

**GOKULDHAM HIGH SCHOOL & JUNIOR COLLEGE**  
**SECOND PRELIMINARY EXAMINATION (2018-2019).**  
**SUBJECT : SCIENCE PAPER 1**  
**(PHYSICS)**

STD : X

MARKS: 80

DATE: 11.01.2019

TIME: 2 hours

*Answers 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 the paper is the time allowed for writing the answers.*

*Section I is compulsory. Attempt any four questions from Section II.*

*The intended marks for questions or parts of question are given in the brackets [ ]*

**Section I ( 40 Marks )**

*Attempt all questions from this section*

**Question 1**

- (a) Name the physical quantities which are measured in the following units: [ 2 ]
- i. kVA
  - ii. N.s
- 
- (b) i. A man weighing 80 kg tries to push a rigid wall. Find the work done. [ 2 ]
- ii. Name the type of energy possessed by a compressed spring.
- (c) A motor of power 1MW is used to lift a load of 20000N. [ 2 ]  
With what speed is the load raised?

This printed paper consists of 8 pages.

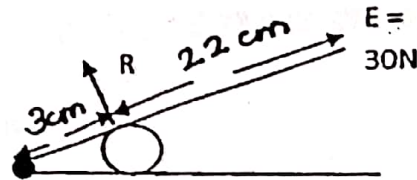
*Turn Over*

STD X

- (d) i. State the position of centre of gravity of a circular disc. [2]  
 ii. A stone is tied to an inextensible thread and rotated in a horizontal circle. What force provides the centripetal force for circular motion?
- (e) i. Write the relationship between the efficiency ( $\eta$ ), mechanical advantage (M.A) and the velocity ratio (V.R) for a machine. [2]  
 ii. Which class of levers always has mechanical advantage (M.A) > 1?

**Question 2**

- (a) Observe the adjoining diagram of a nutcracker and calculate the resistance (R) offered by the nut when an effort of 30 N is applied at one end. [2]



- (b) i. Explain the statement: Refractive Index of kerosene is 1.41 [2]  
 ii. Refractive index of glass w.r.t air is given by the expression:  ${}_a\mu_g = \frac{\sin i}{\sin r}$ .  
 If  $\angle r = 90^\circ$ , what is the corresponding  $\angle i$  called?

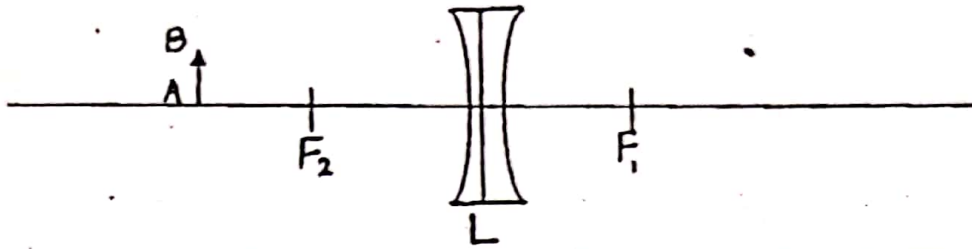
- (c) With the help of a neat and labelled diagram show that the apparent depth of a water filled tank is less than its real depth. [2]

- (d) A thin lens has a focal length (-10 cm). Identify the type of lens and find its power. [2]

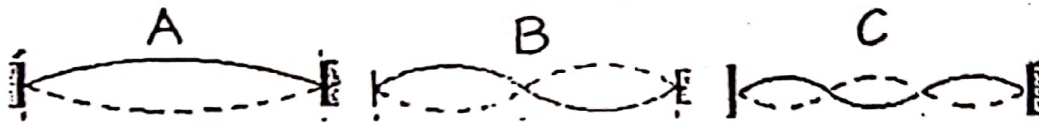
- (e) i. State one harmful effect of ultraviolet radiations. [2]  
 ii. Name the material of prism required for obtaining spectrum of ultraviolet radiations.

## Question 3

- (a) Copy and complete the diagram below showing image of the [ 2 ]  
object AB as formed in lens L.



- (b) The diagram below shows three different modes of vibration [ 2 ]  
A, B and C of the same string of given length.



Which vibration produces : i. the faintest sound?  
ii. sound of least shrillness(pitch)?

- (c) i. How does the heat produced in a current carrying wire. [ 2 ]  
vary with the current?  
ii. A substance has nearly zero resistance at a temperature of  
1K. What is such a substance called?

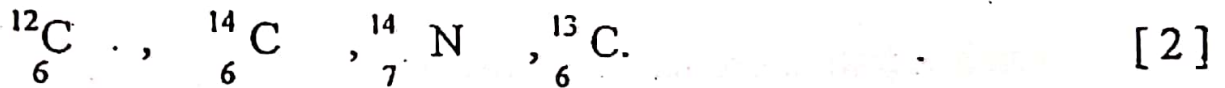
- (d) Calculate the energy released by a room heater which draws [ 2 ]  
a current of 5A at 220V for 2 minutes.

- ~~(e) i. State any one characteristic of a fuse wire. [ 2 ]  
ii. Name the material used to make a fuse wire.~~

## Question 4

- (a) i. State the effect on the magnetic field of a solenoid if its [ 2 ]  
core is made of soft iron.  
ii. State the energy change taking place in a simple D.C.  
Motor.

- (b) Draw a neat labelled diagram of a device used to transform A.C. 220V to 22kV. [ 2 ]
- (c) A heater of 500 W is used to heat 10 kg of a liquid from 20 °C to 50 °C. Calculate the time taken if the specific heat capacity of liquid is 960 J/ kg °C. [ 2 ]
- (d) A heavy bottomed pan is preferred over a light one for cooking. Explain why. [ 2 ]
- (e) Form a pair of isotopes and a pair of isobars from the following:

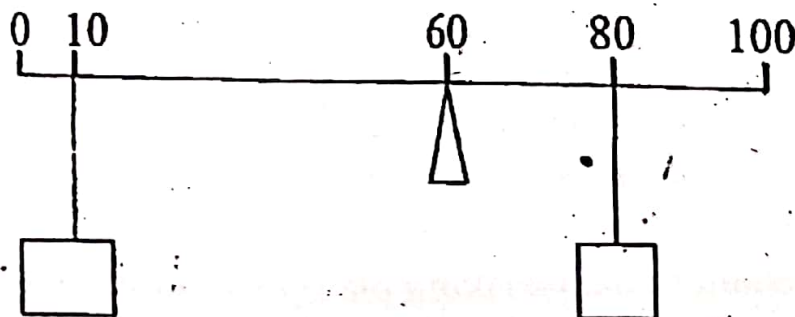


### Section II ( 40 Marks )

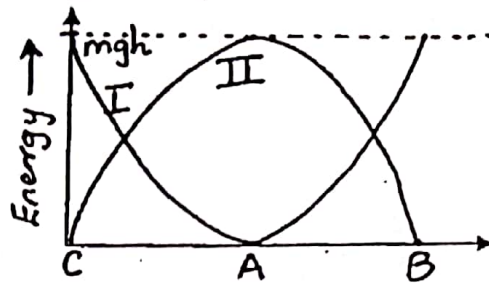
*Attempt any four questions from this section*

#### Question 5

- (a) A uniform metre scale of weight 55gf is pivoted at the 60cm mark. A weight of 5 gf is suspended at the 10cm mark. Find the weight to be suspended at the 80cm mark to balance the scale. [ 3 ]



- (b) The diagram below shows the graphs of the variation of potential and kinetic energy of a simple pendulum oscillating from position C to B, mean position being at A. [ 3 ]



- i. Which graph I or II represents the variation of

1) Potential Energy?

2) Kinetic Energy?

- ii. What is the total energy possessed by the pendulum at any point during its motion?

- (c) i. Draw a neat diagram to show a block and tackle arrangement of 5 pulleys. Show clearly the Load L, Effort E and tension T along with their directions. [ 4 ]

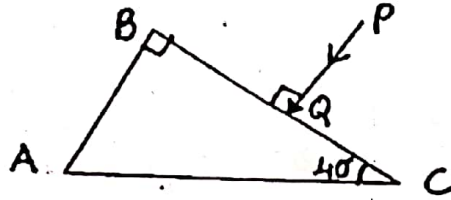
- ii) When an effort is applied to above system, the load is raised through 60cm. By how much distance has the effort moved?

### Question 6

- (a) i. A beam of light is incident on two identical prisms made of flint glass and crown glass. If  $\mu_{\text{flint}} > \mu_{\text{crown}}$  and  $\angle i$  is same for both cases, which prism will deviate the light more? [ 3 ]

- ii. An object is placed in front of a convex lens at a distance greater than twice the focal length of the lens. Draw a ray diagram to show the formation of the image.

- (b) i.  $\Delta ABC$  is the principal section of a right angled prism. [ 3 ]  
Copy and complete the diagram to show the path of ray PQ through the prism till it emerges out of the prism.  
ii. Name the optical phenomenon taking place at the surface AC.



- (c) An object is placed at a distance 10 cm in front of a convex lens of focal length 15 cm. Find [ 4 ]  
i. Position of the image  
ii. Magnification of image and  
iii. Nature of image.

### Question 7

- (a) i. Smoke coming out of a chimney appears blue on a misty day. Explain why. [ 3 ]  
ii. Name the electromagnetic radiations used for night photography.

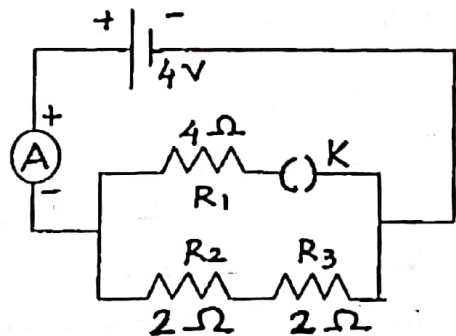
- (b) A bouncing ball bounces 4 times in 1 second. A boy starts bouncing the ball and fires a gun at the same time in the direction of a cliff. He hears an echo after 10 bounces of the ball. Find the distance of the boy from the cliff. [ 3 ]

(velocity of sound in air = 340 m/s)

- (c) i. Aircraft designers ensure that frequency of vibrations of all mechanical structures of the aircraft do not match with the frequency of the flight's engine. Give reasons. [ 4 ]  
ii. What is the effect on the loudness of a sound wave if its amplitude is doubled?  
iii. The skin of a tabla is tightened so as to produce a sound of \_\_\_\_\_ (low/high) pitch. Complete the sentence.

### Question 8

- (a) i. How does power rating of an electrical device help us to describe the type of connecting wires to be used with it? [ 3 ]  
ii. What is the colour coding of live wires?(new convention)  
iii. State Ohm's Law
- (b) i. How is earthing of an appliance done? [ 3 ]  
ii. How does it protect the user from an electric shock?  
iii. Under which condition is the e.m.f (E) and terminal voltage (V) of a cell equal ?
- (c) Observe the circuit diagram below and calculate [ 4 ]  
i. Current in the Ammeter when key is open  
ii. Current in the Ammeter when key is closed  
iii. Current in  $R_1$   
iv. Power consumed by  $R_1$



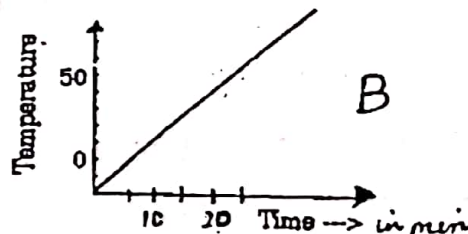
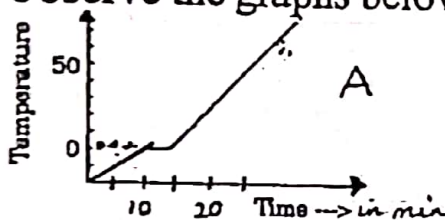
### Question 9

- (a) i. An armature coil is made to rotate in a magnetic field. [ 3 ]  
What is the magnitude of the induced e.m.f (maximum or minimum) when  
1) plane of coil is in direction of magnetic field.  
2) plane of coil is normal to the magnetic field.  
ii. A transformer cannot be used with a d.c. source. Justify the statement.
- (b) i. Give one point of difference between heat capacity and specific heat capacity. [ 3 ]  
ii. A wet cloth band applied on the forehead during high fever brings down the fever fast. Explain how.

- (c) A copper vessel of negligible thermal capacity contains 60g water at  $40^{\circ}\text{C}$ . In this water is placed 10g of ice at  $-10^{\circ}\text{C}$ . If all the ice melts, find the final temperature of water. [ 4 ]  
 Specific heat capacity of ice =  $2100\text{ J/kg }^{\circ}\text{C}$ .  
 Specific heat capacity of water =  $4200\text{ J/kg }^{\circ}\text{C}$ .  
 Specific latent heat of fusion of ice =  $336000\text{ J/kg}$ .

Question 10

- (a) i. Define Specific latent heat of fusion of a substance. [ 3 ]  
 ii. Some ice in a vessel is heated and its variation of temperature with time is recorded at regular intervals. Observe the graphs below and find :



- 1) Which graph A or B correctly shows the changes in temperature of ice when heated?  
 2) Explain your answer in part 1 above
- (b) i. Name the nuclear radiation having highest ionizing power. [ 3 ]  
 ii. Write the equation when an atom of  ${}_{92}^{238}\text{U}$  decays with emission of radiation mentioned by you in question i. above.  
 iii. If these radiations are passed through an electric field, towards which plate (positive or negative) will they deflect?
- (c) i. Name the nuclear process possible at ordinary temperature. [ 4 ]  
 ii. Define the process.  
 iii. How is it controlled?  
 iv. State one peaceful use of above mentioned process.

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