ICSE Class X Prelims 2020 : Physics (Smt. Sulochanadevi Singhania School Thane)

SMT SULOCHANADEVI SINGHANIA SCHOOL, THANE						
CLASS	SUBJECT	EXAM	DATE	MARKS	TIME	TOTAL NO OF PRINTED SIDES
10	PHYSICS	PRELIMS	16.01.20	80	2 HRS	4

SECTION I (40 MARKS)

All questions are compulsory

(2x5=10)

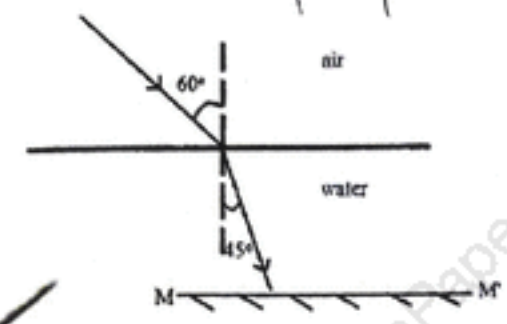
Question 1

Two deuterons combine to form a new nucleus.

a. Name the phenomenon.

b. Write the equation for this reaction.

Complete the diagram by marking all the angles till the ray emerges out of the medium. principal of reversibility of light



Give one example each of a class I lever where mechanical advantage is

a. more than 1, and

b. less than 1.

An object placed in the denser medium when seen from the rarer medium appears to be vertically shifted. How will the apparent depth be affected if

a. Thickness of the denser medium is reduced.

b. Wavelength of the light used is increased.

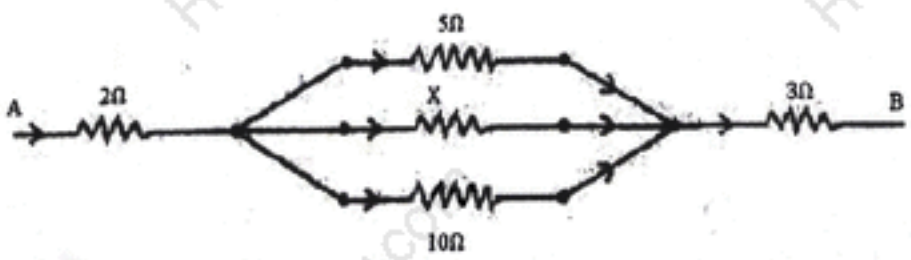
A body of mass 5kg is moving with a velocity of 10m/s. What will be the ratio of its initial kinetic energy and final kinetic energy, if the mass of the body is doubled and velocity is halved?

(2x5=10)

Question 2

Draw a neat labelled diagram of a transformer where Ns/Np >1.

Calculate the resistance X when the effective resistance between A and B is 8Ω.



A radioactive source emits three types of radiations.

a. Name the radiation with maximum ionising power.

b. Name the radiation which travels with the speed of light.

The refractive index of water with respect to air is given as $\mu_w = 4/3$.

a. What information does it convey?

b. What is the value of ${}^{w}\mu_a$?

Calculate the power of an electric heater required to melt 1kg of ice at 0° C in 30s if the efficiency of the heater is 40%. (SLH of ice=336J/g).

Question 3

A current I passes through a conductor of resistance R for time t.

a. Write an expression for the heat produced in the conductor.

b. If the potential difference V in the conductor is halved, what change is produced in the quantity of heat generated in a given time.

Name the energy changes in the following while in the use

a. photoelectric cell

b. nuclear reactor.

Draw a neat labelled diagram to show the path of the ray of light after it strikes the glass - air surface at an angle of incidence

a. 30°

b. 70°.

A constant force of 100N displaces a particle

a. 4m in the direction of force.

b. 5m at an angle of 60° from the direction of force.

Calculate work done by the particle in each case.

A man standing in front of a vertical cliff fires a gun. He hears the echo after 3s.On moving 320m away from the cliff, he fires again and hears the echo 2s later.

Calculate

a. The speed of sound.

b. The distance of the cliff from the person after he fired the second shot.

(2x5=10)

Question 4

a. Why does the sky appear blue?

b. Define the phenomenon related to this.

State two characteristic of primary coil of a step down transformer when compared to the secondary coil

A radioactive element P decays to give 3α particle and 2β particle and forms an element Q with atomic number 90 and mass number230. Represent the nuclear change with proper nuclear reaction and appropriate atomic number and mass number.

A ray of yellow colour is incident on an equilateral glass prism at an angle of incidence equal to 48° and suffers minimum deviation.

a. Calculate the angle of minimum deviation.

b. How will the angle of deviation change if the angle of incidence is changed to 30^{0}.

a. The earthing of an electric appliance is useful only if the fuse is in the live wire. Give the reason.

b. Name the part of the appliance which is earthed.

SECTION II

(ANSWER ANY 4 OUT OF 6)

Question 5

Define resistivity. State the factors affecting the resistivity of a wire. (3)

A meter scale is balanced at 20cm when a weight of 60N is suspended from one end. Draw a neat labelled diagram and calculate the weight of the meter scale. (3)

Draw a neat labelled diagram of an ideal system of pulleys which enables an effort of 150N to raise the load of 600N.Show the direction of load, effort, and tension in each strand in the diagram .What is the V.R of this system. (4)

Question 6.

A converging lens forms the image of an object placed in front of it beyond $2F_2$ of the lens. Draw a ray diagram to show the formation of image. State the nature of the image formed. (3)

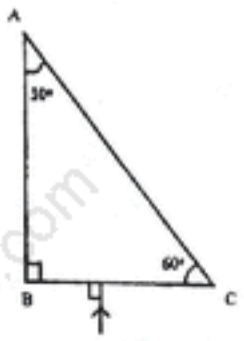
A convex lens forms an erect and three times magnified image of an object placed at a distance 10cm in front of it. Find (3)

a. the position of image

b. the focal length of the lens.

On a hot sunny day, a driver may see a pool of water in front of him at some distance. Explain why? (4)

A ray of light is incident normally on the face BC of the given glass prism. Complete the ray diagram showing its emergence into air after passing through the prism. Find the angle of deviation at surface AC.



Question 7

A liquid P has specific heat capacity less than the liquid Q. Which liquid is useful as (3)

i. coolant in car radiators

ii. heat reservoir to keep juice bottles without freezing.

What is the value of absolute zero in °C.

What is background radiation? (3)

Two identical guitars are played by two persons to give notes of the same loudness and pitch. Will they differ in quality? Give a reason for your answer.

A vessel of mass 80g contains 250g of water at 35°C. Calculate the amount of ice , which must be added to attain the final temperature of 10°C. (4)

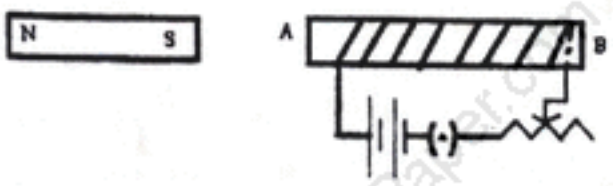
(S.H.C of vessel=800J/kg °C, S.H.C of water=4.2 J/g °C, S.L.H of ice =336J/g .)

Question 8

The diagram shows a small magnet placed near a solenoid AB with its south pole near the end A. Current is switched on in the solenoid by pressing the key. (3)

a. State the polarity at the ends A and B.

b. Will the magnet be attracted or repelled?



(3)

2 State the function of each of the following in a household circuit

a. kWh meter

b. MCB

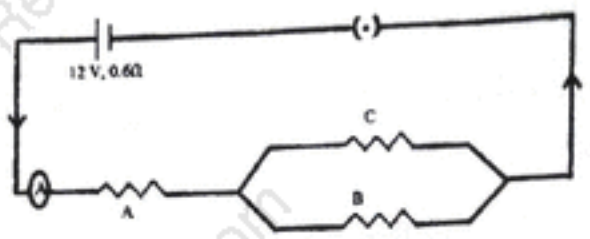
c. Main switch. (4)

3 The diagram below shows a battery of e.m.f 12V and internal resistance 0.6 Ω, connected to three resistor A = 8 Ω,B = 12 Ω and C = 6 Ω. Calculate

a. the total resistance of the circuit,

b. the current through resistor B

c. the potential drop across the internal resistance, and (iv) the terminal voltage of the cell.



Question 9

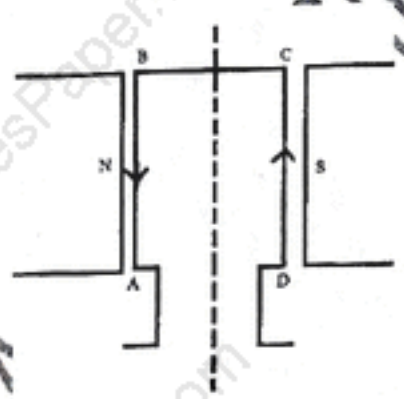
1 The figure below shows a rectangular coil ABCD suspended in a magnetic field. (3)

What is the force acting on

a. the side DC

b. the side BA

c. Why is a commutator necessary for the continuous rotation of coil?



2 State three factors on which the angle of deviation produced by a prism depends. (3)

3 a. A fuse is rated 12A.How many 100W, 220V lamps can be used safely with this fuse? (4)

b. What are high tension wires? State any two of its characteristics.

Question 10

1 State the principle of moments. Give one example of dynamic equilibrium. (3)

2 Earth revolves around the sun in a circular path of radius R. (3)

a. Name the centripetal force responsible for its motion.

b. What is the change in its kinetic energy when it completes half of its rotation.

c. Compare the magnitude of centripetal and centrifugal force

3 A boy of mass 50 kg climbs up a flight of 35 steps each 20 cm high in 2 minutes and a girl of mass 40 kg does the same in 1.5 minutes. Compare (4)

a. the work done.

b. the power developed by them