SEVEN ELVEN SCHOLASTIC SCHOOL (ICSE)
PRELIMINARY EXAMINATION
2020-2021

Name: _____ ***Date: 15th January , 2020***
Grade: X Div : ____Roll no__ ***Marks: 80***
Subject: PHYSICS ***Duration: 2 hrs***

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 the Question Paper.
The time given at the head of this paper is the time allowed for writing the answers.
Section I compulsory. Attempt any **four** questions from **Section II**.
The intended marks for questions or parts of questions are given

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SECTION I (40 Marks)
Attempt all Questions from this section

Question 1

(a) Where is the centre of gravity of : [2]
(1) a uniform ring,
(2) An Equilateral Triangle

(b) State factor on which the position of centre of gravity of a body depend? Give an example [2]

(c) When a body moves in a circular path, how much work is done by the body? Give reason. [2]

(d) What is a single fixed pulley? State its one use. [2]

(e) A fixed pulley is driven by a 100 kg mass falling at a rate of 8.0 m in 4.0 s. It lifts a load of 500 kgf. Calculate the power input to the pulley taking the force of gravity on 1 kg as 10 N. [2]

Question 2

(a) State two differences between Centripetal and Centrifugal forces [2]

(b) What is KWh ? State its Value in S.I. Unit [2]

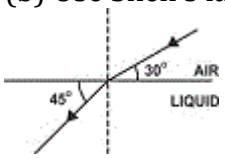
(c) How much heat energy is released when 5.0 g of water at 20°C changes into ice at 0°C? [2]
Take specific heat capacity of water = 4.2 J g^{-1} K^{-1},specific latent heat of fusion of ice = 336 J g^{-1}.

(d) Why do pieces of ice added to a drink cool it much faster than ice cold water added to it? [2]

(e) What are radio isotopes ? State one use of radio isotopes. [2]

Question 3

(a) The diagram below shows the refraction of a ray of light from air to a liquid. 2
(a) Write the values of (i) angle of incidence, (ii) angle of refraction.
(b) Use Snell's law to find the refractive index of liquid with respect to air.



(b) A lens forms an upright and magnified image of an object. [2]
(a) Name the lens.
(b) State whether the image is real or virtual.

(c) Name the radiations of wavelength just (i) longer than 8 x 10^{-7} m, (ii) shorter than 4 x 10^{-7} m. [2]

(d) Which colour of white light is scattered the least? Give reason. [2]

(e) (i) A ray of light passes from water to air. How does the speed of light change ? [2]
(ii) Ice is transparent but crushed ice appears white. Why ?

Question 4

(a) What adjustment will you make for tuning a stringed instrument such as violin to emit a desired pitch ? [2]

(b) Lesser the resistance of an electric bulb, more is the power consumed by it. Explain your answer mathematically or otherwise. [2]

(c) Explain the meaning of the statement 'the current rating of a fuse is 5 A'. [2]

(d) State one way of increasing the frequency of a note produced by an air column. [2]

(e) State the factors on which internal resistance of a cell depends. [2]

SECTION II (40 Marks)

Attempt all Questions from this section

Question 5

(I) State Work Energy Theorem . Derive the Formula also [3]

(II) A bullet of mass 5 g travels with a speed of 500 m s^{-1}. If it penetrates a fixed target which offers a constant resistive force of 1000 N to the motion of the bullet, find : [3]

(a) the initial kinetic energy of the bullet,

(b) the distance through which the bullet has penetrated before coming to rest,

the speed with which the bullet emerges out of the target if target is of thickness 0.5 m.

(III)Distinguish between Kinetic Energy and Potential Energy (4)

Question 6

(a) Draw the ray diagram in convex lens when object is placed between(I) F & C : (II) At C [4]

(b) An electric press is rated 750 W , 230 V , Calculate the electric Energy consumed [3]

(c) (a) What do you understand by the change of phase of a substance ? [3]

(b) Is there any change in temperature during the change of phase ?

(c) Does the substance absorb or liberate any heat energy during the change of phase ?

Question 7

(a) A ray of light in passing from one transparent medium to the other medium having different optical density, bends. [3]

(a) Name the phenomenon. Give reason for it.

(b)How do the following quantities change speed, wavelength, frequency and amplitude if second medium is denser than the first medium.

(c) State whether the ray of light will bend or not, if both medium have same optical densities.

(b) What is meant by the 'aperture' and 'shutter speed' of a camera? How are they related? [3]

(c) Name any four regions of electromagnetic spectrum (other than visible light) in increasing order of wavelength. [4]

Question 8

(a) (i) What is the principle on which sonar is based? [3]

(ii) Calculate the minimum distance at which a person should stand in front of a reflecting surface so that he can hear a distinct echo. (Consider speed of sound in air = 350 ms^{-1}.)

(b) The stem of a vibrating tuning fork is pressed against a table top. [3]

(a) Would it produce an audible sound?

(b) Does it cause the table to set in vibrations? If yes, what type of vibrations are they?

(c) Under what condition does it lead to resonance ?

(c) A vibrating tuning fork is placed over the mouth of a burette filled with water. The tap is opened and the water level gradually falls . lt is observed that the sound becomes the loudest for a particular length of air column. [4]

(i) What is the name of the phenomenon taking place when this happens ?

(ii) Why does the sound become the loudest ?

(iii) What is the name of the phenomenon taking place when sound is produced for another length of air column and is not the loudest ?

Question 9

(a) Draw a V-I graph for a conductor obeying Ohm's law. (b) What does the slope of V-I graph for a conductor represent? [3]

(b) Give two reasons why a fuse must not be replaced by an ordinary copper wire. [3]

(c) Write 3 properties for Alpha; Beta ; gama rays [4]

Question 10

(a) What purpose is served by the terminals of a three way pin plug? Draw a diagram and name the pins. [3]

(b) (i) State Ohm's law. [3]

(ii) State the factors that alter the resistance of a conductor.

(c) (i) State three factors which govern the speed of rotation of an electric motor. [4]

(ii) State the law which determines the direction of magnetic field round a current carrying conductor.