

Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during 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 A is compulsory. Attempt **any four** questions from **SECTION B**.
The intended marks for questions or parts of questions are given in brackets [].

SECTION A

(Attempt *all* questions from this Section)

Question 1

Choose the correct answers to the questions from the given options.

[15]

(Do not copy the question, write the correct answers only.)

- (i) The resistance offered by the toaster coil if a potential difference of 12 V and current 2 A flows in the circuit is:
(a) $8\ \Omega$ (b) $9\ \Omega$ (c) $24\ \Omega$ (d) $6\ \Omega$
- (ii) Assertion (A): By avoiding incandescent lights, there is a substantial gain in efficiency.
Reason (R): LED light bulbs use more energy than traditional incandescent bulbs.
(a) Both (A) and (R) are true and (R) is the correct explanation of (A)
(b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
(c) (A) is true but (R) is false
(d) (A) is false and (R) is true
- (iii) The attractive property of a magnet is maximum at:
(a) North pole only (b) South pole only
(c) North and South poles (d) Mid-point of the magnet
- (iv) In transverse waves, how does the particle of medium vibrate compared to the direction of propagation of wave?
(a) parallel (b) at 45° (c) perpendicular (d) at 60°
- (v) Per second is the unit of:
(a) frequency (b) amplitude (c) time period (d) wavelength
- (vi) The virtual image is always:
(a) feeble (b) clear (c) inverted (d) erect
- (vii) When an incident ray passes through the focus and strikes a spherical mirror, the reflected ray will be:

(i) Complete the following by choosing the correct answers from the bracket: [6]

(a) An instrument used to measure the magnitude of current flowing in a circuit is _____. [voltmeter / galvanometer / ammeter]

(b) Elephants produce _____ [infrasonic / ultrasonic / supersonic] sound.

(c) The _____ [potential / kinetic / chemical] energy of wind is called wind energy.

(d) A focal plane passes through the focus and is _____ [inclined / parallel / normal] to the principal axis.

(e) A magnetic pole induces _____ [opposite / similar] polarity on the near end and _____ [similar / opposite] polarity on the farther end of the iron bar.

(ii) Define the term focus of a convex mirror. [2]

(iii) (a) What is responsible for the flow of current through a metallic conductor? [2]

(b) A conductor carries a current of 0.2 A. Find the amount of charge that will pass through the cross section of conductor in 30 s.

Question 3

(i) (a) Which mirror would give an enlarged size of your face when you view it from a close distance? [3]

(b) What is the nature and size of the image formed by a concave mirror when object is placed on its centre of curvature?

(c) Can a real image obtained on a screen?

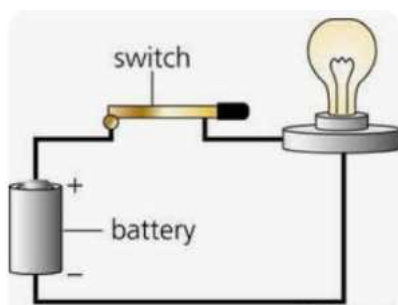
(ii) A submarine emits a sonar pulse, which returns from an underwater cliff in 1.02 s. If the speed of sound in salt water is 1531 m s^{-1} , how far away is the cliff? [2]

(iii) Arun designed a device using a soft iron bar, copper wires, key, battery, ammeter and rheostat. [2]

(a) Name the device designed by Arun?

(b) Suggest one way to increase the strength of the device named in part (a).

(iv) The given below diagram shows a simple electric circuit. [2]

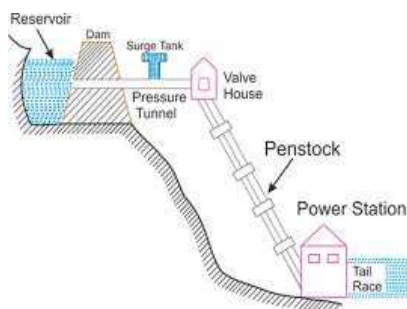


(a) Redraw the diagram by using proper symbols of electrical components.

(b) Name the type of electric circuit shown in the above diagram.

(v) Observe the diagram given below:

[2]



(a) Name this diagrammatic set up.

(b) State one limitation of energy stated by you in part(a).

(vi) What social initiatives must be taken for the sensitive use of energy?

[2]

(vii) Name two substances which contract on heating.

[2]

SECTION B

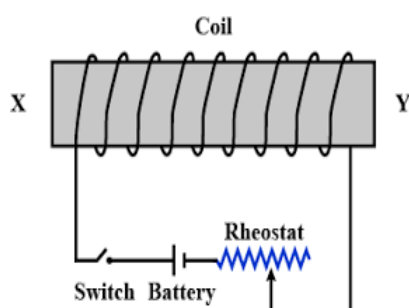
(Attempt *any four* questions from this Section)

Question 4

(i) (a) Name and state the law which relates the potential difference and current in a conductor. [3]

(b) What is the necessary condition for a conductor to obey the law named by you in part (a)?

(ii) (a) The diagram below shows a coil wound around a soft iron XY. State the polarity at the ends X and Y as the switch is pressed. [3]



(b) Can we use an a.c. source in the above diagram?

(c) Give one advantage of using an electromagnet over a permanent magnet.

(iii) Draw symbols and state the functions of each of the following components in an electric circuit. [4]

(a) Plug key (open) (b) Galvanometer

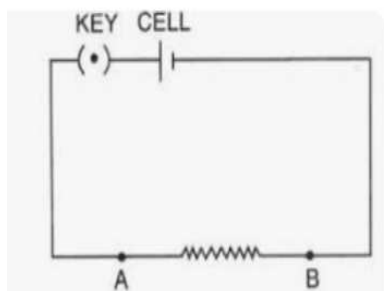
Question 5

(i) (a) If you place your ear close to an iron railing which is struck some distance away, you hear the sound twice. Give reason. [3]

(b) Name and define the quantity which gives the product of frequency and wavelength.

(ii) You are given a resistance wire(Load) AB connected with a cell and key as shown in [3]

the diagram given below.



(a) You are required to measure the current in the wire AB and potential difference across it. Name the instruments that you would use and draw a labelled diagram to show how they are connected.

(b) Also mark the direction of current in each component.

(iii) (a) How is the resistance of a wire affected if its (1) length is doubled and (2) radius is doubled? [4]

(b) Name the physical quantities whose units are (1) coulomb and (2) ampere.

Question 6

(i) (a) Deep pond of water has its top layer frozen during winter. State the expected temperature of water layer just in contact with ice. [3]

(b) Draw the graphical representation to show the variation in density of water with temperature in range 0°C to 10°C .

(ii) (a) What do you mean by green house effect? [3]

(b) Name any two green house gases.

(iii) (a) Find the current drawn from the cell of potential difference 12 V when it is connected to a bulb which has a resistance when it glows with $24\ \Omega$. [4]

(b) Write the S.I. unit and its symbol for the following quantities.

(1) Wavelength (2) Time period

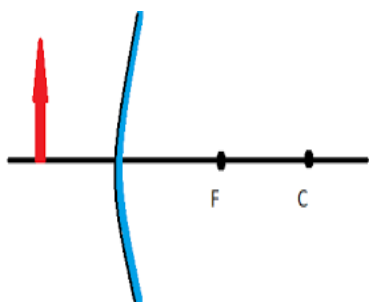
Question 7

(i) Two plane mirrors are kept mutually perpendicular to each other. An object O is placed between the two mirrors. [3]

(a) How many images will be formed?

(b) Represent it with a ray diagram.

(ii) An object is placed in front of a convex mirror as shown in the diagram given below. [3]



(a) Draw the ray diagram to show the formation of image.

(b) State the three characteristics of the image.

(iii) Draw a diagram to show the lateral inversion of an alphabet. [4]

Question 8

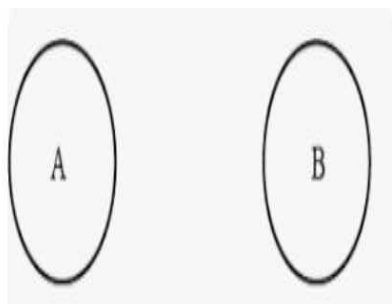
(i) (a) The speed of sound in a gas is not affected by the change in certain quantities. [3]

Name the quantities.

(b) Draw the graphical representation of displacement - distance graph of a wave.

(ii) (a) Name and define the S.I. unit of resistance. [3]

(b) The diagram below shows two conductors A and B. The conductor A is positively charged and B is uncharged. Copy the diagram and show the direction of flow of electrons when they are joined by a metallic wire.



(iii) (a) Write any two properties of magnetic field lines. [4]

(b) You are given two identical bars, one of which is magnetised. How will you select the magnetised bar?

(c) Draw the pattern of lines of uniform magnetic field of earth.

Question 9

(i) (a) Draw the magnetic field lines of a strong bar magnet due to two like poles facing each other. [3]

(b) A soft iron piece is in the form of a closed ring (no free ends). A wire is wound over it to make it an electromagnet. What happens when current is passed through the wire?

(ii) A concave mirror forms an image beyond the centre of curvature. [3]

(a) Represent it with a ray diagram.

(b) State the characteristics of the image formed.

(iii) (a) Write any two measures to minimise the impact of global warming. [4]

(b) At what temperature the density of water is maximum?

(c) What is the main constituent of biogas?
