CLASS X - SCIENCE

✤ General Instruction

(1) This question paper consists of 39 questions in 3 sections. Section A is Biology; Section B is Chemistry and Section C is Physics.

(ii) All questions are compulsory. However, an Internal choice is provided in some questions. A student is expected to attempt only one of these questions.

SECTION-A (BIOLOGY)

1. Which of the following statements are true for flowers?
   (i) Flowers are always bisexual
   (ii) They are the sexual reproductive organs
   (iii) They are produced in all groups of plants
   (iv) After fertilisation they give rise to fruits
   A. (ii) and (iv) B. (ii) and (iii)
   C. (i) and (iii) D. (i) and (iv)
2. Which of the following options indicates the products formed after breakdown of the glucose in our muscle cells when there is lack of oxygen?
   A. Ethanol + carbon dioxide + Energy
   B. Lactic acid + Energy
   C. Lactic acid + carbon monoxide + Energy
   D. Carbon dioxide + Water + Energy
3. Which of the following human activities has resulted in an increase of non-biodegradable substances?
   A. Organic farming
   B. Increase in tree plantation
   C. Use of plastic as packaging material
   D. Composting of kitchen waste
4. Choose the correct statement that describes arteries:
   A. They have thick elastic walls, blood flows under high pressure; collect blood from different organs and bring it back to the heart.
   B. They have thin walls with valves inside, blood flows under Ion pressure and carry blood away from the heart to various organs of the body.

C. They have thick elastic walls, blood flows under low pressure; carry blood from the heart to various organs of the body.
D. They have thick elastic walls without valves inside. The Blood flows under high pressure and carry blood away from the heart to different parts of the body.

5. In a cross between black furred rabbit (B) and white furred rabbit (b), all offspring were found to have black fur. What can be Inferred about the genetic makeup of the parent rabbits?
A. BB X bb B. Bb X Bb C. Bb X bb D. bb X bb

6. Which of the following is a correct combination of function and part of the brain?
A. Posture and balance: Cerebrum
B. Blood pressure: Medulla in hindbrain
C. Hunger: Pons in hindbrain
D. Salivation: Medulla in midbrain

7. In a food chain if frog is eaten by snake then the energy transfer will be from
A. producer to primary consumer
B. primary consumer to secondary consumer
C. secondary consumer to tertiary consumer
D. Producer to decomposer

8. Assertion (A): Vulture will always have the least amount of pesticides in a food chain.
Reason (R): Vulture occuples the last trophic level and it gets only 10% of energy of the previous trophic level.
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 but R is true

9. Assertion (A): When pure breed tall plants are crossed with pure breed short plants, all the plants in F1 progeny are tall. When the tall plants of F1 progeny are crossed, short plants re-appear in F2 progeny.
Reason (R): Traits are independently inherited.
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 but R is true

10. List two changes in habit that people must adopt to dispose non-biodegradable waste that will contribute for saving the environment.

11 <u>Attempt either option A or B.</u>

A. How many chambers are there in the heart of the following organisms? How is mixing of oxygenated and deoxygenated blood prevented in their body?

(i) Fishes

(ii) Humans

OR

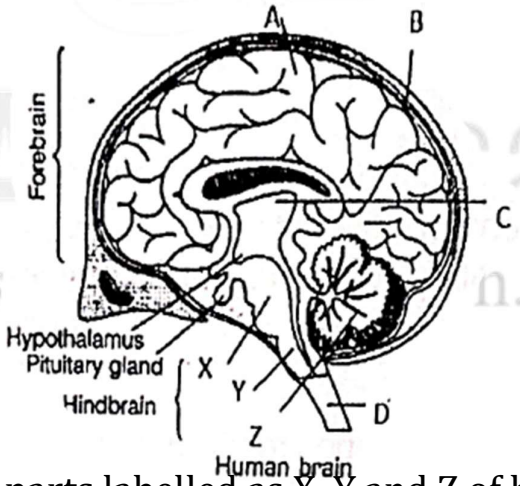
B. Explain the mechanism by which the water is transported in plants?

12. (a) What happens to the heart when muscles work harder?

(b) Which body system is directly affected when a person has heart disease?

(c) Which cells increase in number during infection?

13. Given below is a diagram of human brain.



(a)Identify the parts labelled as X, Y and Z of hind brain.

(b) Write any one function of the part labelled as A,B and C

14. In a genetic experiment, plants with pure round green seeds (RRyy) were crossed with plants with wrinkled yellow seeds (ΠΥΥ).

(i) Show the gametes formed when F1 was self-pollinated.

(ii) A total of 144 seeds were produced which developed into saplings. Show the ratio in which these traits are independently inherited in these144 sapling.

15. Neha consumed boiled sweet potatoes and boiled eggs for breakfast. Help her to understand some steps in the process of digestion of the

food taken by her by answering the questions given below.
Attempt either subpart A or B.

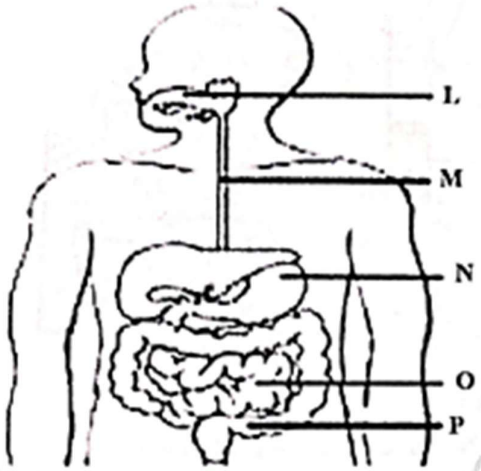
A. Which of these food items is rich in proteins? In which part of the alimentary canal is the digestion of this component initiated? Name the enzymes, conditions required and the glands associated with the digestion here.

OR

B. Which of these food items contains fats? How is it digested?

C. Which of these food items is rich in starch? How is its digestion initiated?

D. The figure given below represents parts of the human alimentary canal. Which of these parts (L,M,N,O or P) will have the maximum amount of digested food as soon as the process of digestion is completed?



For visually impaired students

D. What are the main parts of alimentary canal and mention the role of large intestine ?

16 <u>Attempt either option A or B.</u>

A. (i) What happens when :-

(a) Planaria gets cut into many pieces accidentally.

(b) Bryophyllum leaf falls on the wet soil.

(c) On maturation sporangia of Rhizopus bursts?

(ii) What is vegetative propagation? Explain any three advantages of vegetative propagation.

OR

B. Annie was conducting research on the number of fruits produced by watermelon under different conditions. She grew 25 watermelon

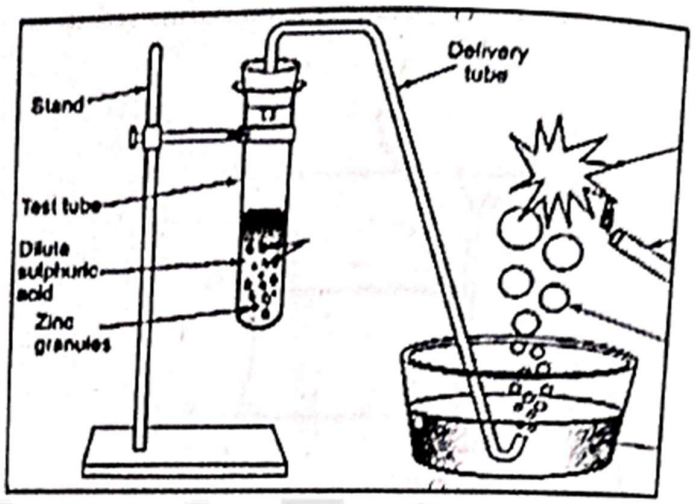
plants each in both glass house A and B. She introduced pollinators in glass house A only.

(i) What difference will she observe in the number of fruits produced in the two glass houses? Explain with reason.

(ii) List 3 changes that will occur in a flower once it gets fertilizer.

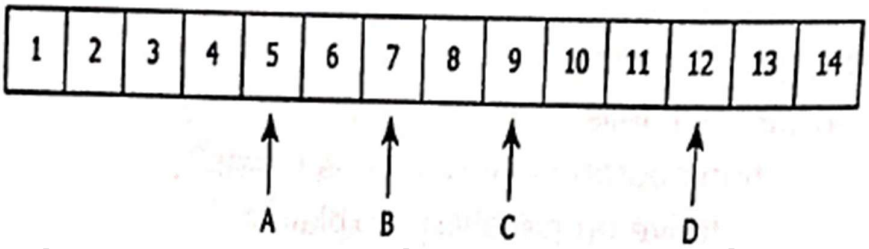
SECTION-B

17. What will be observed in the reaction shown in the figure?



A. Carbon dioxide gas will be released
B. Hydrogen gas will be released with pop sound
C. Carbon dioxide gas will be released and solution become milky
D. Hydrogen gas along with carbon dioxide gas will be released

18. The image shows the pH values of four solutions on a pH scale. Which solutions are alkaline in nature?



A. A and B B. B and C C. Cand D D. A and D

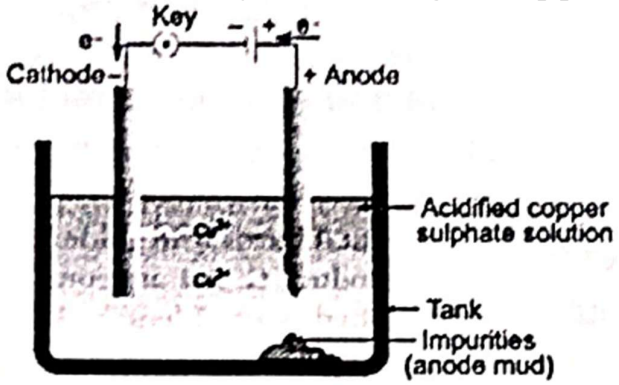
19. The water of crystallization is present in 1

(i) Bleaching Powder (ii) Plaster of Paris
(iii) Washing Soda (iv) Baking Soda
A. (ii) and (iv) B. (ii) and (iii)
C. (i) and (iii) D. (i) and (iv)

20 The first member of alkyne homologous series is

A. ethyne B. ethane
C. propyne D. methane

21. The image shows the electrolytic refining of copper.



Which option explains the process to obtain pure copper?

A. When current is passed, pure copper from cathode deposits to the anode.
B. When current is passed, pure copper from anode deposits in the electrolytic solution.
C. When current is passed, pure copper from the electrolytic solution deposits at the anode.
D. When current is passed, pure copper from the electrolytic solution deposits at the cathode.

22. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of:

A. combination reaction
B. single displacement reaction
C. double displacement reaction
D. displacement reaction

23. In the reaction of aqueous solution of barium chloride with aqueous solution of sodium sulphate, the aqueous solution formed will be:

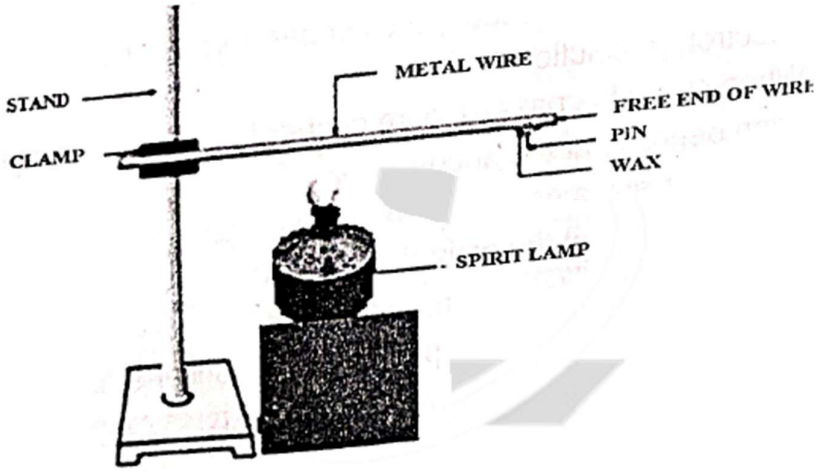
A. $BaCl_2$ B. $BaSO_4$
C. Na_2SO_4 D. NaCl

24. Assertion (A): C_4H_8, C_4H_6 and C_4H_{10} are members of the same homologous series

Reason (R): C_4H_8, C_4H_6, C_3H_4, C_3H_6, C_2H_4, C_2H_2 are unsaturated hydrocarbons.

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 but R is true

25. The following activity is set-up in the science lab by the teacher. He clamped an aluminium wire on a stand and fixed a pin to the free end of the wire using wax. Then he heated the wire with a burner from the end where the wire is clamped. Students observed the pin fall off.



A. If the teacher replaces aluminium wire by silver wire; will the students' observation change? Justify your answer.
B. Will the aluminium wire melt? Give reason for your answer.

26. <u>Attempt either option A or B.</u>

A. During electrolysis of brine, a gas 'G' is liberated at anode. When this gas 'G' is passed through slaked lime, a compound 'C' is formed, which is used for disinfecting drinking water.

(a) Write the formula of 'G' and 'C'.
(b) State the chemical equation involved in the formation of compound C.
(c) What is the common name of compound' C'? Give its chemical name.

OR

B. Distinguish between 'roasting' and 'calcination. (any two) Which of these two is used for sulphide ores and why?

27. 2g of ferrous sulphate crystals are heated in a boiling tube.
(a) State the colour of ferrous sulphate crystals both before heating and after heating.

(b) Name the gases produced during heating.
(c) Write the chemical equation for the reaction.

28. A compound which is prepared from Gypsum has the property of hardening when mixed with water.
(a) Identify this compound.
(b) Write the chemical equation for its preparation.

OR

(b)What will happen if Gypsum is heated for a longer time?
(c) For what purpose will this compound be used in the hospitals?
(d)How many molecules of water of crystallization are present in gypsum?

29. Attempt either option A or B.
A compound X is formed by the reaction of a carboxylic acid $C_2H_4O_2$ and an alcohol in presence of a few drops of H_2SO_4. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid as used in this reaction.
Give the names and structures of
(a) carboxylic acid, (b) alcohol and
(c) the compound X.
Also write the reaction.

OR

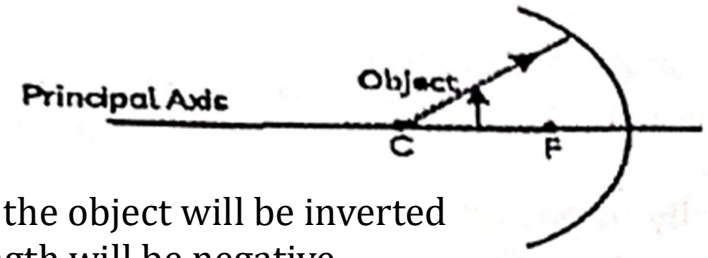
B. (i) Draw the electron dot structure of 3rd member of alkyne series.
(ii) Differentiate between addition reaction and substitution reaction. Give one example of each.
(iii) Name an oxidising agent which converts ethanol to ethanoic acid.

SECTION-C

30. Choose the correct option from the below which explains the reason for us to perceive the day sky as blue.
A. As sunlight passes through the atmosphere, shorter wavelengths, such as blue are scattered more than other colors.
B. The sky appears blue because all colors are scattered equally, but blue light is stronger and more visible to the human eye.
C. The blue color of the sky is due to longer wavelengths like red and orange scattering more than shorter wavelengths, making blue stand out more.

D. The atmosphere contains blue-colored particles that give the sky its blue appearance.

31. Identify the correct conclusions that can be drawn based on the diagram of the concave mirror given below:



I) the image of the object will be inverted
II) the focal length will be negative
III) the image of the object will be virtual
IV) the reflected ray will travel along the same path as the incident ray in the opposite direction

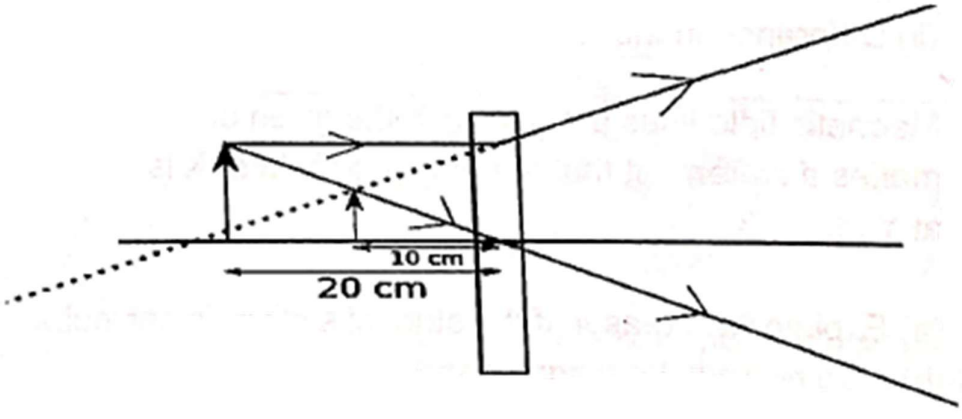
(A) I and III (B) I,II and IV、
(C) III and IV (D) II and III

32. Assertion (A): A point object is placed at a distance of 26 cm from a convex mirror of focal length 26 cm. The image will not form at infinity.

Reason (R): For above given system the equation $1/f=1v+1u$ gives $v = \infty$.

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 but R is true

33.



The above image shows the formation of an image with an optical instrument.

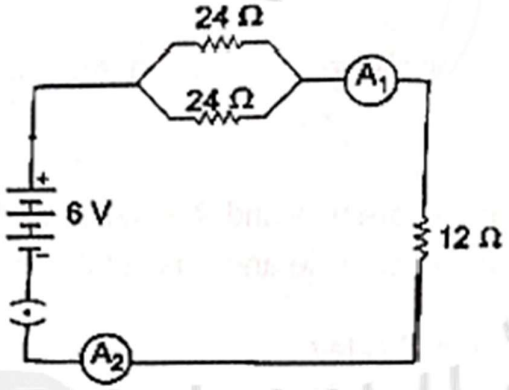
A. Identify the optical instrument (shown schematically as a rectangle) in the image.
B. What type of image is formed in this case?
C. Based on the measurements given in the image, calculate the focal length of the instrument.

<u>For visually impaired students</u>

A. Under what conditions can a convex lens form a virtual image?
B. Why does a piece of paper catch fire if we allow sunlight to pass through a convex lens onto the paper?

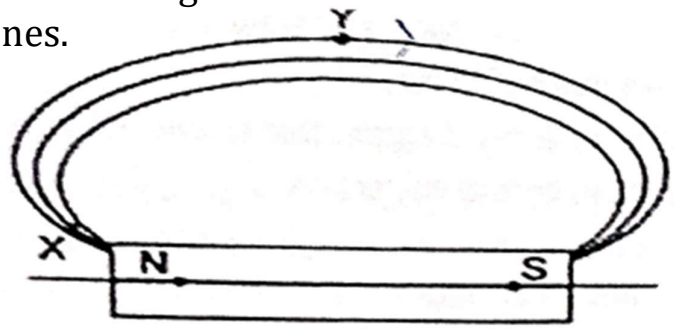
34. <u>Attempt either option A or B.</u>

A. How can three resistors of resistances 2 Ω, 3 Ω, and 6 Ω respectively be connected to give a total resistance of



Study the circuit and find out-
(i) Current in 12-ohm resistor
(ii) Difference in the readings of ammeter A1 and A2 if any

35. Magnetic field lines are shown in the given diagram. A student makes a statement that the magnetic field at X is stronger than at Y.
(a) Explain with reason if the student's claim is correct.
(b) Also redraw the diagram and mark the direction of magnetic field lines.

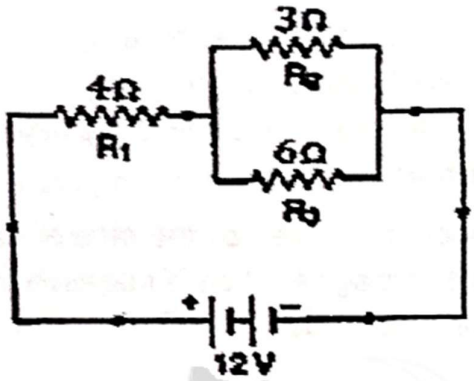


For visually impaired students

(a) Write down two properties of magnetic field lines.

(b)When does an electric short circuit occur?

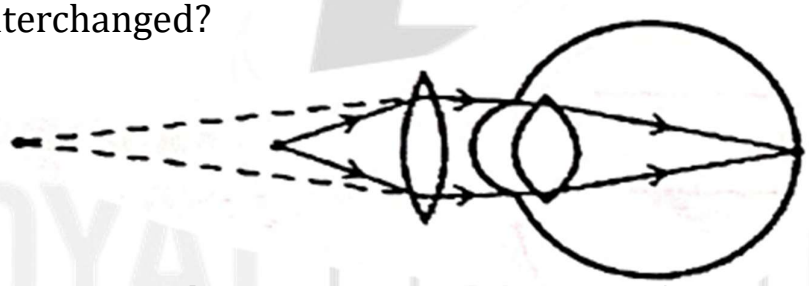
36. Observe the Circuit diagram and answer the following questions:



(a) Find the equivalent resistance of the circuit.

(b) What amount of current is flowed in the circuit?

(c) What would be the equivalent resistance when R1 and R2 were interchanged?



37. The above image shows a corrective measure for a particular defect of vision.

(i) Identify the defect of vision and state what kind of lens is used to correct this deficiency.

(ii) Draw and label a ray diagram that shows the defect of vision in the above case before correction.

For visually impaired students

(i)State one function of each of them-(a) Retina (b) Pupil

(ii)What is power of accomodation?

38. The relation between distance of an object from the mirror (u), distance of image from the mirror (v) and the focal length (F) is called mirror formula. This formula is valid in all situations for all spherical mirrors for all positions of the object. The size of image formed by a spherical mirror depends on the position of the object from the mirror. The image formed by a spherical mirror can be bigger than the object, equal to the object or smaller than the

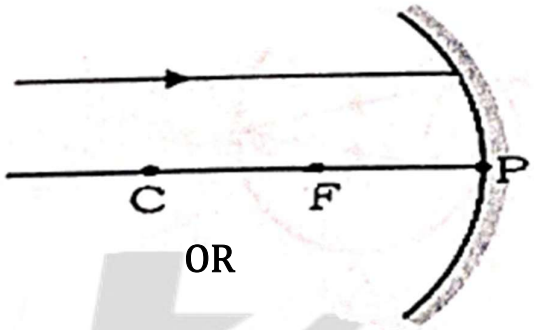
object. The size of the image relative to the object is given by the linear magnification (m).

Thus, the magnification is given by the ratio of height of image to the height of object. If magnification is negative, image is real and if it is positive, image is virtual.

(a) What is the position of an image when an object is placed at a distance of 20 cm from a concave mirror of focal length 20 cm?

(b) Complete the following ray diagrams for the ray of light incident on a concave mirror as shown in figure.

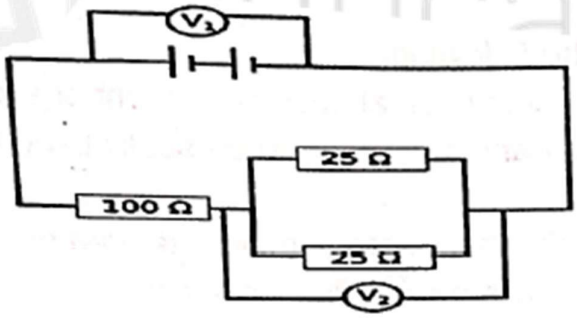
(c) If the magnification of an image is -1, write the characteristic of the image.



OR

(c)A parallel beam of light is made to fall on a concave mirror. An image is formed at a distance of 7.5 from the mirror. Calculate the focal length of the mirror.

39. <u>Attempt either option A or B.</u>



A. The arrangement of resistors shown in the above figure is connected to a battery;

The power dissipation in the 100 Ω resistor is 81 W. Calculate

(i) the current in the circuit

(ii) the reading in the voltmeter V2

(iii) the reading in the voltmeter V1

OR

B. (i) State ohm's law?

(ii) The value of (I) current following through a conductor for Corresponding values of (V) potential difference are given

below

V	0.5	0.1	1.5	2.0	2.5	3.0
I	0.1	0.2	0.3	0.4	0.5	0.6

Plot a graph between V and I and also calculate resistance.

(iii) What is the better way of connecting lights and other electrical appliances in domestic wiring? Why?

A (i) What is electrical resistivity? In a series electrical circuit comprising a resistor made up of a metallic wire, the ammeter rates 5A. The reading of ammeter decreases to half when the length of wire is doubled. Why?

(ii) Name the device to measure - Current and voltage/potential difference

OR

B. 1.Explain the following-

(i) Why is tungsten used almost for filament of electrical lamps?

(ii) Why copper and aluminium wire usually used for electricity transmission?

(iii)How does the resistance vary with its area of cross-section?

2. 100 J of heat is produced each second in a 4 ohm resistance. Find the potential difference across the resistor.

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