LILAVATIBAI PODAR HIGH SCHOOL (ISC)

Preliminary Examination - 2018-19

Subject: Physics **Points: 80**
Std.: X **Duration: 2 hours**

Instructions
Answers to this Paper must be written on the paper provided separately.
The time given at the head of this Paper is the time allowed for writing the answers.
Section I is compulsory. Attempt any four questions in Section II.
The intended marks for questions or parts of questions are given in brackets [].

Section I (40 marks)

Attempt All questions from this section

Question 1

(a) (i) State the S.I unit of work and define it.

(ii) How is electron volt related to the S.I unit of the quantity that it measures? [2]

(b) (i) Which class of lever has mechanical advantage always greater than one ?.

(ii) What change can be brought about in the lever to increase its mechanical advantage ? [2]

(c) (i) If the moment of force is assigned a negative sign , then will the turning effect of the force be clockwise or anti clockwise ?

(ii) Name the physical quantity measured by the formula P x t .
where ,P = power spent or consumed and t = time taken. [2]

(d) A colour of ray of light is changed from yellow to orange. What will be the effect on its : (i) lateral displacement and (ii) critical angle of the medium. [2]

(e) Classify the following into class I or class II or class III lever.

(i) lemon crusher (ii) chopping knife. [2]

This paper contains 6 printed sides

Question 2

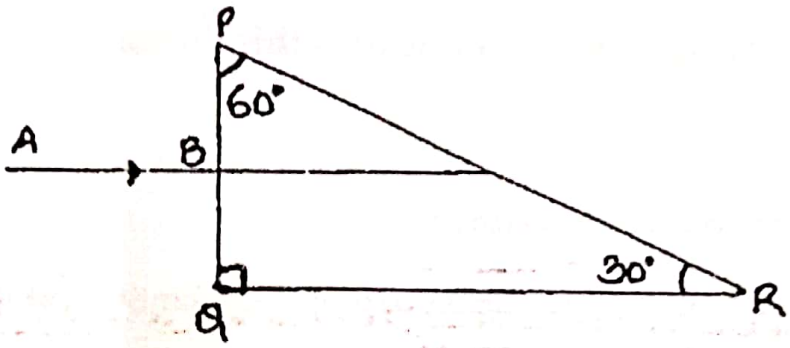
(a) (i) The ratio of velocities of light of wavelengths 4000 A° and 8000 A° in vacuum is 1 : 1. Give reason for the same.

(ii) Which of the above mentioned wavelength has greater frequency? [2]

(b) (i) If a particular convex lens is placed in water instead of air, then will its focal length be increased or decreased or will remain same ?

(ii) If part of lens is covered with paper, then state the effect on its focal length? [2]

(c)



The above diagram shows a 30° - 60° - 90° prism with of critical angle 42°. Complete the path of incident ray AB emerging out of the prism marking the angle of incidence on each surface. [2]

(d) The power of lens is - 4 D.

(i) Identify the lens

(ii) Calculate the focal length of the lens [2]

(e) (i) Define scattering .

(ii) The smoke from the fire looks white.

Which of the following statement is not true.

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

Question 3

(a) Two similar sound waves have their amplitudes in the ratio 3: 2. state the ratio of their (i) loudness and (ii) frequencies. [2]

(b)An cell of emf 1.5 V and internal resistance of 1 Ω are connected to a resistor of 5 Ω with ammeter in series. What is the reading of the ammeter? [2]

(c) In a step up transformer, windings of the primary coil are made thicker than the secondary coil. Why? [2]

(d) Draw a displacement – time graph for damped vibrations as executed by the swinging pendulum. [2]

(e) (i) What is nuclear fission?

(ii) Name the particle used in the process of the nuclear fission. [2]

Question 4

(a) (i) An equal amount of heat is supplied to two substances A and B of equal mass. Substance A shows a greater rise in its temperature. What can you say about the specific heat capacity of B as compared to A?

(ii) Name the law on which principle of mixtures is based. [2]

(b) Some hot water is added to three times the mass of cold water at 10°C and the resulting temperature was found to be 20°C. What was the temperature of hot water ? [2]

(c) Calculate the value of an unknown resistor that must be connected in parallel to a resistor of value 15Ω to obtain an effective resistance of 6Ω . [2]

(d) (i) What is radioactivity ?

(ii) A radioactive substance under goes oxidation reaction. What change do you expect to take place in its radioactivity? [2]

(e) State any two advantages of electro magnet over permanent magnet. [2]

Section II

(Attempt any four questions from this section)

Question 5

(a) (i) State the S.I unit of torque.

(ii) What would be the angle between the component of force and displacement to obtain: 1. maximum work and 2. zero work done. [3]

(b) A uniform half metre rule is balanced at 20 cm mark when a weight of 10 gf is suspended at its one end. Draw a diagram ½ meter

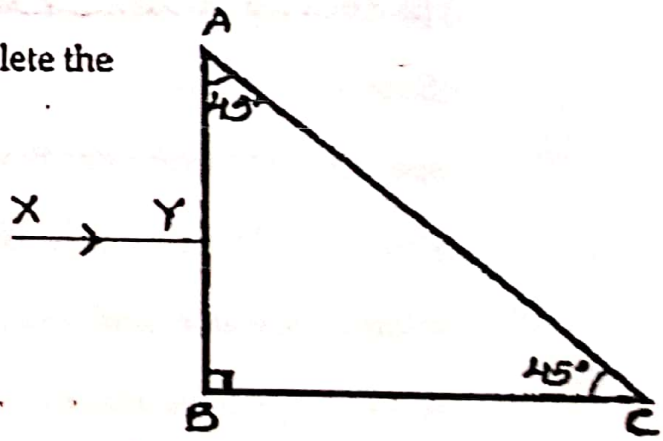
(i) Draw the diagram of the arrangement.

(ii) Find the weight of the metre rule. [3]

(c) Draw a diagram of a pulley system of velocity ratio of 3. Calculate the mechanical advantage of this system if the efficiency is 80% [4]

Question 6

(a) (i) Refer the diagram given alongside and complete the path of the ray XY till it emerges out of prism.



(ii) Which prism surface will act like a mirror? [3]

(b) An object is placed at a distance of 12 cm from a convex lens of focal length of 8 cm. Find (i) position of the image (ii) nature of the image. [3]

(c) An object AB is kept on principal axis in front of the diverging lens. Using three standard rays obtain the image of the object AB. [4]

Question 7

(a) (i) What is SONAR ?

(ii) Write two medical uses of ultrasonic waves. [3]

(b) A person claps 10 times in one second while standing in front of the cliff. If thedistance between the person and the cliff is 1680 cm then it is observed that the clap and the echo coincides. Find the velocity of the sound. [3]

(c) A person riding a motor bike observes that at a particular speed the piston makes a rattling sound.

(i) Why does this happen ?

(ii) Identify the phenomenon responsible and define it.

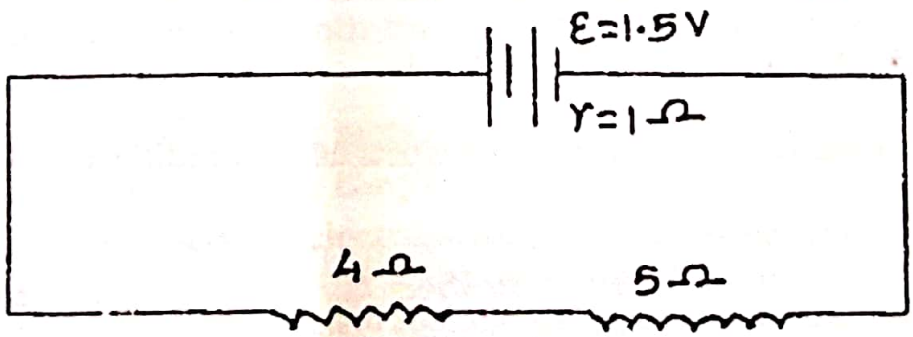
(iii) What can be done to stop the rattling sound ? [4]

Question 8

(a) (i) What is the purpose of fuse in an electric circuit?

(ii) Why is fuse connected to the live wire in the circuit ? [3]

(b)



Refer the above circuit diagram and calculate :

(i) current in the circuit(ii) potential difference across the cell

(iii) voltage drop when the current is flowing. [3]

(c) An electric oven is marked 1000 W – 200 V. Calculate :

(i) resistance of its element (ii) energy consumed by oven in half an hour in joules.

(iii) time in which it will consume 15 kWh of energy. [4]

Question 9

(a) (i) Rishi was surprised to see water is boiling at 115°C in a container. Give reason as to why this has happened ?

(ii) Name the property of water that makes it an effective coolant. Define it. [3]

(b) (i) State the difference between heat capacity and specific heat capacity of a substance. (Any two points)

(ii) Write the relation between heat capacity and specific heat capacity. [3]

(c) 40 g of ice at -10°C is heated by an heater of power 250 W, such that water so formed from it reaches its boiling point. For how long the heater was on ?

(Sp. heat capacity of ice = 2.1 J g^{-1} K^{-1}, Latent heat of ice = 336 J g^{-1}

Sp. heat capacity of water = 4.2 J g^{-1} K^{-1}) [4]

Question 10

(a) (i) Name the device that you would use to transform 200 V AC to 15 V AC.

(ii) Draw a diagram of the device identified in (i) by you. [3]

(b) (i) What are back ground radiations ?

(ii) Write one medical use and one industrial use of a radio isotope. [3]

(c) (i) What is nuclear fusion?

(ii) Write an equation showing the nuclear fusion.

(iii) Why does nuclear fusion takes place at higher temperature and under high pressure? [4]