City International School, Mumbai

SECOND PRELIMINARY EXAMINATION 2018 – 2019

Date : 08/01/2019 **Marks : 80**

Std : X **Subject : Physics (Paper 1)** **Time : 2 hrs**

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 brackets ( )

SECTION – A [40 MARKS]

All questions are compulsory in this Section.

Question 1

a. List two reasons why efficiency of a single movable pulley is not 100%. (2)

b. Name the energy changes in the following: (2)
   i. An electric cell in a circuit.
   ii. Solar furnace

c. A pair of scissors and a pair of pliers belong to the same class of levers. (2)
   i. Name the class of levers.
   ii. Which one of them has M.A. > 1.

d. What do you mean by lateral displacement? Explain with the help of a neat labeled diagram. (2)

e. State a consequence of total internal reflection. Explain the phenomenon. (2)

Question 2

a. What are mirror isobars? Give one example. (2)

b. State the two characteristics required in a material to be used as an effective fuse wire. (2)

c. A radar sends a signal to an aeroplane at a distance of 300 km away with a speed of 3×10^{8} ms $^{-1}$. After how much time is the signal received back after reflecting from the aeroplane. (2)

d. State the factor that determines. (2)
   i. the pitch of a note
   ii. the loudness of sound

e. What are tracers? How are they useful? (2)

Question 3

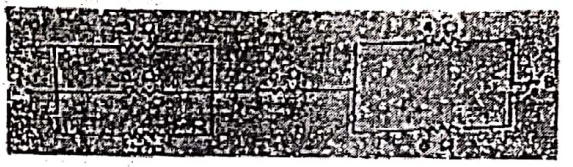
a. What is copper loss? How can you reduce it? (2)

b. Name the prism used to obtain the spectrum of: (2)
   i. UV light
   ii. Infra-red light

c. Define calorie. State its relation to SI unit Joule. (2)

d. Mention any two safety rules for handling radioactive materials. (2)

e. Calculate the equivalent resistance between points A and B for the following combination of resistors. (2)



Question 4

a. List the colour code of wires for cables used in house wiring. (any two) (2)

b. Calculate the value of resistance which must be connected to 15 ohms to provide an effective resistance of 6 ohms. (2)

c. What happens to the temperature of the surrounding when a frozen lake starts melting? (2)

d. Name the commercial unit of electrical energy. Define it. (2)

e. What is the work done when a body moves in a circular path? Explain giving suitable reason. (2)

SECTION – B [40 MARKS]

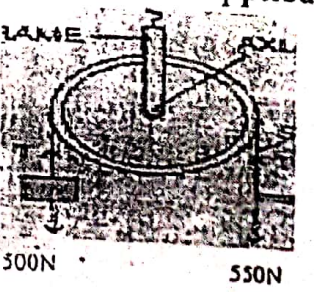
Attempt any four questions from this section.

Question 5

a. Define lever. Name the principle on which it works. Draw a diagram of a claw hammer stating which class of levers it belongs. (3)

b. What does the position of centre of gravity of a body depend on? Explain with a suitable example. (3)

c. The figure shows a fixed pulley used by a lady to draw water from the well having load of 500 N through a vertical height of 10 meters in 50 s. The effort applied by the lady on the other end of the rope is 550 N. (4)
   i. What is the M.A. of the pulley?
   ii. Calculate the efficiency of the pulley?
   iii. What is the energy gained by the load in50s
   iv. How much power was developed by the lady in drawing water from the well?



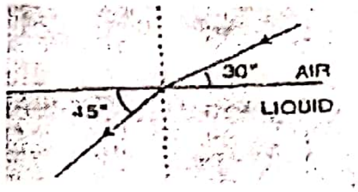
Question 6

a. The diagram alongside shows the refraction of ray of light from air to liquid: (3)

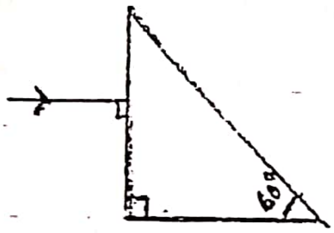
i. Write the value of angle of incidence

ii. Write the value of angle of refraction

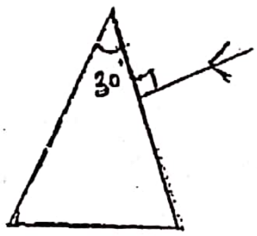
iii. Use Snell's law to find refractive index of liquid with respect to air.



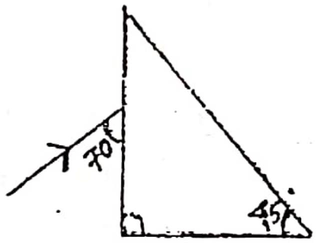
b. A light ray of a monochromatic nature is incident on the following prisms A, B and C. Redraw the diagrams by drawing the path of ray of light as it emerges out of the prism. Mark the angles wherever necessary. (3)



A



B

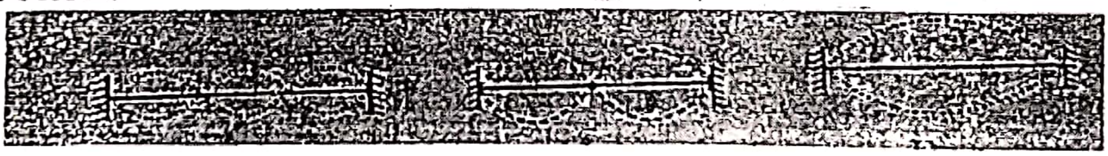


C

c. Define critical angle. State the relationship between critical angle and refractive index. List the two factors on which the critical angle depends. (4)

Question 7

a. Three different modes of vibration of a string of length l, is shown in the diagram given below: (3)



A B C

i. Which of the vibration is of the faint sound? Why?

ii. Which of the vibration is of the least shrillness?

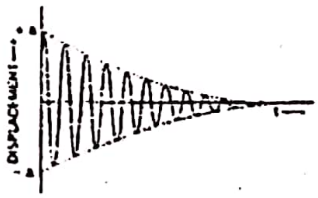
iii. What is the ratio of wavelength between (a) and (c).

b. The diagram shows the displacement time graph of a vibrating body: (3)

i. Name the kind of vibrations.

ii. Give an example.

iii. Why is the amplitude of vibration gradually decreasing?



c. i. Express 5 kWh into joule. (4)

ii. The energy of an electron is 4×10^{-19} J. Express it in eV.

Question 8

a. State the principle of method of mixture. What is the mathematical statement for it Name the law on which the above principle is based. (3)

b. A hot iron ball of mass 0.5 kg is added into 1 kg of water at 20 °C. The resulting temperature is 60 °C. Calculate the to the temperature of hot ball. (SHC of iron = 336 J $kg^{-1}K^{-1}$ and SHC of water = 4.2 x 10^3J kg^{-1} K^{-1}) (3)

c. Give reason for the following statements: (4)
   i. Water is used as an effective coolant.
   ii. The base of a cooking pan is made thick.

Question 9

a. How does nuclear fission differ from a radioactive decay? (3)

b. A radioactive source emits three types of radiations. (3)
   i. Name the radiation which is least penetrating.
   ii. Name the radiation which travels with the speed of light.
   iii. Name the radiation consisting of the same kind of particles as the cathode rays.

c. Draw a labelled diagram of an A.C. generator. What is the energy conversion that take place in it.? State two similarities between a D.C. motor and a A.C. generator (4)

Question 10

a. Can a transformer be used with a D.C source? Why do you say so? What is the function of the laminated core used in a transformer? (3)

b. Name the principle on which a transformer works. On what factors does the magnitude of e.m.f. induced in the secondary coil depend on? (3)

c. Calculate the electrical energy in kWh consumed in a month, in a house using 2 bulbs of 100 W each and 2 fans of 60 W each, if the bulbs and fans are used for an average of 10 hours each day. If the cost per unit is ₹4.50, calculate the electric bill to be paid per month. (4)

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