

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 spend in **reading** the **question paper**.
The **time** given at the **head** of this **Paper** is the **time allowed** for writing the answer.

Section I is compulsory. Attempt **any four** questions from **Section II**.
The **intended marks** for **questions** or parts of questions are given in brackets ().
This question paper consists of **6** pages

SECTION I (40 Marks)

Attempt **all** questions from this section. All Questions carry **10** marks each.

Question-1

- a. Two balls of mass ratio 1:2 are dropped from the same height.
i. State the ratio between their velocities when they strike the ground and (2)
ii. the ratio of the forces acting on them during motion. (2)
- b. i. Is it possible to detect the filling of a bottle under a tap by hearing its sound at a distance? (2)
ii. Justify your answer. (2)
- c. A small piece of stone tied at an end of a string is whirled in a horizontal circle.
i. State the force which provides the centripetal force. (2)
ii. State the direction of the centripetal force. (2)
- d. i. What is the source of energy in sun. (2)
ii. Define it. (2)
- e. A uniform metre rule rests horizontally on a knife edge at the 40cm mark when a mass of 20g is suspended from one end.
i. At which end must this mass be suspended. (2)
ii. What is the mass of the rule? (2)

Question-2

- a. A ball is placed on a compressed spring.
i. What form of energy does the spring possess? (2)
ii. Why does the ball fly away on releasing the spring? (2)
- b. i. 'Bottle opener' belongs to which class of lever? (2)
ii. Give example for the above mentioned class of lever found in human body. (2)
- c. Draw a diagram to show how does the light bend when it travels from liquid to glass and then to liquid if the light slows down in glass. (2)
- d. A crowbar 2m long is pivoted about a point 10cm from its tip.

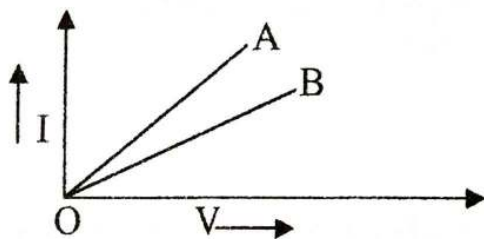
- i. Calculate the mechanical advantage of the crowbar.
 - ii. What is the least force which must be applied at the other end to displace a load of 100kgf? (2)
- e. i. Define the term refractive index of a medium. (2)
- ii. Can it be less than 1?

Question-3

- a. A convex lens forms an image 10cm long of an object 2cm long kept at a distance of 5cm from the lens. The object and the image are on the same side of the lens. Find the
- i. position of the image and
 - ii. the focal length of lens. (2)
- b. i. Name the electromagnetic radiation used in photographic dark rooms to provide visibility. (2)
- ii. Name the type of prism used for obtaining its spectrum. (2)
- c. i. Name the kind of lens used in Galilean telescope. (2)
- ii. State the nature of the image formed by the above mentioned lens. (2)
- d. i. How does the intensity of scattered light depend on the wave length of the incident light? (2)
- ii. State the condition under which this dependence holds. (2)
- e. A person standing between two vertical cliffs and 490m away from the nearest cliff produces sound. He hears the first echo after 3s and the second echo 5s later. Calculate
- i. the speed of sound in air. (2)
 - ii. the distance between the cliffs. (2)

Question-4

- a. The figure below shows an I-V graph for two conductors A and B.



- i. Which conductor has more resistance? (2)
 - ii. Give reason for your answer. (2)
- b. i. Same amount of heat is supplied to two liquids A and B. The liquid B shows a greater rise in temperature. What can you say about the heat capacity of A as compared to that of B? (2)
- ii. Which liquid A or B can be used as an effective coolant? (2)
- c. i. Which has more heat; 1g of ice at 0°C or 1g of water at 0°C ? (2)
- ii. Give reason. (2)
- d. i. Give reason for the release of energy in a nuclear fusion. (2)
- ii. If in nuclear fission of a piece of uranium, 0.5g mass is lost, how much energy in kWh is obtained? (2)
- e. The soft drink bottle is cooled by a) ice cube at 0°C and b) iced-water at 0°C .
- i. Which will cool the drink quickly? (2)
 - ii. Give reason. (2)

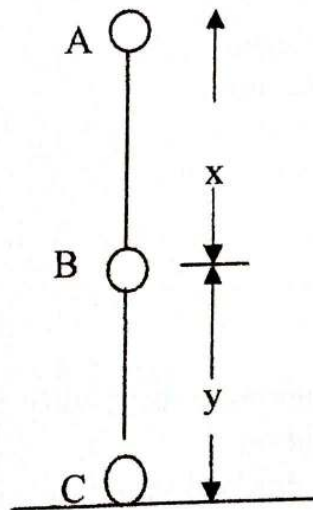
SECTION II (40 Marks)

(Attempt any four questions)

Question-5

- a. A block and tackle system having two pulleys in each block is used to lift a load of 150kgf through a vertical height of 20m. The effort required is 50kgf.
- i. Draw a neat diagram to show the arrangement.
 - Calculate
 - ii. the distance moved by the effort and
 - iii. the mechanical advantage. (4)
- b.
 - i. Name the kind of equilibrium, when an electron moves around the nucleus of an atom.
 - ii. State one condition which is required for the equilibrium mentioned above in part (i).
 - iii. Give another example for the same kind of equilibrium. (3)
- c. An object of mass 'm' is allowed to fall freely from point A as shown in the figure. Calculate the total mechanical energy of an object at

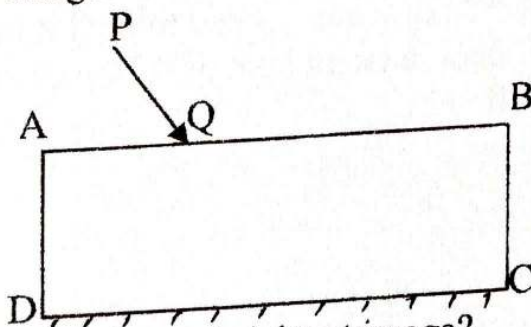
- i. point A
- ii. point B
- iii. point C



(3)

Question-6

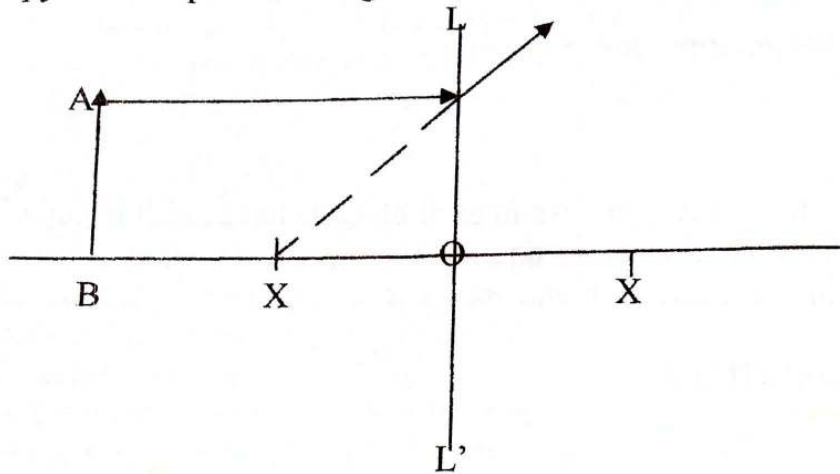
- a.
 - i. The diagram below shows a ray of white light PQ coming from an object P and incident on the surface of a thick glass plane mirror. Copy the diagram and complete it to show the formation of the three images of the object P as formed by the mirror.



- ii. Which image will be the brightest image?

(4)

b. i. Copy and complete the diagram to show the formation of the image of the object AB.



ii. What is the name given to X? (3)

c. How does the value of angle of deviation produced by a prism change with an increase in the

- i. value of angle of incidence
- ii. wavelength of incident light. (3)

Question-7

a. i. Name the factor that determine the quality of a note.

ii. What is damped vibration?

iii. Give an example of damped vibration.

iv. A certain sound has a frequency of 256 Hz and a wavelength of 1.3m. Calculate the speed with which this sound travels. (4)

b. i. A person is tuning his radio set to a particular station. What is the person trying to do to tune it?

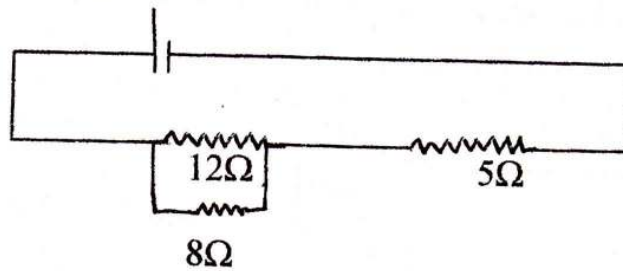
ii. Name the phenomenon involved in tuning the radio set.

iii. Define the phenomenon named by you in part (ii). (3)

c. A vessel contains 150g of water at 30°C . 50g of ice is needed to cool it to 5°C . Calculate the thermal capacity of the vessel. Take specific latent heat of fusion of ice = 340 J/g and specific heat capacity of water = $4.2\text{ Jg}^{-1}\text{K}^{-1}$. (3)

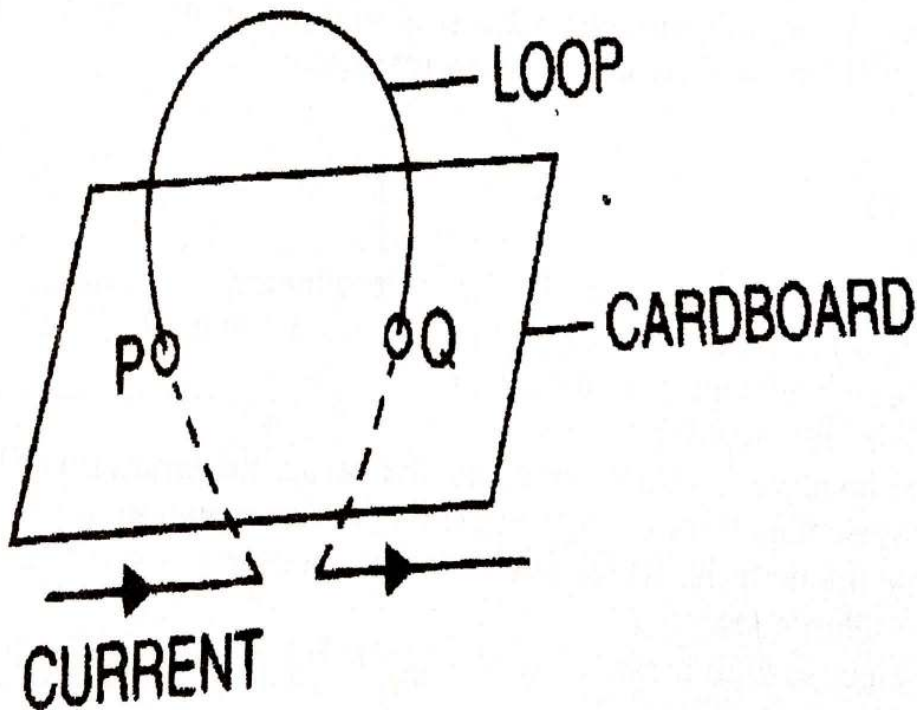
Question-8

- a. A cell of emf 4.5V and internal resistance 0.2Ω is connected as shown.



Calculate the

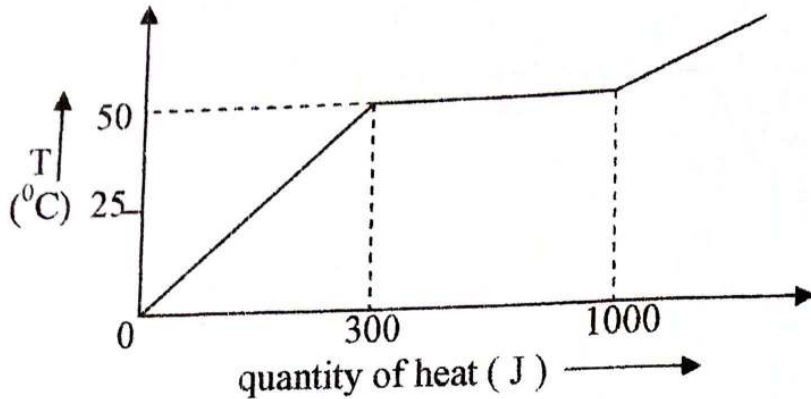
- i. current in the circuit.
 - ii. potential difference across the 5Ω resistor.
 - iii. voltage drop when the current is flowing.
 - iv. current in the 8Ω resistor. (4)
- b. i. State two factors on which the strength of an induced current depends.
- ii. When a solenoid that is carrying current is freely suspended, it comes to rest along a particular direction. Why does this happen? (3)
- c. The diagram below shows a current carrying loop passing through a sheet of cardboard at the points P and Q. The sheet of cardboard is sprinkled uniformly with iron fillings



- i. Copy the diagram and draw the pattern of iron fillings when current is passed through the loop.
- ii. In the diagram show the direction of magnetic field lines. (3)

Question-9

- a. A substance is in the form of a solid at 0°C . The amount of heat added to the substance and the temperature of the substance are plotted on the following graph.



If the specific heat capacity of the solid substance is $300\text{Jkg}^{-1}\text{ }^{\circ}\text{C}^{-1}$, find

- i. the mass of the substance.
 - ii. the specific latent heat of fusion of the substance in the liquid state.
- b. i. Why do the farmers fill their fields with water on a cold winter night? (4)
- ii. Name the material used for making calorimeter. (3)
- iii. Give a reason for using the material stated by you. (3)
- c. i. An electric gadget can give an electric shock to its user under certain circumstances. Mention any two of these circumstances (3)
- ii. A metal wire of resistance 6Ω is stretched so that its length is increased to twice its original length. Calculate the new resistance. (3)

Question 10

- a. i. Draw a labelled diagram of a d.c electric motor. (4)
 - ii. What is the function of the split rings in a d.c motor?
 - iii. State one advantage of a.c over d.c. (3)
- b. i. Define radioactivity. (3)
- ii. What happens inside the nucleus that causes the emission of beta particles?
- iii. Express the above change in the form of an equation. (3)
- c. i. Name the material which is used as a fuse wire. (3)
- ii. State Ohm's law.
- iii. An electric bulb is rated '50W - 220V'. What information does this convey. (3)