

SAMPLE PAPER – 2

CBSE BOARD

CLASS - X

SCIENCE

Time : 3 Hours

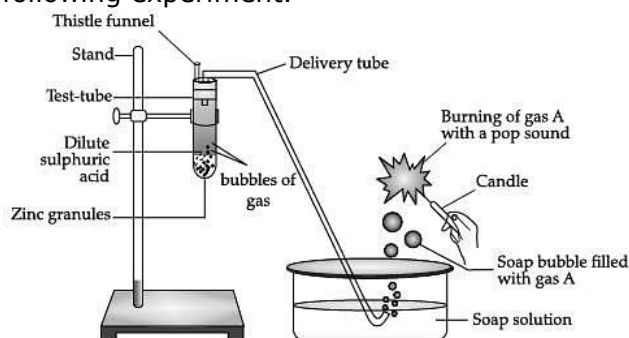
Max. Marks : 80

General Instructions:

- This question paper consists of 39 questions in 5 sections.
- 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** consists of 20 objective type questions carrying 1 mark each.
- 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.
- 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.
- 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.
- Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION – A

1. Identify gas A in the following experiment.

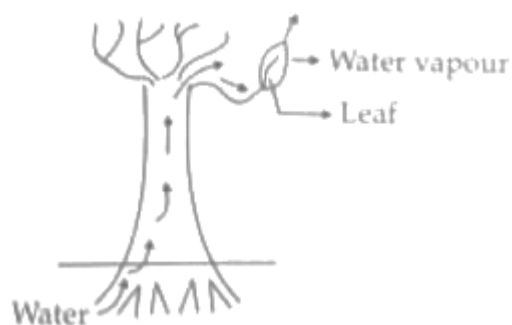


- (A) Nitrogen (B) Hydrogen (C) Oxygen (D) Carbon dioxide
2. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?
- (i) Au (ii) Cu (iii) Na (iv) K
- (A) (i) and (ii) (B) (i) and (iii)
- (C) (ii) and (iii) (D) (iii) and (iv)
3. A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is:
- (A) X=Ca; Y=CaO; Type of reaction = Decomposition
- (B) X=Mg; Y=MgO; Type of reaction = Combination
- (C) X=Al; Y=Al₂O₃; Type of reaction = Thermal decomposition
- (D) X=Zn; Y=ZnO; Type of reaction = Endothermic

4. While studying the saponification reaction, what do you observe when you mix an equal amount of colourless vegetable oil and 20% aqueous solution of NaOH in a beaker?
 (A) The colour of the mixture has become dark brown.
 (B) A brisk effervescence is taking place in the beaker.
 (C) The outer surface of the beaker has become hot.
 (D) The outer surface of the beaker has become cold.
5. The correct electron dot structure of a water molecule is:
 (A) $\text{H} \cdot \ddot{\text{O}} \cdot \text{H}$ (B) $\text{H} : \ddot{\text{O}} : \text{H}$ (C) $\text{H} : \ddot{\text{O}} : \text{H}$ (D) $\text{H} : \text{O} : \text{H}$
6. Two salts X and Y are dissolved in water separately. When phenolphthalein is added to these two solutions the solution X turns pink and the solution Y does not show any change in colour, therefore X and Y are:

	(X)	(Y)
(A)	Na_2CO_3	NH_4Cl
(B)	Na_2SO_4	NaHCO_3
(C)	NH_4Cl	Na_2SO_4
(D)	NaNO_3	Na_2SO_4

7. In which of the following, the identity of initial substance remains unchanged?
 (A) Curdling of milk (B) Formation of crystals by process of crystallisation
 (C) Fermentation of grapes (D) Digestion of food
8. In plants the role of cytokinin is :
 (A) Promote cell division (B) Wilting of leaves
 (C) Promote the opening of stomatal pore (D) Help in the growth of stem
9. One of the events that do not occur during photosynthesis is :
 (A) Chlorophyll absorbs solar energy. (B) Carbon dioxide is released during the process.
 (C) Oxygen is released during the process. (D) Carbon dioxide is absorbed during the process.
10. Observe the following diagram and identify the process and its significance from the following options:
 (A) Evaporation : maintains water contents in leaf cells.
 (B) Transpiration : creates a suction force which pulls water inside the plant.
 (C) Excretion : helps in excreting out waste water from the plant.
 (D) Translocation : helps in transporting materials from one cell to another.



11. In an experiment with pea plants, a pure tall plant (TT) is crossed with a pure short plant (tt). The ratio of pure tall plant to pure short plants in F_2 generation will be:
 (A) 1 : 3 (B) 3 : 1 (C) 1 : 1 (D) 2 : 1

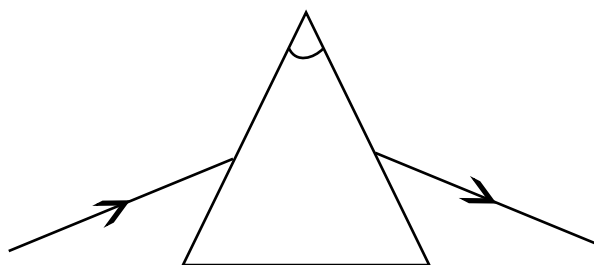
SECTION – B

21. A teacher provided acetic acid, water, lemon juice, aqueous solution of sodium hydrogen carbonate and sodium hydroxide to students in the school laboratory to determine the pH values of these substances using pH papers. One of the students reported the pH values of the given substances as 3, 12, 4, 8 and 14 respectively. Which one of these values is not correct? Write its correct value stating the reason.
22. There are various muscles present in the human digestive system known as sphincters. Two examples of those are given below:
 (a) Pyloric sphincter – at the junction of stomach and small intestine.
 (b) Anal sphincter – at the anus
 Give ONE most likely consequence of malfunctioning of each of these sphincters.
23. Name the part of brain which is responsible for the following actions:
 (a) Maintaining posture and balance (b) Beating of heart
 (c) Thinking (d) Blood pressure

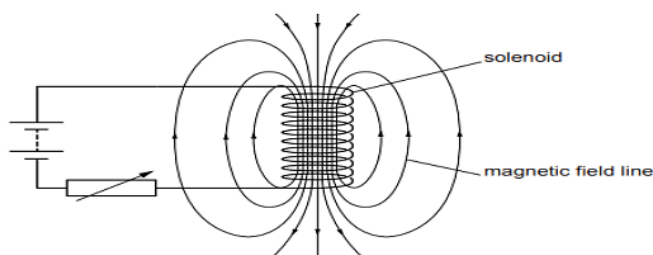
OR

Where are auxins synthesised in a plant? Which organ of the plant shows:

- (a) Positive phototropism
 (b) Negative geotropism
 (c) Positive hydrotropism
24. A student traces the path of a ray of light through a glass prism as shown in the diagram but leaves it incomplete and unlabeled. Redraw and complete the diagram. Also label on it $\angle i$, $\angle r$, $\angle D$ and $\angle e$.



25. A circuit contains a battery, a variable resistor and a solenoid. The figure shows the magnetic field pattern produced by the current in the solenoid.

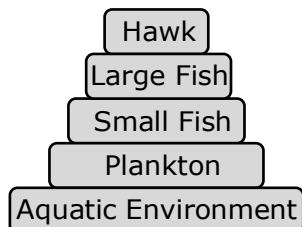


- (a) State how the magnetic field pattern indicates regions where the magnetic field is stronger.
 (b) What happens to the magnetic field when the current in the circuit is reversed?

OR

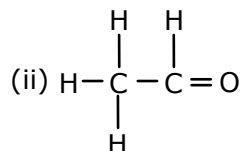
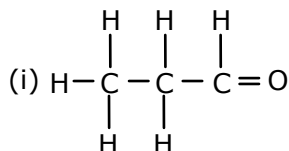
State any two factors on which the magnetic field produced by a current carrying straight conductor depends. Mention the rule which helps to find the direction of its magnetic field.

26. DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer.



SECTION – C

27. Consider the following organic compounds:

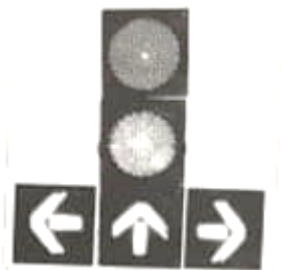


- (a) Name the functional group present in these compounds.
 (b) Write the general formula for the compounds of this functional group.
 (c) State the relationship between these compounds and draw the structure of any other compound having similar functional group.
28. Distinguish between esterification and saponification reactions with the help the chemical equation for each. State one use of each (i) esters and (ii) saponification process.

OR

Write three different chemical reaction showing the conversion of ethanoic acid to sodium ethanoate. Write balanced chemical equation in each case. Write the name of the reactants and the products other than ethanoic acid and sodium ethanoate in each case.

29. (a) What is double circulation?
 (b) Why is the separation of the right side and the left side of the heart useful?
 (c) How does it help birds and mammals?
30. Name the phenomenon occurring in plants which are under the control of gravity, water and chemicals with one example each that shows the movement involved.
31. (a) What is visible spectrum?
 (b) Why is red used as the stopping light at traffic signals?

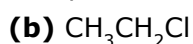
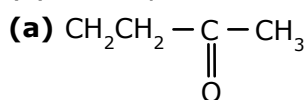


(c) Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of the combination. Will there be any dispersion? Justify your answer.

32. (a) State Ohm's law. Represent it mathematically.
 (b) Define 1 ohm.
 (c) What is the resistance of a conductor through which a current of 0.5 A flows when a potential difference of 2 V is applied across its ends?
33. (a) A student wants to use an electric heater, an electric bulb and an electric fan simultaneously. How should these gadgets be connected with the mains? Justify your answer giving three reasons.
 (b) What is an electric fuse? How is it connected in a circuit?

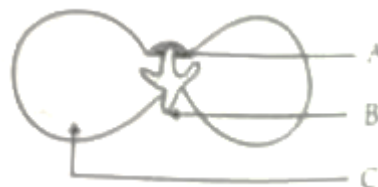
SECTION – D

34. (a) It is observed that covalent compounds are bad conductors of electricity. Give reason.
 (b) Carbon can neither form C^{4+} cation nor C^{4-} anion. Why?
 (c) Draw electron dot structure of ethanol.
 (d) Identify heteroatom(s) in the following compounds:



OR

- (a) What are soaps? Explain the mechanism of cleansing action of soap with the help of a labelled diagram.
 (b) Why detergents are better than soap? Write its advantages.
35. (a) Name the two types of pollination and differentiate between them.
 (b) Explain the post fertilization changes that occur in the ovary of a flower.
 (c) Given below is a diagram of a germinating seed. Label the parts that:
 (i) Gives rise to future shoot.
 (ii) Gives rise to future root system.
 (iii) Stores food.



OR

- (i) Name and explain the two modes of asexual reproduction observed in Hydra.
 (ii) What is vegetative propagation? List two advantages of using this technique.
36. Rishi went to a palmist to show his palm. The palmist used a special lens for this purpose.
 (a) State the nature of the lens and reason for its use.
 (b) Where should the palmist place/hold the lens so as to have a real and magnified image of an object?
 (c) If the focal length of this lens is 10 cm and the lens is held at a distance of 5 cm from the palm, use lens formula to find the position and size of the image.

OR

An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm.

- (a) Use lens formula to find the distance of the image from the lens.
 (b) List four characteristics of the image (nature, position, size, erect/inverted) formed by the lens in this case.
 (c) Draw a ray diagram to justify your answer of part(b).

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.** pH is a unit of measure which describe the degree of acidity or alkalinity of a solution. It is measured on a scale of 0 to 14. The term pH is derived from "p", the mathematical symbol for negative logarithm, and "H", the $\text{pH} = -\log[\text{H}^+]$. pH provides needed quantitative information by expressing the degree of activity of an acid or base in terms of its hydrogen ion activity. The pH value of a substance is directly related to the ratio of hydrogen ion $[\text{H}^+]$ and hydroxyl ion $[\text{OH}^-]$ concentrations. If the H^+ concentration is greater than the OH^- , the material is acidic. If the OH^- concentration is greater than its H^+ , the material is basic. If equal number of H^+ and OH^- ions are present, the material is neutral. In clean water, neutral hydrogen ion concentration is 10^{-7} gram-equivalents per litre. Solution with a pH of less than 7 is considered acidic.
- (a) State the nature of solution, if its pH increases from 7 to 14.
 (b) Mention the ion whose concentration increases with the increase in pH value.
 (c) What is meant by the term pH of a solution? Suggest a method that is generally used for measuring the pH value.

OR

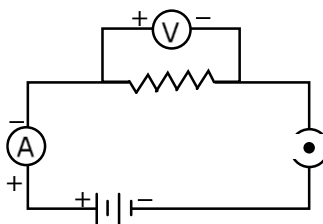
The pH of rain water collected from two cities A and B was found to be 6 and 5 respectively. The water of which city is more acidic?

- 38.** All human chromosomes are not paired. Most human chromosomes have a maternal and a paternal copy and we have 22 such pairs. But one pair of sex chromosomes are odd in not always being a perfect pair. Women have a perfect pair of sex chromosomes. But man has a mismatched pair in which one is normal sized while the other is a short one.
- (a) In humans, how many chromosomes are present in a zygote and in each gamete?
 (b) A few reptiles rely entirely on environmental cues for sex determinations. Comment.
 (c) The sex of a child is a matter of chance and none of the parents is considered to be responsible for it. Justify it through a flow chart only.

OR

(d) Why do all the gamete formed in human female have an X chromosome?

- 39.** The picture shows an electric circuit.
- (a) Which of these is true about the circuit? Circle 'Yes' or 'No' for the correct response.



Is this true for the circuit?	Yes or No
The circuit is open.	Yes/No
The circuit has double batteries.	Yes/No
The circuit has an ammeter and a voltmeter parallel to each other.	Yes/No

- (b) Will there be any change in the ammeter reading if the length of the wire in the circuit is doubled? Explain your answer.
 (c) How is ammeter connected in the circuit to measure electric current?

OR

(d) What is the shape of the graph obtained by plotting the potential difference applied across a conductor against the current flowing through it?