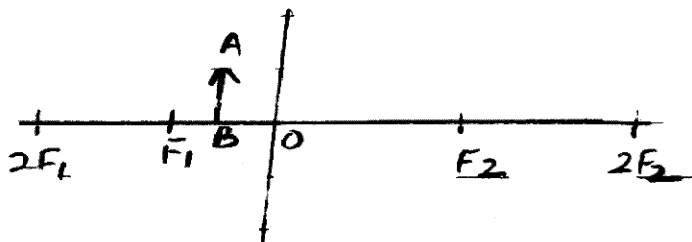


- b. An object AB is placed between O and F_1 on the principal axis of a converging lens as shown in the diagram.



Copy the diagram and by using two standard rays starting from point A obtain an image of the object AB. Is the image real or virtual? (4)

- c. A nut which can be broken by applying a force of 40 Kgf is broken by using a nut-cracker having its handle 20 cm long, by placing it at a distance 2 cm from the hinge. Calculate the minimum force required to break the nut. (3)
10. a. A body of mass 50kg has a momentum of 3000 kgm/s. Calculate
- the kinetic energy of the body
 - velocity of the body. (3)
- b. An electric iron is rated 220V, 2KW. If the iron is used for 2 hours daily
- Find the cost of running it for 1 week if it costs Rs. 4.25 per kWh (4)
 - State the energy change when an electric iron is used.
- c. A water pond appears to be 54m deep. If the refractive index of water is $4/3$ find the actual depth of the pond. (3)

Quarterly Examination - 2018-19 PHYSICS

Class : X

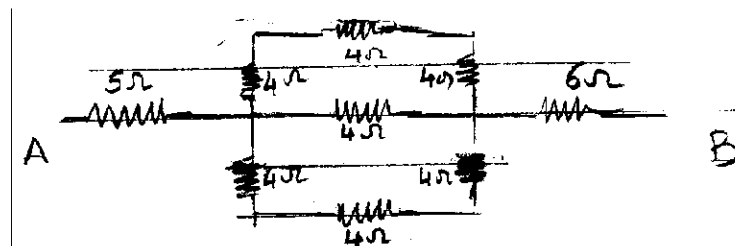
Time : 2 Hrs. 15 mints

Full Marks : 80

SECTION A (40 Marks)

Attempt all questions

- The weights of two bodies are 2N and 2 Kgf. What is the mass of each body? ($g=10\text{m/s}^2$) (2x5=10)
 - A uniform meter rule can be balanced at the 70 cm mark when a mass of 0.05 kg is hung from the 94 cm mark. Draw a diagram for the arrangement and find the mass of the meter rule.
 - State the energy changes when (i) fuel is burnt (ii) string of a bow is pulled and an arrow is shot.
 - Give two reasons why the efficiency of a single movable pulley system is not 100%
 - A body of mass 0.2 kg falls from a height of 10 m to a height of 6 m above the ground. Find the loss in potential energy taking place in the body. ($g=10\text{m/s}^2$)
- State two conditions required for total internal reflection of light to take place (2x5=10)
 - Calculate the equivalent resistance between A and B for the following combination of resistors.



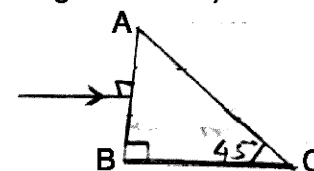
- iii. Calculate the force to be applied at C to just raise the load $W = 20 \text{ kgf}$ neglecting the weight of the pulley P_1 and friction. (4)
- c. i. A stone of mass 64 g is thrown vertically upward from the ground with an initial velocity of 20 m/s . The gravitational potential energy at the ground level is considered to be zero. Apply the principle of conservation of energy and calculate the potential energy at the maximum height attained by the stone ($g = 10 \text{ m/s}^2$)
- ii. Using the same principle, state what will be the total energy of the body at its half-way point? (3)
6. a. A linear object is placed on the axis of a lens. An image is formed by refraction in the lens. For all positions of the object on the axis of the lens the positions of the image are always between the lens and object
- i. Name the lens
- ii. Draw a ray diagram to show the formation of the image of an object placed in front of the lens at any position of your choice except infinity. (3)
- b. A current through a 12 V tungsten filament lamp connected to a 12 V accumulator of negligible resistance is 3 A . Calculate (i) the resistance of the filament (ii) the power of the lamp and (iii) the electrical energy in kWh consumed in 5 hours. (4)
- c. Both a pair of scissors and a pair of pliers belong to the same class of levers. Name the class of lever. Which one has the mechanical advantage less than one and why? (3)

- c. Name the waves
- (i) having most energy ii. use to take photographs in dark (iii) lowest wavelength iv. used for satellite communication
- d. The speed of light in air is $3 \times 10^8 \text{ m/s}$. Calculate the speed of light in glass. The refractive index of glass is 1.5 .
- e. A block and tackle system of pulleys has a velocity ratio 4 . Draw a diagram of the system indicating clearly The points of application and directions of load and effort.

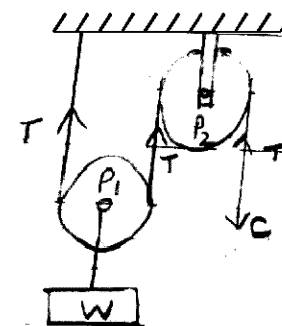
SECTION B (40 Marks)

Attempt any four questions

- Q5. a. The diagram below shows a right angled prism with a ray of light incident on the side AB (The critical angle for glass is 42°)



- i. Copy the diagram and complete the path of the ray of light in and out of the glass prism. (3)
- ii. What is the value of the angle of deviation shown by the ray
- b. The figure shows the combination of a movable pulley P_1 with a fixed pulley P_2 used for lifting up a load W
- i. State the function of the fixed pulley P_2 ii. If the free end of the string moves through a distance x , find the distance by which the load W is raised.



- c. i. With reference to their direction of action, how does a centripetal force differ from a centrifugal force?
- ii. Name the form of energy which a body may possess even when it is not in motion
- d. Why is red colour used as a sign of danger?
- e. An object is placed in front of a convex lens such that the image formed has the same size as that of the object. Draw a ray diagram to illustrate this.

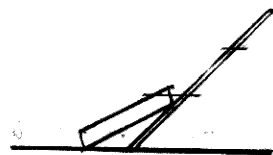
3. a. An electric heater is rated 1000W - 200V. (2x5=10)
Calculate

- i. the resistance of the heating element
- ii. the current flowing through it

- b. Which physical quantity does the electron volt measure? How is it related to the SI unit of this quantity?

- c. The diagram shows a rod lifting a stone. Mark the position of load (L), effort (E) and fulcrum (F) and draw arrows to show the direction of load and effort.

- ii. Name the class of lever



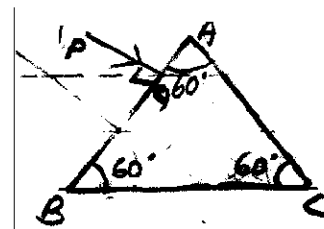
- d. Name the radiation that are absorbed by
- i. greenhouse gases ii. ozone layer

- e. State Ohm's law

4. a. An object is placed at a distance of 20 cm (2x5=10) in front of a concave lens of focal length 20 cm. Draw a ray diagram to show the formation of image.

- b. Define the term 'critical angle'.

7. a. The figure shows a ray of light PQ incident normally on the face AB of an equilateral glass prism. Complete the ray diagram showing its emergence into air after passing through the prism. Take critical angle for glass is 42 (3)



- b. Two resistors of 4Ω and 6Ω are connected in parallel to a cell to draw 0.5A current from the cell.

- i. Draw a Labelled circuit diagram showing the above arrangement

- ii. Calculate the current in each resistor. (4)

- c. A given wire of resistance 6Ω is stretched to double its length. What will be the new resistance? (3)

8. a. State the energy change in the following cases while in use. (3)

- i. washing machine ii. solar cell iii. steam engine.

- b. An object is placed at a distance of 10 cm in front of a concave lens of focal length 10 cm. Find :

- i. the position of the image and
- ii. the size of the image in relation to the object. (4)

- c. The power of a lens is -2.0D. Find its focal length and its kind. (3)

9. a. Define the term specific resistance and state its S.I. unit. (3)