

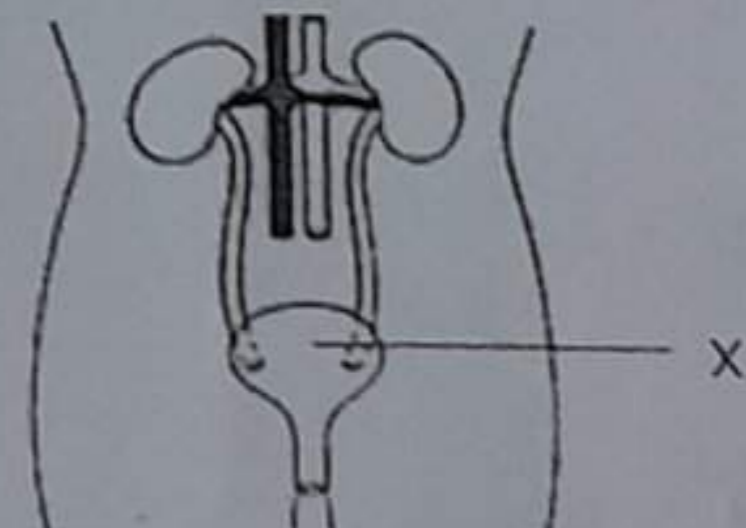
TIME : 3 Hr.

**GENERAL INSTRUCTIONS:**

- i. This question paper consists of 39 questions in 5 sections.
- 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.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

**SECTION A**

1. What change in colour is observed when white silver chloride is left exposed to sunlight? What type of chemical reaction is this?  
(a) Grey, Photolytic decomposition      (b) Black, Photolytic decomposition  
(c) Grey, Thermal decomposition      (d) Black, Thermal Decomposition
2. Which two of the following chemical reactions are of the SAME type?  
i)  $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$       ii)  $\text{Mg} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$   
iii)  $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$       iv)  $2 \text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$   
(a) i and ii      (b) i and iv  
(c) ii and iii      (d) ii and iv
3. Neetu has two test tubes containing dilute hydrochloric acid and dilute sodium hydroxide solution, but they are not labeled. Adding which of the following solutions to the test tubes will help her visually identify the acidic and basic solution?  
(a) only vinegar      (b) only baking soda  
(c) only sodium chloride      (d) Red Litmus solution
4. During electrolytic refining of copper, Anode mud is obtained at  
(a) Anode      (b) Cathode  
(c) Electrolyte      (d) At the bottom of Anode electrode

5. Identify a hydrocarbon which has carboxylic acid functional group  
(a)  $C_2H_5OH$  (b)  $C_2H_5CHO$   
(c)  $HCOOH$  (d)  $CH_3COCH_3$
6. Haemetite is an ore of  
(a) Iron (b) Aluminium  
(c) zinc (d) Copper
7. Scum is formed when hard water is treated with  
(a) Soap (b) Detergent  
(c) soft water (d) foam
8. What are the products obtained by anaerobic respiration in plants?  
(a) Lactic acid + energy (b) Carbon dioxide + water + energy  
(c) Ethanol + carbon dioxide + energy (d) Pyruvate
9. The anther of flower contains  
(a) sepals (b) ovules  
(c) pistil (d) pollen grains
10. The image shows the excretory system in humans.  
What is the importance of the labelled part- X in the excretory system?  
(a) It produces urine.  
(b) It filters waste from the blood.  
(c) It stores the urine till urination.  
(d) It carries urine from the kidney to the outside.
- 
11. Which of the following is an example of genetic variation?  
(a) One person has a scar, but his friend doesn't  
(b) One person is older than the other  
(c) Reeta eats meat, but her sister Geeta is a vegetarian  
(d) Two children have different eye colour
12. The root of a plant is said to be:-  
(a) positively geotropic (b) positively phototropic  
(c) negatively geotropic (d) positively thigmotropic
13. When an object was kept at position X in front of a concave mirror, an enlarged and virtual image was formed. Which among the following identifies 'X' correctly?  
(a) anywhere between the centre of curvature and principal focus  
(b) anywhere between the pole and principal focus

(c) exactly at the centre of curvature

(d) exactly at the principal focus

14. The face of the moon that is visible to us is called as the near side and the face of the moon which is invisible to us is called as far side. What colour would the sky appear to an astronaut standing on the "far side" of the Moon and why?

(a) blue, as the Moon's atmosphere scatters sunlight just like Earth

(b) white, as the Moon's surface reflect all the light that falls on it

(c) black, as there is no atmosphere on Moon to scatter sunlight

(d) black, as sunlight does not fall on the far side of the Moon

15. Plants receive energy from the Sun which they utilise for several processes. The energy utilized for which of the following plant processes gets transferred to the next trophic level that consumes plants?

(a) only growth

(b) only respiration

(c) only transport of substances and reproduction

(d) all essential processes like- growth, photosynthesis, respiration and transport of substances

16. Hydra reproduces by

(a) budding and fission

(b) budding and regeneration

(c) regeneration and fragmentation

(d) vegetative propagation

For question numbers 17 to 20, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

(a) Both A and R are true and R is correct explanation of the assertion.

(b) Both A and R are true but R is not the correct explanation of the assertion.

(c) A is true but R is false.

(d) A is false but R is true

17. Assertion(A) : Copper is used to make hot water tanks and not steel.

Reason(B): Copper is a better conductor of heat than steel and it is fairly resistant to corrosion than steel.

18. Assertion(A): Biodegradable substances result in the formation of compost and natural replenishment.

Reason (R): It is due to breakdown of complex inorganic substances into simple organic substances

19. Assertion (A): Iron filings scattered around a straight current carrying conductor in a plane perpendicular to the length of the conductor, arrange themselves in concentric circles.

Reason (R): Magnetic field has both magnitude and direction.

20. Assertion (A): Variations always provide a survival advantage to an organism.

Reasons (R): Variations can be caused due to incorrect DNA copying.

### SECTION B

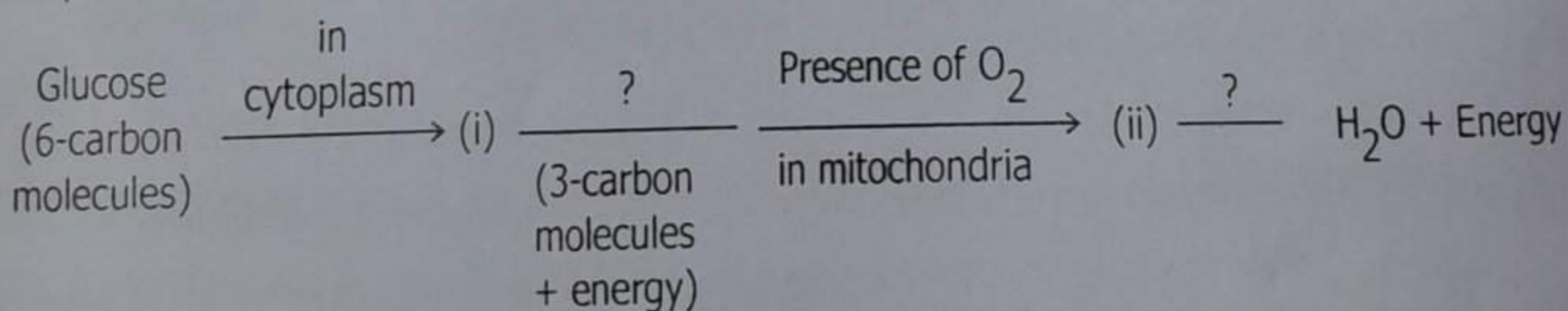
21. A white chemical compound becomes hard on mixing proper quantity of water. It is also used to fix bones and joints. Name the chemical compound and write its chemical formula. Write the chemical equation to show what happens when water is added to this compound in proper quantity

22. What will happen if mucus is not secreted by the gastric glands?

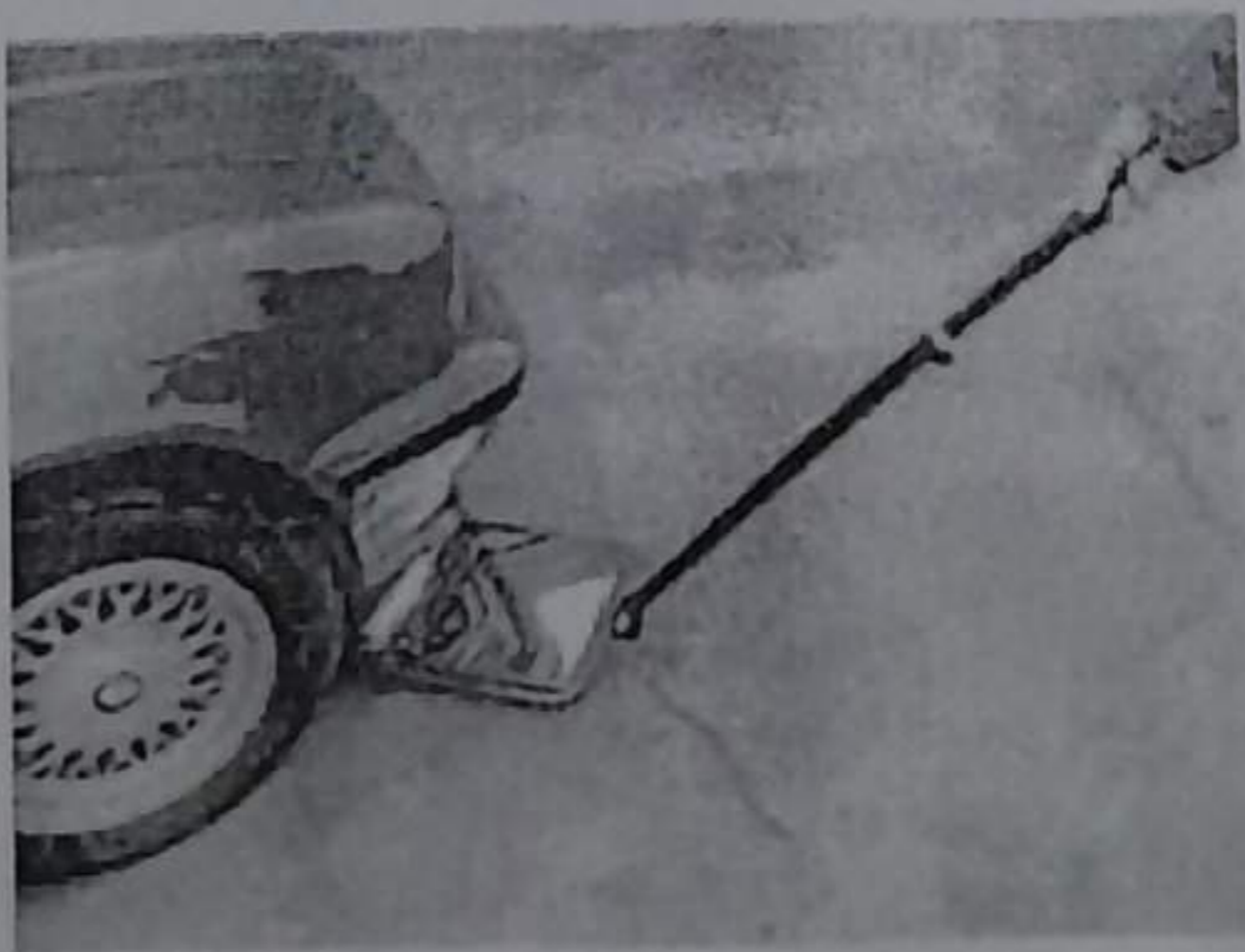
23. Rate of breathing in aquatic organisms is much faster than that in terrestrial organisms. Give reasons.

Or

Complete the following pathway showing the breakdown of glucose during aerobic respiration.



24. Search mirrors are mirrors that are used to look for hidden objects underneath the cars as shown. The hidden objects can be easily spotted as the mirror provides a wider field of view.



- (a) What type of mirrors are generally used to make search mirror?
- (b) With the help of a ray diagram describe the nature of image formed by the type of mirror identified in (a).

25. Draw a ray diagram to explain the term angle of deviation.

or

What happens when a narrow beam of a monochromatic light passes through

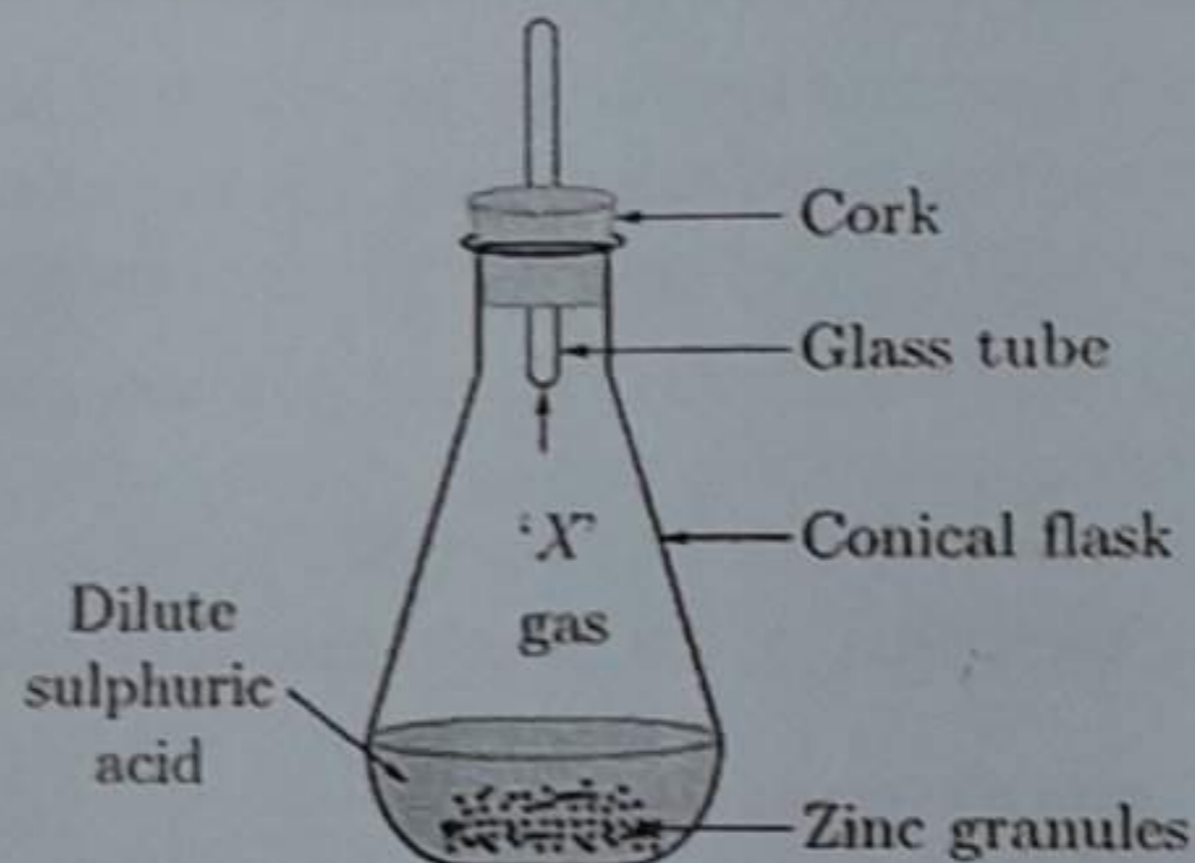
(a) glass slab and

(b) glass prism?

26. Give any two methods which could be applied to reduce our intake of pesticides through food to some extent.

### SECTION C

27. (a) Observe the given figure and answer the questions that follow:



(i) Identify the gas 'X'.

(ii) How will you test for the gas which is liberated in the experiment?

(b) Why Nitric acid on reaction with metal does not produce hydrogen gas?

28. An element M with electronic configuration 2,8,1 reacts with Another element Y with electronic configuration 2,8,7 forms a compound Z.

(a) Identify M, Y and Z.

(b) Predict the nature of bond formed by Z.

(c) Draw the electron dot structure of Z

OR

(a) Differentiate between roasting and calcination

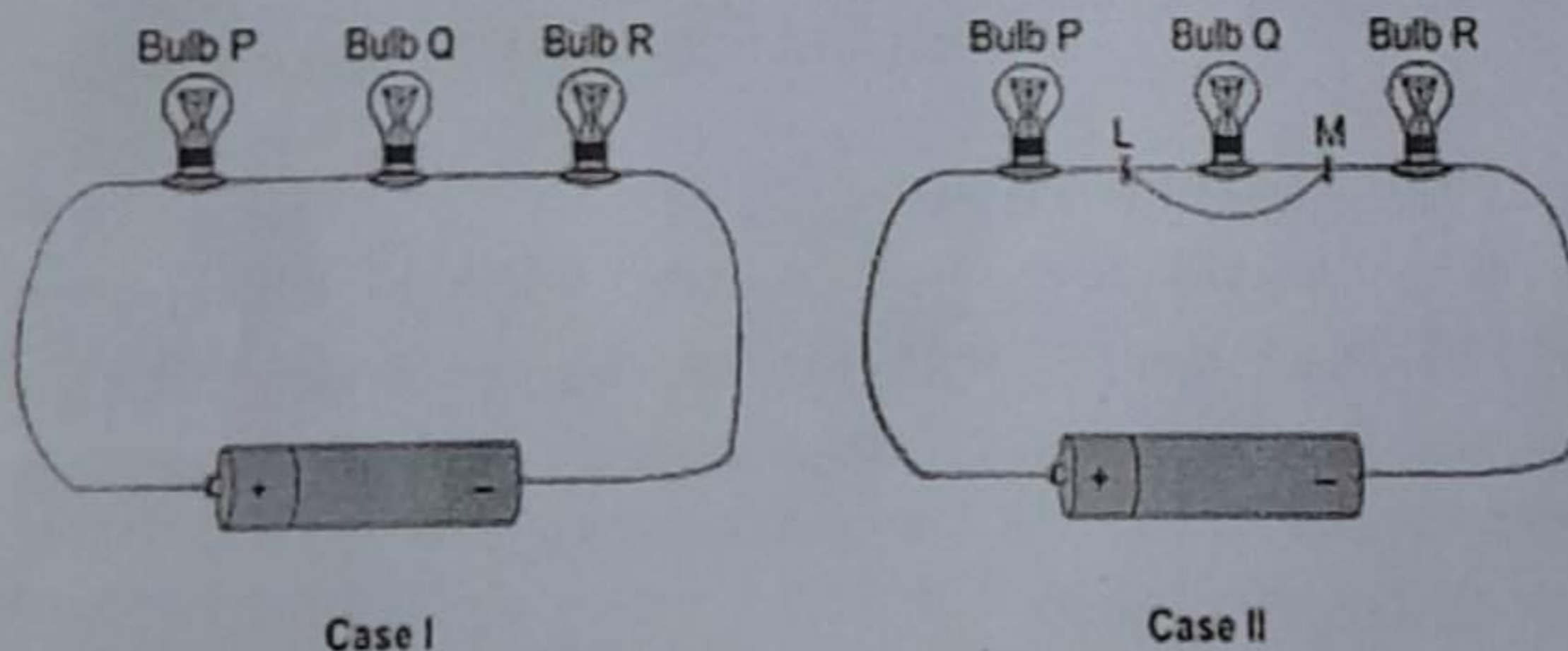
(b) Explain the extraction of Mercury from the cinnabar ore

29. (a) Define reflex arc. Draw a flow chart showing the sequence of events which occur when accidentally our foot steps on a nail.

(b) List any one plant hormones. Write its one function.

30. Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F1 and F2 generations when he crossed the tall and short plants? Write the phenotype ratio he obtained in F2 generation plants.

31. Absolute refractive indices of two media P and Q are 1.33 ( $n_P$ ) and 2.52 ( $n_Q$ ) respectively. The speed of light in medium P is  $2 \times 10^8$  m/s.
- What would be the speed of light in medium Q?
  - If the angle of incidence for a ray of light travelling from medium P to Q is  $0^\circ$ , then what will be the path of light in the medium Q?
32. Kaveri conducted an experiment to study the energy efficiency of different bulbs. She connected a bulb A having a resistance of 100 ohms to a 240 V power supply in a laboratory.
- How much energy will be consumed by the bulb, if it is kept ON for 4 hours each day for a week? Express your answer in kJ.
  - Kaveri connects another similar bulb B in series with bulb A and connects the combination to a 240 V supply. Will there be any change in the brightness with which bulb A glows now? Explain mathematically.
33. Vijaya connects three bulbs P, Q and R in series with a battery in two different ways using identical conducting wires as shown below. She notices that in case I all three bulbs glow but in case II only the bulbs P and R continue to glow. What could be the reason for the bulb Q to not glow in case II? Explain.



Two resistances when connected in parallel give a combined resistance of  $10/3$  ohms. When the same two resistors are connected in series, the combined resistance becomes 15 ohms. Calculate the individual resistance of each resistor.

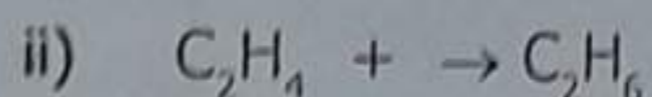
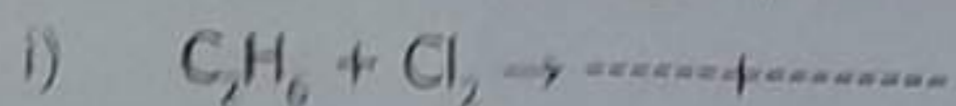
### SECTION D

- 34.
- Draw electron dot structure of nitrogen molecule
  - Name and draw the isomers of butane
  - Distinguish between saturated and unsaturated hydrocarbons
  - What happens when Alcohol undergoes oxidation reaction. Name the Oxidising agent and write the chemical equation also
  - Acetic acid on reaction with alcohol in acidic medium gives a product X with fruity odour. Identify the product X formed and name the process of formation of X

OR

(a) Describe the cleansing action of soap

(b) Complete the following equations:



35. (a) Certain specialized cells in animals called stem cells have the ability to divide and differentiate into different cell types. This helps in the replacement of a damaged organ.

Name and explain ANY ONE methods of asexual reproduction that are similar to stem cells and occur mostly in multicellular organisms.

(b) Identify TWO pairs of reproductive organs in males and females that are functionally similar to each other. Justify.

OR

(a) Sagar saw a beautiful rose and smelled it. As he was smelling it, he happened to touch a thorn and pull his hand away.

State TWO differences and ONE similarities in the way the nervous system performs the two actions. (i.e smelling of rose flower and pulling hand away)

(b) Are all involuntary actions reflex actions? Justify.

36. (a) The image formed by a concave mirror is observed to be virtual, erect and larger than the object. Where should the position of the object be relative to the mirror? Draw ray diagram to justify your answer.

(b) The linear magnification produced by a spherical mirror is  $+1/3$ . Analysing this value state the (i) type of mirror and (ii) position of the object with respect to the pole of the mirror. Draw any diagram to justify your answer.

Or

(a) List two possible ways in which a concave mirror can produce a magnified image of an object placed in front of it. State the difference if any between these two images.

(b) Draw ray diagrams for the following cases when a ray of light:

(i) passing through centre of curvature of a concave mirror is incident on it.

(ii) parallel to principal axis is incident on convex mirror.

### SECTION E

37. A chemical reaction is a representation of chemical change in terms of symbols and formulae of reactants and products. There are various types of chemical reactions like combination, decomposition, displacement, double displacement, oxidation and reduction reactions. Reactions in which heat is released along with the formation of products are called exothermic chemical reactions. All combustion reactions are exothermic reactions

- (a) Name the type of chemical reaction in which a single substance breaks down into two or more simpler substances upon (i) heating and (ii) passing electricity
- (b) Which type of chemical reaction takes place that pushes the rocket forward through space?
- (c) Name the reddish brown colour fumes which evolves when a white salt undergoes decomposition and write the chemical equation also
- (d) State a point of difference between exothermic and endothermic reaction?

OR

(d) Silver salts are stored in dark coloured bottles. Give reason.

38. Figures (a) to (d) given below represent the type of ear lobes present in a family consisting of 2 children – Rahul, Nisha and their parents.

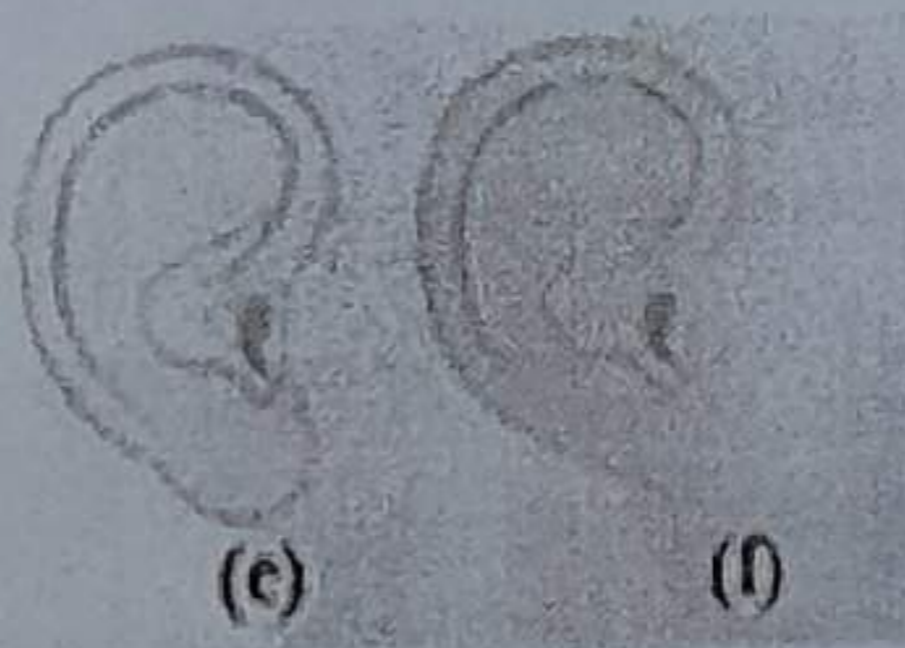


a) Rahul's Father

b) Rahul

c) Rahul's Mother

d) Rahul's sister Nisha



Type of ear lobes

Excited by his observation of different types of ear lobes present in his family, Rahul conducted a survey of the type of ear lobes found {Figure (e) and (f)} in his classmates. He found two types of ear lobes in his classmates as per the frequency given below:

SEX	FREE	ATTACHED
MALE	36	14
FEMALE	31	19

On the basis of above data answer the following questions.

- a) Which of the two characteristics - 'free ear lobe' or 'attached ear lobe' appears to be dominant in this case? Why?
- b) Is the inheritance of the free ear lobe linked with sex of the individual? Give reason for your answer.



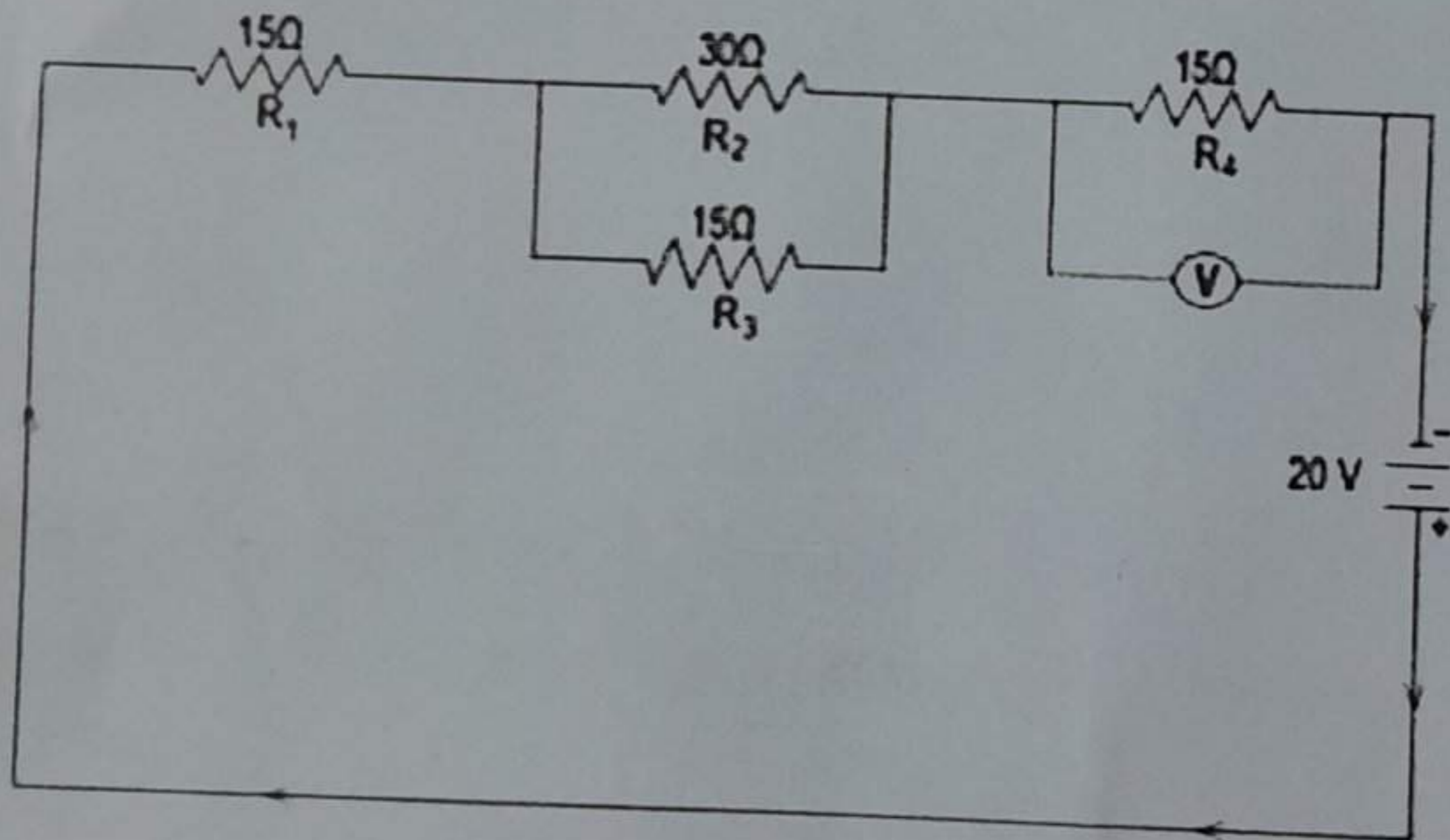
- c) What type of ear lobe is present in father, mother, Rahul and his sister Nisha? Write the genetic constitution of each of these family members which explains the inheritance of this character in this family?

(Gene for Free ear lobe is represented by F and gene for attached ear lobe is represented by f for writing the genetic constitution).

OR

Suresh's parents have attached ear lobes. What type of ear lobe can be seen in Suresh and his sister Siya? Explain by giving the genetic composition of all.

39. Four resistors, a voltmeter and a battery are connected in a circuit as shown below.



- (a) What is the net resistance in the circuit?  
(b) How much potential difference will the voltmeter connected across the resistor R<sub>4</sub> measure?

OR

What is the power dissipated by the resistor R<sub>1</sub>?

If R<sub>3</sub> is removed, will the net current in the circuit increase or decrease or remain the same? Justify your answer.