

**APEEJAY COMMON PREBOARD EXAMINATION**  
**SESSION 2023-2024**  
**Class- X**  
**Science (086)**

Max. Marks: 80

Time Allowed: 3 hours

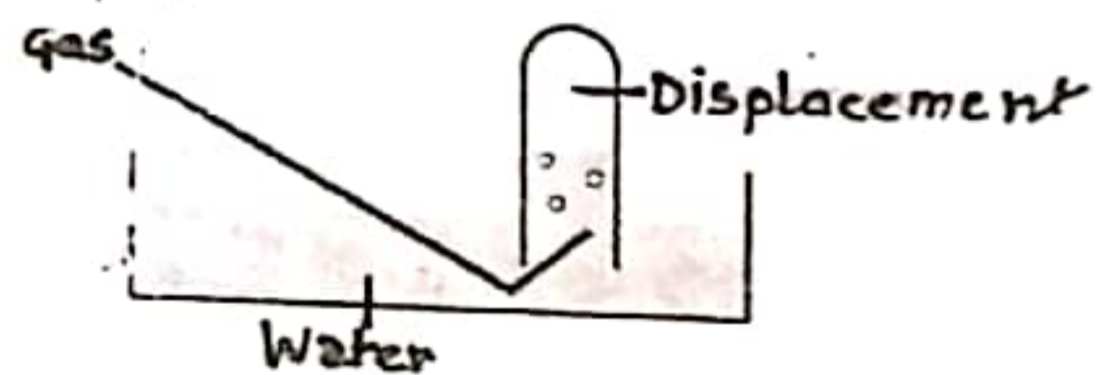
**General Instructions:**

- 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. Answers 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**

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q. No	Questions	Marks
1.	Black coating of copper oxide on copper can be removed chemically by passing hydrogen gas over copper oxide. The metal turns brown because a) Hydrogen is removed by oxygen b) Hydrogen is added to black oxide c) Oxygen is removed by hydrogen d) Oxygen is added to black oxide	1
2.	A metal is heated with dil $H_2SO_4$ . The gas evolved is collected by the method shown in the figure. Identify the correct method of collection of gas from the following: a) Upward displacement method b) Downward replacement method c) Downward displacement method d) Upward replacement method	1
3.	The difference between the number of molecules of water of crystallization in gypsum and calcium sulphate hemihydrate is a) $5/2$ b) 2 c) $3/2$ d) $1/2$	1
4.	Aarav spills few drops of a concentrated acid accidentally over his hand. What would you suggest so that he is relieved from pain?	1



- a) to wash hands with saline solution.
- b) to wash hands immediately with plenty of water and apply a paste of sodium hydrogen carbonate.
- c) to wash hands with plenty of water, and then apply solution of sodium hydroxide
- d) to wash hands with sanitizer

5



Above figure shows heating of Blue Vitriol. Which of the following changes would be observed?

- I. A white coloured residue is left behind in the test tube.
- II. Water droplets are observed on the upper cooler part of the test tube.
- III. Residue that is produced reacts with air and changes to green colour.

- a) I and III
- b) II and III
- c) I and II
- d) I, II and III

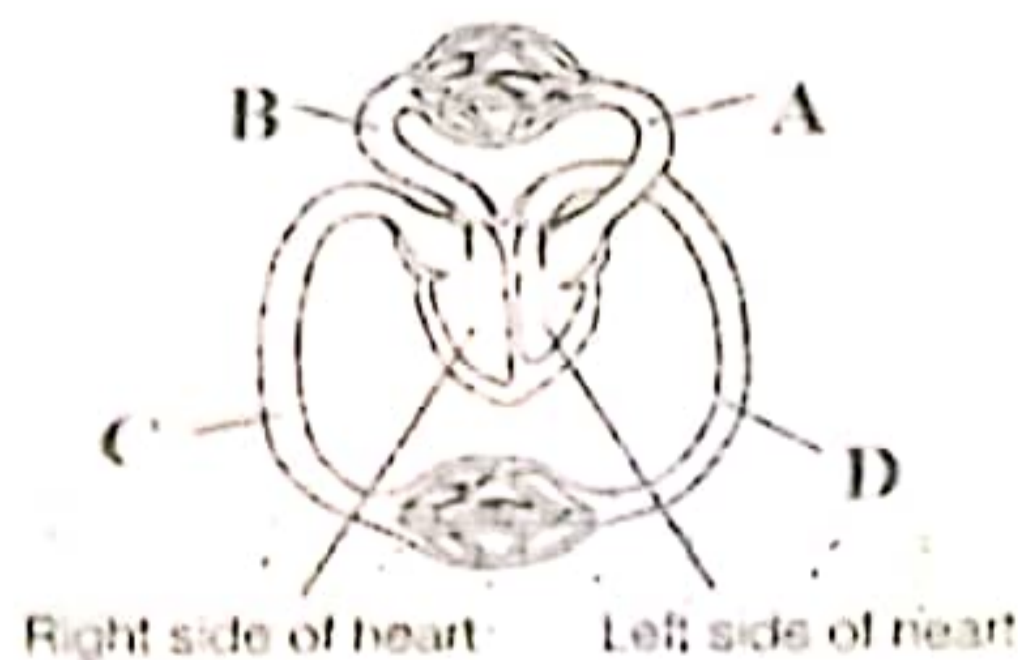
6. What would be the atomic number of an element that forms a basic oxide 1

- a) 7
- b) 17
- c) 14
- d) 11

7. What is the mole ratio of the gases evolved in the electrolysis of water? 1

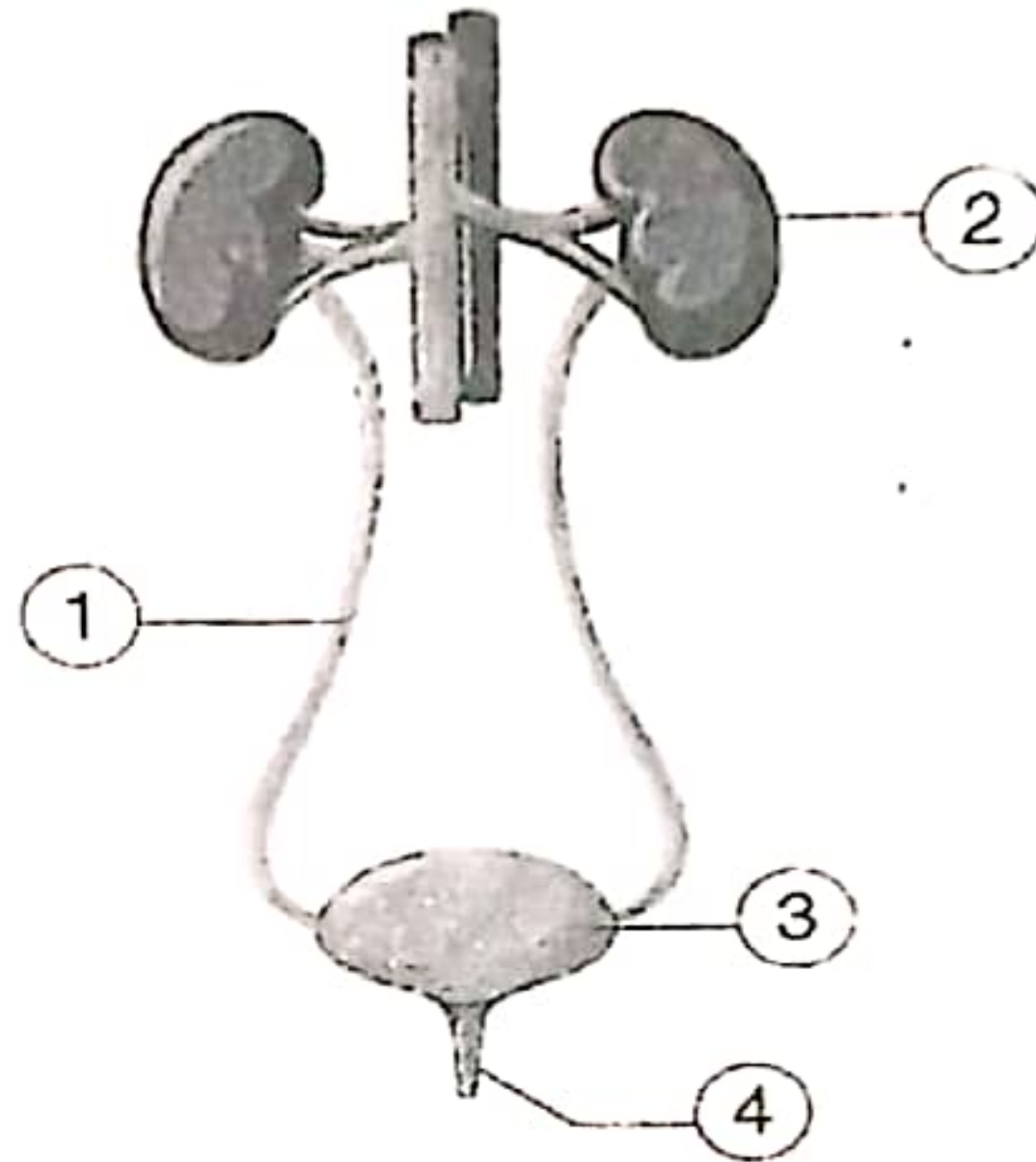
- a) 3:2 at Anode and Cathode respectively
- b) 2:1 at Cathode and anode respectively
- c) 1:2 at Anode and Cathode respectively
- d) 2:1 at Anode and Cathode respectively

8. Identify the parts marked as 'A', 'B', 'C' and 'D'. 1



- a) A: Artery B: Vein C: Atrium D: Ventricle
- b) A: Aorta B: Vena cava C: Pulmonary Artery D. Pulmonary Vein
- c) A: Pulmonary vein B: pulmonary artery C: Vena Cava D: Aorta
- d) A: Pulmonary artery B: Pulmonary vein C: Aorta D: Vena Cava

The diagram shows human excretory system. Choose the incorrect option from the choices given below. 1



- a) '4' is a common passage for urine and spermatic fluid in males.
- b) '2' possesses tiny filtrating units.
- c) '3' stores the urine temporarily.
- d) '1' reabsorption of water takes place here.

10 Which of the following statements about the transmission of the nerve impulse are correct? 1

- (i) A nerve impulse travels from the dendritic end towards the axonal end.
- (ii) At the dendritic end, some neurotransmitters are released for transmission of nerve impulses.
- (iii) The neurotransmitters released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron.
- (iv) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cells.

- a) (i) and (iii)
- b) (ii) and (iv)
- c) (i) (iii) and (iv)
- d) (ii) (iii) and (iv)

11 Guard cells \_\_\_(1)\_\_\_ and stomatal pore \_\_\_(2)\_\_\_ when water flows into the guard cells. 1

- a) 1 shrink 2 closes
- b) 1 shrink 2 opens
- c) 1 swell 2 opens
- d) 1 swell 2 closes

- 12 Two pea plants one tall with round seeds (TTRR) and another a short plant with wrinkled seeds (ttrr) seeds produce F1 progeny that have tall and round seeds (TtRr) seeds. When F1 plants are self-pollinated, the F2 progeny will have a new combination of characters. Choose the new combinations from the following  
 (i) Tall Round (ii) Tall Wrinkled (iii) Short Round (iv) Short Wrinkled  
 a) (i) and (ii)  
 b) (ii) and (iii)  
 c) (ii) and (iv)  
 d) (i) and (iv)
- 13 'n' number of resistors, each of resistance R, are first connected in series so as to give an effective resistance  $R_s$ . Subsequently, these resistors are connected in parallel so as to give an effective resistance  $R_p$ . Then the ratio  $R_p:R_s$  will be  
 a) n:1  
 b)  $n^2:1$   
 c)  $1:n^2$   
 d) 1:n
- 14 What will happen to the current passing through a conductor if potential difference across it is doubled and the resistance is halved?  
 a) Remains unchanged  
 b) Becomes double  
 c) Becomes halved  
 d) Becomes four times
- 15 The amount of energy at the fourth trophic level is 5kJ in the given food chain. What will be the amount of energy available at the second trophic level?  
 CARROT → RABBIT → FOX → LION  
 a) 5000 kJ  
 b) 50 kJ  
 c) 5500 kJ  
 d) 500 KJ
- 16 In the following Food Chain if a grasshopper is eaten by a frog, then the energy transfer will be from:  
 Grass ⇒ Grasshopper ⇒ Frog ⇒ Snake ⇒ Hawk  
 a) producers to decomposers  
 b) producer to primary consumer  
 c) primary consumer to secondary consumer  
 d) secondary consumer to tertiary consumer

**Q. no 17 to 20 are Assertion - Reasoning based questions.**

**These consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:**

- (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
- 17 **Assertion (A):** The correct procedure for diluting an acid is to add acid to water and not water to acid.  
**Reason (R):** Specific heat of water is quite large.

- 18 **Assertion (A):** The Cerebellum is located in the forebrain. 1  
**Reason (R):** The Cerebellum helps in walking in a straight line.
- 19 **Assertion(A):** Rings of cartilage are present in the throat. 1  
**Reason (R):** These ensure that the air passage does not collapse.
- 20 **Assertion (A):** By decreasing the number of coils, the magnitude of the magnetic field produced by a current carrying solenoid will increase. 1  
**Reason (R):** The magnitude of the magnetic field produced by a current carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.

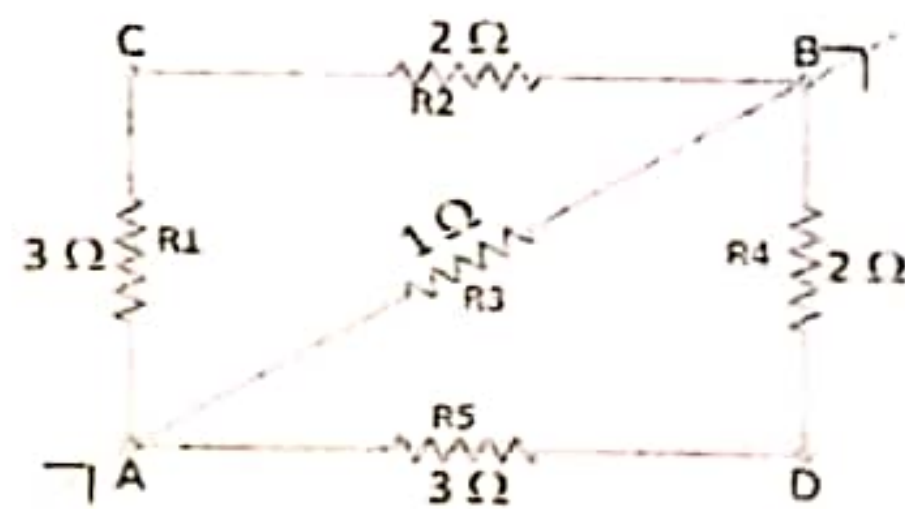
### SECTION – B

Q. no. 21 to 26 are very short answer questions.

- 21 Study the following table. Write the balanced chemical equation for the correct option 2

	Salt	Parent Acid	Parent Base	Nature
a)	Ammonium sulphate	H <sub>2</sub> SO <sub>4</sub>	NH <sub>4</sub> OH	Basic
b)	Ammonium sulphate	H <sub>2</sub> SO <sub>4</sub>	NH <sub>4</sub> OH	Neutral
c)	Ammonium sulphate	H <sub>2</sub> SO <sub>4</sub>	NH <sub>4</sub> OH	Acidic
d)	Ammonium sulphate	H <sub>2</sub> CO <sub>3</sub>	NH <sub>4</sub> OH	Acidic

- 22 What type of respiration takes place in human muscles during vigorous physical exercise? How is it different from the kind of respiration in a yeast cell? 2  
 OR  
 a) Name the specific nutrient that is absorbed in the small intestine and also reabsorbed by the kidney tubules.  
 b) How does bile juice help in the process of digestion in human beings?
- 23 Why is it not possible to reconstruct the whole organism from a fragment in a complex multicellular organism? 2
- 24 Explain the feedback mechanism to regulate the action of the hormones with the help of one suitable example. 2
- 25 An object is situated at a distance of  $f/2$  from a convex lens of focal length  $f$ . What will be the distance of image from the lens? 2
- 26 The diagram shows a network of resistors which is connected to an electric source through points A and B. Find the resultant resistance of the given combination. 2



OR

- a) Draw the magnetic field lines through and around a single loop of wire carrying electric current.
- b) How will the change in direction of current affect the above case (case a)?

### SECTION – C

Q.no. 27 to 33 are short answer questions.

- 27 'X', a compound of calcium is used in whitewashing when dissolved in water. What will be your observations? Write the chemical equation involved in the reaction. Give any other application of the substance X. 3
- 28 In the formation of a compound between two elements A and B, A loses two electrons and B gains one electron. 3
- Identify the elements A and B.
  - What is the nature of bond formed between A and B? What will be the chemical formula of the compound so formed?
  - Represent the above formed compound by electron dot structure.
- 29 Explain the phenomenon of Biological Magnification with the help of an example. 3
- 30 Rahul wanted to obtain an erect image of an object, using a concave mirror of focal length 20 cm. 3
- What should be the range of distance of the object from the mirror?
  - What will be the size and nature of the image formed?
  - Draw a ray diagram to support your answer in the case.
- OR
- How dispersion of light is different from scattering of light? Give an example of each.
  - List the factors on which the angle of deviation depends.
- 31 What happens when a narrow beam of 3
- Monochromatic light passes through (a) a glass slab and (b) a glass prism
  - White light passes through (a) a glass slab and (b) a glass prism?
- 32 Two conductors X and Y of circular cross-section have radii in the ratio of 1:2, length of the conductor in the ratio of 1:3 and resistivity in the ratio of 3:1. Find the ratio of their resistances. 3
- 33 a) What is geotropism? Draw a labeled diagram of a potted plant showing positive geotropism and negative geotropism. 3
- b) What is Chemotropism? Give an example of chemotropism.
- OR
- How do pea plants climb up to the other plants or fences by means of tendrils? Explain
  - How is the movement of the leaves of Touch-me-not Plant different from the movement of a shoot towards light?

### SECTION – D

Q.no. 34 to 36 are long answer questions

- 34 a) An organic compound A is widely used and has a molecular formula  $C_2H_4O_2$ . This compound reacts with ethanol to form a sweet-smelling compound B. 5
- Identify the compound A.

- ii) Write the chemical equation for the reaction between Compound A and ethanol to form compound B.
- iii) How can we get compound A from B? Name the process.
- b) An organic compound 'A' of molecular formula  $C_2H_6O$  on heating with excess of conc. sulphuric acid gives compound 'B' of molecular formula  $C_2H_4$ .
- i) Write a chemical equation for obtaining 'B' from 'A'.
- ii) What is the role of conc. sulphuric acid in the above reaction?

OR

- a) Give balanced chemical equation for the following reactions.
- i) Ethanoic acid from Ethanol
- ii) Propane from Propene
- iii) Sodium Ethoxide from Ethanol
- b) An organic compound with molecular formula  $C_2H_4O_2$  produces brisk effervescence on the addition of sodium carbonate.
- i) Write the chemical equation for the above reaction.
- ii) List any two important uses of the above compound.
- 35 a) State the changes that would take place in the human female reproductive system 5
- (i) in the uterus when implantation of the embryo has occurred
- (ii) if the egg is not fertilized.
- b) Explain the role of Placenta in humans.

OR

- a) What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained?
- b) List any four methods of contraception used by humans. How does their use have a direct effect on the health and prosperity of a family?
- 36 Circuits consisting of just one battery and one load resistance are very simple to analyse, but they are not often found in practical applications. Usually, we find circuits where more than two components are connected in different combinations. These combinations of resistors put a limit on the current that flows through the circuit. 5

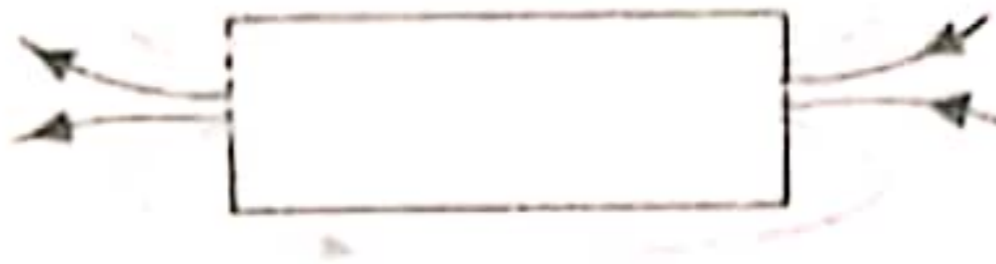
After performing the experiments using two different types of circuit arrangements, the following observations were made using Ohms law. Based on the observations answer the following questions:

Resistor Used	Number of Observation	Voltmeter reading in Volt ( $V$ )	Ammeter reading in ampere ( $A$ )	$R = V/I$ (in ohm)
$R_1$ CASE I	(a)	0.01	0.01	1.0
	(b)	0.02	0.02	1.0
$R_2$ CASE II	(a)	0.06	0.03	2.0
	(b)	0.08	0.04	2.0
1st combination of $R_1$ and $R_2$ CASE III	(a)	0.03	0.01	3.0
	(b)	0.06	0.02	3.0
IInd combination of $R_1$ and $R_2$ CASE IV	(a)	0.03	0.045	0.66
	(b)	0.06	0.09	0.66

- a) Which combination of resistors  $R_1$  &  $R_2$  represents series and parallel combination?
- b) Plot a graph of  $I$  versus  $V$  by representing  $V$  on X axis and  $I$  on Y axis. What will be the nature of the slope represented in each case mentioned above?
- c) Why the measured currents in II<sup>nd</sup> combination is greater than the I<sup>st</sup> combination?
- d) Identical bulbs of the same rating were connected in case III and case IV circuits, In which case bulb will glow brighter and why?
- e) How part (b) will change if axis of  $I$  and  $V$  are interchanged?

OR

- a) Draw the given diagram and mark the poles of a magnet given in the figure



- b) What is meant by magnetic field?
- c) How is the strength of the magnetic field around a wire related to the strength of the electric current flowing in the wire?
- d) State the rule used to determine the direction of magnetic field produced around a straight conductor carrying current. Draw diagram to justify your answer.

#### SECTION – E

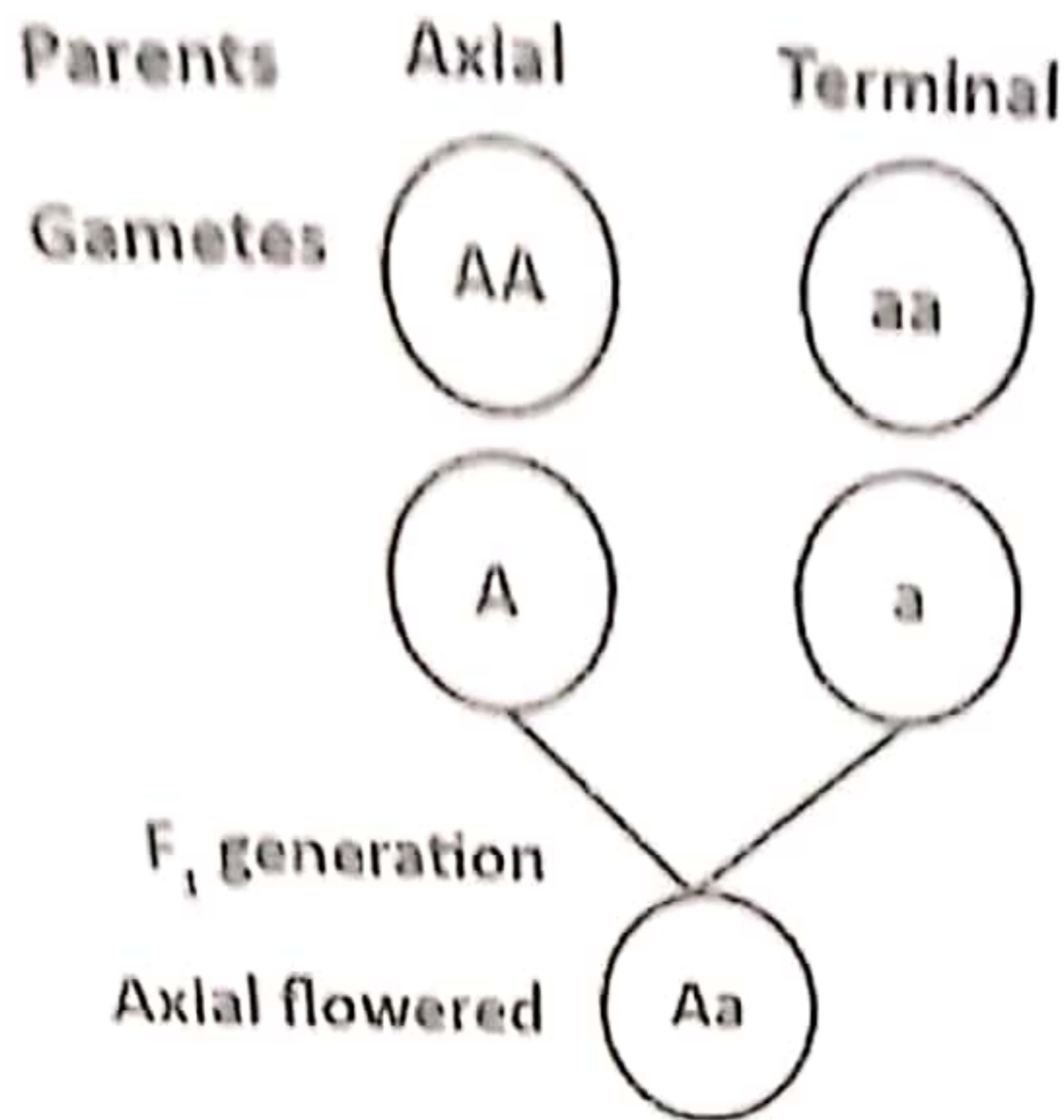
Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

- 37 Non-metals are highly electronegative in nature. They tend to gain electrons in their valence shell to achieve nearest noble gas configuration. Thus, they form anions and act as good oxidising agents. Covalent bond is formed between non-metal and non-metal. 4
- They react with air or oxygen on heating to form oxides which react with water to form acids. Thus, non-metal oxides are acidic in nature. Non-metals do not react with dilute acids. This is because they are electronegative and therefore, cannot displace hydrogen from acids but they form covalent hydrides when heated with hydrogen.
- a) What is an oxidizing agent?
- b) Hydrogen acts as an oxidizing as well as a reducing agent. How will it behave when it is made to react with metals and non -metals respectively?
- c) An element 'X' forms an oxide  $XO_2$ , which is a gas used in the process of photosynthesis. Draw the electron dot structure of the gas.

OR

- c) An element 'X' forms an oxide  $X_2O$ , which is a universal solvent. Show its electron dot structure.
- 38 Given below is a schematic diagram of a cross between sweet pea plants having axial flowers (AA) and terminal flowers (aa). Study the cross and answer the questions that follow: 4





- Give the phenotypic ratio of the  $F_2$  generation on selfing of  $F_1$  generation. Represent it with the help of a cross.
- Give the phenotypic ratio of  $F_2$  progeny if Axial Flowers with genotype  $Aa$  are crossed with terminal flowers with genotype  $aa$ . Represent it with the help of a cross.
- What type of gametes will be produced from the following genotypes:
  - $PpTt$
  - $Bb$

OR

- Name and define Mendel's law that governs the cross between two parents having one pair of contrasting characters.

There are mainly three common refractive defects of vision. Nearsightedness (myopia) makes far-away objects look blurry. Farsightedness (hypermetropia) makes nearby objects look blurry. Presbyopia can make far-away and nearby objects look blurry or distorted.

4

- What are the least distinct vision and far point of a normal human eye?
- What type of lens is required to treat a myopic eye?
- A person is unable to read a book kept at a distance of 30 cm from his eyes. Give reason. How can it be corrected?

OR

- A girl is unable to read the hoardings of an advertisement on the roadside. What type of defect is she suffering from and how it can be corrected?