SHUBHAM

X - H

RBK School, Mira Road
(Managed by Babubhai Kanakia Foundation)
School Code: MA069

FIRST PRELIM EXAM 19-20

Std: X **Marks: 80**

Date: 04/12/19 **Subject: PHYSICS** **Dur. : 2 Hr.**

Section I (40m)

(All questions in this section are compulsory)

I a. A polychromatic ray of light containing, Orange +Blue +Green light is incident on a glass block and on a prism. Show with diagrams the refracted and emergent rays obtained. 2

b. How far does sound travei in air when a tuning fork of frequency 288 Hz makes 36 vibrations, if the velocity of sound in air is 340 m/s. 2

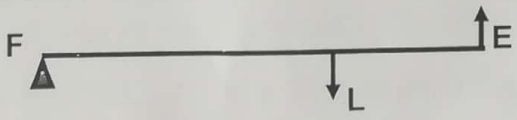
c. When acetone is spilt on the hand, it evaporates rapidly and the hand feels cold. Give suitable reasons. 2

d. Give two points of difference between a Step-up and a Step-down transformer. 2

e. Ores of Uranium, $_{92}U^{238}$ and $_{92}U^{235}$, found in nature are both fissionable. State giving reasons the isotope of Uranium which is most preferred and why? 2

II a. Define Work. Give an expression for the work done by force of gravity on a body of mass **m.** 2

b. The diagram below shows a lever, 2



i) To which class of lever does it belong ?

ii) Without changing the dimension of lever if load is shifted towards the fulcrum, will there be a change in the function of the lever.?

c. State whether True or False , i) The prism does not produce colours.

ii) Dispersion of white light occurs at both surfaces of the prism . 2

d. Draw and solve, to show the join of 3 resistors of 2 ohms each ,such that the total effective resistance obtained is 3 ohms. 2

e. State two advantages of an electromagnet over a permanent magnet . 2

III a. A football is kicked into the air vertically upwards. What is its,

i) velocity at the highest point. ii) acceleration. 2

b. Name a device used to obtain following conversions.

i) Solar energy to electrical energy ii) Heat to electrical energy. 2

c. State the position of the object when a lens is used to obtain a virtual image of the size of a point. Name the device in which the above lens is used. 2

d. What is the change in the alternating voltage generated ,at the grid sub station? Name the device used to bring about this change. 2

e. A nucleus of Americium (Am) ,having mass number 243 and atomic number 95 emits an alpha particle to form a nucleus of Neptunium (Np).

i) Write the balanced nuclear equation. ii) If the above product nuclei is oxidized, what changes do you expect to take place ? 2

IV a. Name the unit used to measure the energy of atomic particles. Give its relation with SI unit of energy. 2

b. Write the expression to relate the critical angle of a medium to its refractive index. If critical angle of medium is 45 °, find refractive index of same medium . 2

c. A student uses a length of wire as a resistor in an electric circuit but he discovers that the resistance of wire is too small. To be certain of increasing the value of resistor, what type of piece of wire should he consider to use. 2

d. Mention two factors by which the magnitude of the induced current in a generator be increased. 2

e. What are isobars? Give an example. 2

Section II

(Answer any FOUR questions from this section)

a. State and define the SI unit of power. How is it related to horse power? 3

b. A see-saw 8m long is balanced in the middle. Two children of mass 30kg and 40kg are sitting on the same side of the fulcrum at distance 1.5m and 3.5m respectively. Where must a lady of mass 50kg sit from the fulcrum so as to balance the see-saw? 3

c. A block and tackle pulley system has a velocity ratio 3.

i) Draw the pulley system indicating the directions of the forces applied.

ii) Determine the MA ,if a load of 2kgf was lifted with a force of 5kgf .

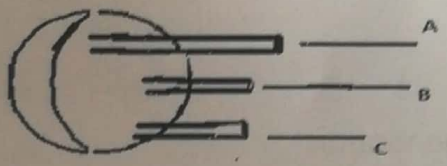
iii) What changes in the above pulley system can increase its efficiency. 4

VI a. i) Which of the wires of similar dimensions of copper and nichrome would you use for the electric heating element? Give suitable reasons.

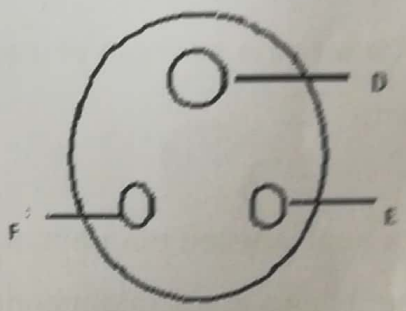
ii) Two fuse wires of same length are rated 5A and 20A. Which of the two is thicker and why? 3

b. Calculate the electrical energy consumed when a bulb of 40W is used for 12.5 hours for 30 days at Rs. 3.00 per unit. 3

c. The diagram below shows a plug and a socket . 4



Plug



i) Name the pins marked A,B,C and the sockets marked D,E,F.

ii) Why is the pin A longer.

VII a. Illustrate how a reflecting prism can be used to erect an inverted object. Name a device in which it is applied. 3

b. An object of height 5mm is placed at a distance of 8cm from a converging lens of focal length 10cm. Find the position and size of the image formed. 3

c. Name the following,

i) A device that produces microwaves.

ii) The part of the spectrum that do not affect ordinary photographic plate.

iii) the nature of electromagnetic waves.

iv) The wavelength range UV rays.

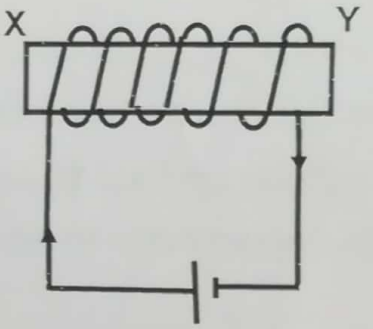
VIII a. State the characteristics of sound and the factors on which they depend. 3

b. i) With reference to the loss in energy ,how are natural vibrations different from damped vibrations.

ii) A pitcher is placed below a running tap of water. As the pitcher gets filled, what is the change observed in the sound .Why? 3

c. Define Echo. A man standing between two cliffs gives a sharp shout. He hears two echoes, the first after 1 s and the next after 1.5 s after his shout. If the speed of sound is 340m/s, calculate the distance between the two cliffs. 4

IX a. Observe the figure given alongside, 3



i) Name the figure .

ii) What will be the polarity at X.

iii) Suggest a way the strength of the device may be increased.

b. i) Draw a neat labelled diagram of the AC generator. 3

ii) If current flows in a straight conducting wire from south to north ,what will be the direction of the magnetic field lines around the wire.

c. i) What do you understand from Einstein's mass-energy equation? Give the expression.

ii) Mention one scientific use of radio –isotopes.

iii) Suggest one effective way for the safe disposal of nuclear waste. 4

X a. What are high tension wires. Give two characteristic of these wires. 3

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

ii) During this phase change does the average KE of the molecules of the substance increase?

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

c. 40g of water at 60°C is poured into a vessel containing 50g of water at 20°C. The final temperature recorded is 30°C.Calculate the thermal capacity of the vessel.

Take the specific heat capacity of water as 4.2 J/g°C . 4.