
c) What is a dc motor used for?
Name principle on which it works. [2]

d) Refractive index of diamond is 2.42. What do you mean by this statement? [2]

e) Name the radiation (i) That is used for photography at night
(ii) Whose wavelength ranges from 100Å to 4000 Å. [2]

Question 4

a) Complete the diagram, the path of ray till it emerges out from the slab. Label and mark the diagram. [2]



b) State the functions of split ring commutator in a dc motor. [2]

c) State the energy change in the following cases, while they are in use : [2]
(i) An electromagnet
(ii) Burning of a match stick

d) State two disadvantages of connecting the appliances in series. [2]

e) What is eV? State its relation with SI unit of work. [2]

SECTION II 40 Marks)

Attempt any four questions from this section

Question 5

a) What do you mean by dispersion of light? Explain its cause. [3]

b) Where must an object be placed in front of converging lens so that the image formed may be : [4]
(i) Of the same size as object (ii) At infinity
(iii) Inverted and enlarged, (iv) upright and enlarged

c) A concave lens forms an erect image of 1/3rd size of the object which is placed at a distance 30 cm in front of the lens. Find :
(i) the position of images and (ii) the focal length of the lens. [3]

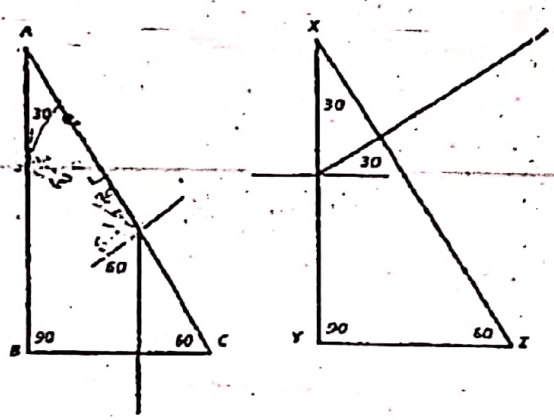
32

Question 6

a) Name the type of a single pulley that has an ideal mechanical advantage equal to 2. Draw a labelled diagram of the pulley mentioned by you. [3]

b) A lever of length 9 cm has its load arm 5 cm long and the effort arm is 9 cm long.
(i) To which class does it belong?
(ii) Draw diagram of the lever showing the position of fulcrum F and directions of both the load L and effort E.
(iii) What is the mechanical advantage and velocity ratio if the efficiency is 100%? [3]

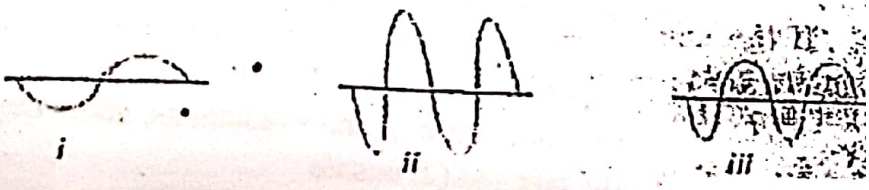
c) Complete the following ray diagrams, till the ray emerges out. [4]



Question 7

a) When a troop crosses a suspension bridge, the soldiers are asked to break their steps. Why? [3]

b) A microphone is connected to the Y- input of a CRO. Three different sounds are made in turn in front of the microphone. Their traces (i), (ii) and (iii) produced on the screen are shown in the figure given alongside.



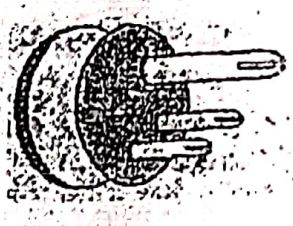
(i) Which trace is due to the loudest sound? Give reason for you answer
(ii) which trace is due to the sound with the lowest pitch? Explain your answer. [4]

c) A man standing in front of a vertical cliff fires a gun. He hears the echo after 3s. On moving closer to the cliff by 82.5 m, he fires again and hears the echo after 2.5 s. Find: (i) the distance of cliff from the initial position of man, and (ii) the speed of sound. [3]

Question 8

a) Two resistors of 4Ω and 6Ω are connected in parallel. The combination is connected across a 6 V battery of negligible resistance. (i) Draw a circuit diagram.(ii) Calculate : (1) the total resistance of circuit, (2) the current through the battery, (3) the current through each resistor. [4]

b) The diagram alongside shows three pin plug. Label the three pins. [3]



(i) Identify the pins.

(ii) Why is the top pin thicker and longer than the other two?

(iii) Why are the pins spitted at the ends?

c) State three ways to increase the speed of rotation of coil of a dc motor. [3]

Question 9

a) Explain the following : [4]

(i) The base of the cooking pan is made thick.

(ii) Water in the lakes and ponds does not freeze at once in cold countries.

b) 2 kg of ice melts when water at 100° C is poured in a hole drilled in a block of ice. What mass of water was used?

Given:

Specific heat capacity of water =4200 $J\,kg^{-1}K^{-1}$,

specific latent heat of ice = 336×10^3 Jkg^{-1}. [3]

c) (i) Out of the three metals A, B and C of specific heat capacity 900 $Jkg^{-1}K^{-1}$, 380 $J\,kg^{-1}K^{-1}$ and 460 $J\,kg^{-1}K^{-1}$ respectively, which will you prefer for calorimeter? Give reason.

(ii) How is the loss of heat due to radiation minimised in a calorimeter. [3]

Question 10

a) (i) State two distinct properties of beta rays.

(ii) What are background radiations? [3]

b) A radioactive sample is kept at the centre of an evacuated spherical vessel.

(i) Out of the α, β and γ radiations, name the radiations which are

(1) safe and (2) unsafe

(ii) State two uses of nuclear fission. [3]

c) What is nuclear fission? Name the particle used for it. Write one fission reaction. [4]

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34

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