PRE BOARD EXAMINATION
2019-20
PHYSICS
Class- X

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 to Questions Paper.
The time given at the head of this paper is the time allowed for writing the answers.

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

SECTION – I (40 Marks)

Questions -1

(a) A light mass and a heavy mass have equal momentum, which will have more Kinetic energy and why? [2]

(b) i) State and define the S.I. unit of power.
ii) How is the unit horse power related to the S.I. unit of power? [2]

(c) i) Name the physical quantity which is measured in calories.
ii) how is calorie related to the S.I. unit of that quantity? [2]

(d) i) Define couple.
ii) State the S.I. unit of moment of couple. [2]

(e) i) why is the ratio of the velocities of light of wavelength 4000Å and 8000Å In vacuum is 1:1?
ii) Which of the above wavelengths has a higher frequency? [2]

Question-2

(a) Arrange the following in ascending order of frequency:
X-rays, radio waves, IR radiation, γ- rays, UV- rays. [2]

(b) i) State the relation between the critical angle and the absolute refractive Index of the medium.
ii) Which colour of light has a higher critical angle? Red light or Green light. [2]

(c) i) Define scattering.
ii) The smoke from a fire looks white.
Which of the following statements is true?
1. Molecules of the smoke are bigger than the wavelength of light.

2. Molecules of the smoke are smaller than the wavelength of light. [2]

(d) Define Centre of gravity. [2]

(e) An electromagnetic radiation is used for photography in fog.

i) Identify the radiation.

ii) Why is this radiation mentioned by you, ideal for this purpose? [2]

Question -3

(a) You have three resistors of value 2Ω, 3Ω and 5Ω. How will you join them so that the total resistance is more than 7Ω?

i) Draw a diagram for the arrangement.

ii) Calculate the equivalent resistance. [2]

(b) i) How is the e.m.f. across primary and secondary coils of transformer related With the number of turns of coil in them?

ii) On which type of current do transformers work? [2]

(c) How does an increase in the temperature affect the specific resistance of a:

i) Metal and

ii) Semiconductor? [2]

(d) i) Define resonant vibrations.

ii) Which characteristic of sound, makes it possible to recognize a person by his voice without seeing him? [2]

(e) Why the base of cooking pan is made thick? [2]

Question-4

(a) Why is the earth pin plug always made longer and thicker? [2]

(b) State the two ways to increase the speed of rotation of a D.C. motor. [2]

(c) i) State whether the specific heat capacity of a substance remains the same when its state changes from solid to liquid.

ii) Give one example to support your answer. [2]

(d) A solid metal weighing 150 g melts at its melting point of 800˚C by providing heat at the rate of 100 W. The time taken for it to completely melt at the same temperature is 4 min. What is the specific latent heat of fusion of the metal? [2]

(e) i) What are isobars?

ii) Give one example of isobars. [2]

SECTION – II (40 Marks)

*Attempt any **four** question from this section*

Question -5

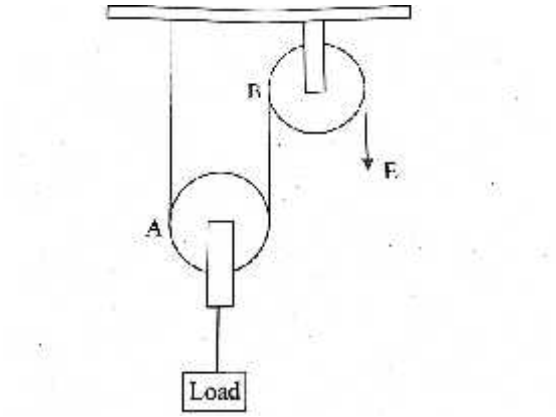
(a) Why is the longer handle of water pump preferred? [3]

(b) A body of mass 10 kg is kept at a height of 5 m. It is allowed to fall and reach the ground.

i) What is the total mechanical energy possessed by the body at the height of 2m assuming it is a frictionless medium?

ii) What is the kinetic energy possessed by the body just before hitting the ground? [3]

(c) The diagram below shows a pulley arrangement:



i) Copy the diagram and mark the direction of tension on each strand of the string.

ii) What is the velocity ratio of the arrangement?

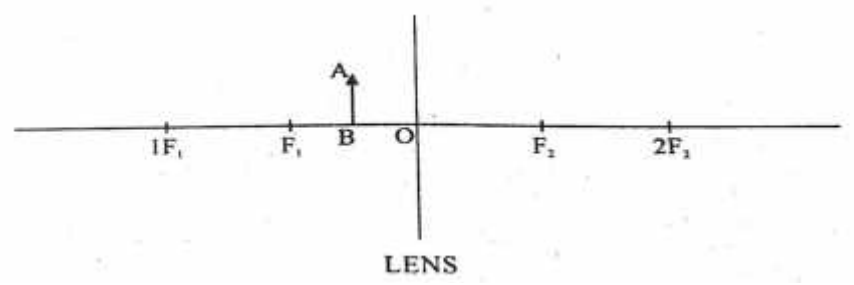
iii) If the tension acting on the string is T, then what is the relationship between T and effort E?

iv) IF the free end of the string moves through a distance x, find the distance by which the load is raised. [4]

Question -6

(a) Draw a properly labeled ray diagram showing the real and apparent position of a coin in a tank filled with water. [3]

(b) An object AB is placed between O and F_1 on the principal axis of a converging lens as shown in the diagram.



Copy the diagram and by using three standard rays starting from point A, obtain An image of the object AB. [3]

(c) An object is placed at a distance of 12 cm from a convex lens of focal length 8 cm. Find:

i) the position of the image

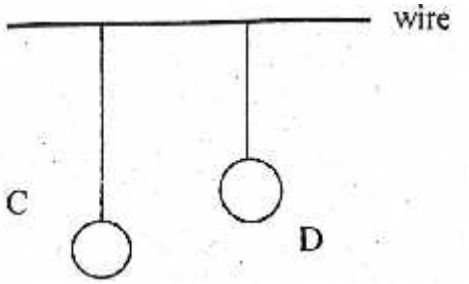
ii) nature of the image [4]

Question-7

(a) Draw the diagram of a right angled isosceles prism which is used to make an inverted image erect. [3]

(b) How can you distinguish the sound of two musical instruments even if they are of same pitch and same loudness? [3]

(c) Two pendulum C and D are suspended from a wire as shown in the figure given below. Pendulum C is made to oscillate by displacing it from its mean position. It is seen that D also starts oscillating.



i) Name the type of oscillation, C will execute.

ii) Name the type of oscillation, D will execute.

iii) If the length of D is made equal to C then what difference will you notice in the oscillations of D?

iv) What is the name of the phenomenon when the length of D is made equal to C? [4]

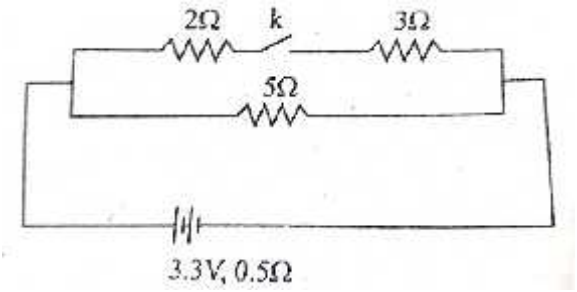
Question -8

(a) i) A fuse is rated 8A. Can it be used with an electrical appliance rated 5 KW, 200 V? Give a reason.

ii) Name two safety devices which are connected to the live wire of a household electric circuit. [3]

(b) Draw labeled diagram of a three pin socket. [3]

(c)



The diagram above shows a circuit with the key k open. Calculate:

i) the resistance of the circuit when the key k is open.

ii) the current drawn from the cell when the key k is open.

iii) the resistance of the circuit when the key k is closed.

iv) the current drawn from the cell when the key k is closed. [4]

Question- 9

(a) The melting point f naphthalene is 80˚C and the room temperature is 30˚C. A sample of liquid naphthalene at 100˚C is cooled down to the room temperature. Draw a temperature time graph to represent this cooling. In the graph, mark the region which corresponds to the freezing process. [3]

(b) i) Heat supplied to a solid changes it into liquid. What is this change in phase is Called?

ii) During the phase change does the average kinetic energy of the molecules of the substance increase?

iii) What is the energy absorbed during the phase change called? [3]

(c) Calculate the time taken by an immersion heater which supplies energy at the rate of 7000J/minute to raise the temperature of 5 kg of water from 22˚C to 47˚C. [4]

Question- 10

(a) What are the α, β and γ radiation composed of? [3]

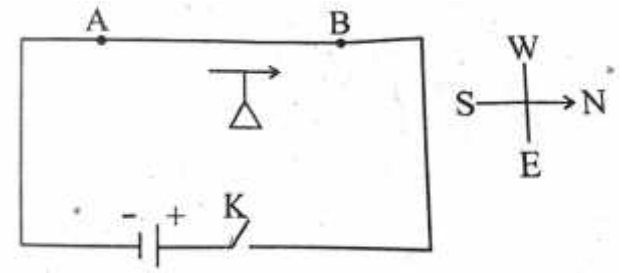
(b) What is the effect on the electron beam particles in cathode ray tube if:

i) A hotter filament is used?

ii) The anode voltage is increased?

Name the device in which the cathode ray tube is used. [3]

(c) The diagram below shows a magnetic needle kept just below the conductor AB which is kept in North South direction.



i) In which direction will the needle deflect when the key is closed?

ii) Why is the deflection produced?

iii) What will be the change in the deflection if the magnetic needle is taken just above the conductor AB?

iv) Name one device which works on this principle. [4]