

SAMPLE PAPER – 3 CBSE BOARD CLASS - X SCIENCE

Time : 3 Hours

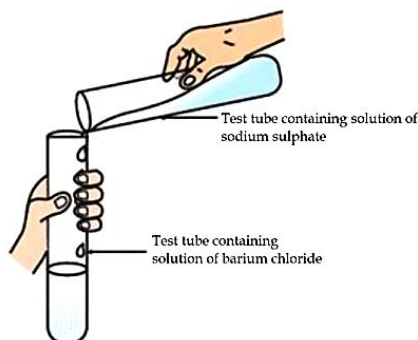
Max. Marks : 80

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 the product which represents the solid state in the given reaction.



- (A) Barium chloride (B) Barium sulphate (C) Sodium chloride (D) Sodium sulphate
2. Mild non-corrosive basic salt is
(A) $\text{Ca}(\text{OH})_2$ (B) NaCl (C) NaOH (D) NaHCO_3
3. Which one of the following correctly represents sodium oxide ?
(A) $\text{Na}^{+2} 2 \left[\overset{\times\times}{\underset{\times\times}{\text{O}} \overset{\times\times}{\text{O}}} \right]^{-2}$ (B) $2 \text{Na}^+ \left[\overset{\times\times}{\underset{\times\times}{\text{O}} \overset{\times\times}{\text{O}}} \right]^{-2}$ (C) $2 \text{Na}^+ 2 \left[\overset{\times\times}{\underset{\times\times}{\text{O}} \overset{\times\times}{\text{O}}} \right]^{-1}$ (D) $\text{Na}^+ \left[\overset{\times\times}{\underset{\times\times}{\text{O}} \overset{\times\times}{\text{O}}} \right]^{-2}$
4. Methane gas released from waste water treatment plants can be used as a source of fuel. Which chemical equation represents the combustion of methane to produce heat energy?
(A) $\text{CH}_4 + \text{CO}_2 \rightarrow 2\text{O}_2 + 2\text{H}_2\text{O}$ (B) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
(C) $2\text{O}_2 + 2\text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{CH}_4$ (D) $\text{CO}_2 + 2\text{O}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$

5. What is X in the reaction ?
 $2Al + 3H_2O \rightarrow Al_2O_3 + X$
(A) Al (B) H_2 (C) O_3 (D) AlH_3
6. Ethane, with the molecular formula C_2H_6 has:
(A) 6 covalent bonds (B) 7 covalent bonds
(C) 8 covalent bonds (D) 9 covalent bonds
7. Bronze is an alloy of:
(A) copper and zinc (B) aluminium and tin
(C) copper, tin and zinc (D) copper and tin
8. The growth of tendril in pea plants is due to:
(A) effect of light
(B) effect of gravity
(C) rapid cell divisions in tendrillar cells that are away from the support
(D) rapid cell divisions in tendrillar cells in contact with the support
9. In the given food chain, suppose the amount of energy at the fourth trophic level is 5 kJ, what will be the energy available at the producer level?
Grass \rightarrow Grasshopper \rightarrow Frog \rightarrow Snake \rightarrow Hawk
(A) 5 kJ (B) 50 kJ (C) 500 kJ (D) 5,000 kJ
10. Select the correct statements for the process of budding in yeast:
I. A bud arises from a particular region on a parent body.
II. A parent cell divides into two daughter cells; here the parental identity is lost.
III. Before detaching from the parent body a bud may form another bud. IV. A bud when detached from the parent body grows into a new individual.
(A) II, III and IV (B) I, II and III
(C) III, IV and I (D) None of the above
11. Name the substances whose build up in the muscles during vigorous physical exercise may cause cramps ?
(A) Ethanol + Carbon dioxide + Energy (B) Lactic acid + Energy
(C) Carbon dioxide + Water + Energy (D) Pyruvate
12. The growth of pollen tubes towards ovules is due to
(A) hydrotropism (B) chemotropism
(C) geotropism (D) phototropism
13. The phenomena of light involved in the formation of a rainbow are:
(A) Refraction, dispersion and scattering.
(B) Refraction, reflection and dispersion.
(C) Refraction, dispersion and internal reflection.
(D) Reflection, dispersion and total internal reflection.
14. The radius of curvature of a converging mirror is 30 cm. At what distance from the mirror should an object be placed as to obtain a virtual image?
(A) Infinity (B) 30 cm
(C) Between 15 cm and 30 cm (D) Between 0 cm and 15 cm

15. Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F1 progeny that have round, yellow (RrYy) seeds. When F1 plants are selfed, the F2 progeny will have new combination of characters. Choose the new combination from the following:
- (i) Round, yellow
(ii) Round, green
(iii) Wrinkled, yellow
(iv) Wrinkled, green
- (A) (i) and (ii) (B) (i) and (iv) (C) (ii) and (iii) (D) (i) and (iii)
16. A microscopic gap between a pair of adjacent neurons over which nerve impulses pass is called
- (A) neurotransmitter (B) dendrites
(C) axon (D) synapse

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

These consist of two statements – Assertion (A) and Reason (R). Answer these questions 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
(E) Both Assertion and Reason are false.
17. **Assertion :** It is advised that while diluting an acid one should add water to acid and not acid to water keeping the solution continuously stirred.
Reason : The process of dissolving an acid into water is highly exothermic.
18. **Assertion :** Egestion is the removal of nitrogenous waste products from the body.
Reason : Excretion is the discharge of undigested matter from the digestive tract.
19. **Assertion :** In the human heart, there is no mixing of oxygenated and deoxygenated blood.
Reason : Valves are present in the heart which allows the movement of blood in one direction only.
20. **Assertion :** A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of the current in the wire is increased.
Reason : The strength of a magnetic field at a point near the conductor increases on increasing the current.

SECTION – B

21. The industrial process used for the manufacture of caustic soda involves electrolysis of an aqueous solution of compound 'X', In this process, two gases 'Y' and 'Z' are liberated. 'Y' is liberated at cathode and 'Z', which is liberated at anode, on treatment with dry slaked lime forms a compound 'B'. Name X, Y, Z and B.

22. (i) Name one gustatory receptor and one olfactory receptor present in human beings.
 (ii) Write a and b in the given flow chart of the neuron through which information travels as an electrical impulse.
 Dendrite → a → b → End point of Neuron

23. (i) Name the organs that form the excretory system in human beings.
 (ii) Describe in brief how urine is produced in the human body.

24. The refractive indices of three media are give:

Medium	Refractive Index
A	1.6
B	1.8
C	1.5

A ray of light is travelling from A to B and another ray is travelling from B to C.

- (i) In which of the two cases the refracted ray bends towards the normal?
 (ii) In which case does the speed of light increase in the second medium? Give reasons for your answer.
25. Priya has a copper wire and an aluminium wire of the same length. Can the electrical resistance of the two wires be the same? Justify your answer.

OR

- (i) Name the poles P, Q, R and S of the magnets in the following figures 'a' and 'b':

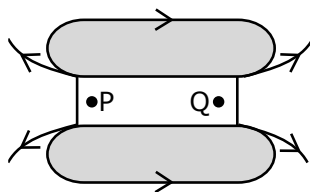


Figure 'a'

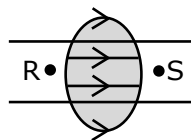


Figure 'b'

- (ii) State the inference drawn about the direction of the magnetic field lines on the basis of these diagrams.

26. What are plant hormones? Give four different types of plant hormones and state their functions briefly.

SECTION – C

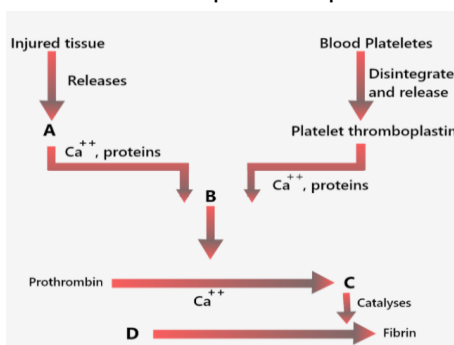
27. A substance X is used as a building material and is insoluble in water. When it reacts with dil. HCl it produces a gas which turns lime water milky.
 (i) Write the chemical name and formula of 'X'.
 (ii) Write chemical equations for the chemical reactions involved in the above statements.

28. Distinguish between esterification and saponification reaction with the help of the chemical equation for each. State one use of each (i) esters and (ii) saponification process.

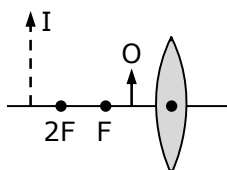
OR

Write three different chemical reactions 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. 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 ratio he obtained in F2 generation plants.
30. Complete the flowchart given below and explain its process:



31. The diagram given shows an object O and its image I. Without actually drawing the ray diagram state the following:



- (i) Type of lens (Converging/Diverging)
 (ii) Name two optical instruments where such an image is obtained.
 (iii) List three characteristic of the image formed if this lens is replaced by a concave mirror of focal length F and an object is placed at a distance F/2 in front of the mirror.
32. (i) List the factors on which the resistance of a uniform cylindrical conductor of a given material depends.
 (ii) The resistance of a wire of 0.001 cm radius 10Ω . If the resistivity of the wire is $50 \times 10^{-8}\Omega \text{ m}$ find the length of this wire.
33. (i) What is visible spectrum?
 (ii) Why is red used as the stopping light at traffic signals?
 (iii) Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of this combination. Will there be any dispersion? Justify your answer.

SECTION – D

34. (i) A compound "A" with a molecular formula of $\text{C}_2\text{H}_4\text{O}_2$ reacts with a base to give salt and water. Identify 'A', state its nature and the name of the functional group it possesses. Write the chemical equation for the reaction involved.
 (ii) When the above stated compound 'A' reacts with another compound 'B' having molecular formula $\text{C}_2\text{H}_6\text{O}$ in the presence of an acid, a sweet smelling compound 'C' is formed.
 (a) Identify 'B' and 'C'.
 (b) State the role of acid in this reaction.
 (c) Write the chemical equation for the reaction involved.

OR

(i) Match the following pH values 1, 7, 10, 13 to the solutions given below:

- (a) Milk of magnesia
- (b) Gastric juices
- (c) Brine
- (d) Aqueous sodium hydroxide.

(ii) Amit and Rita decided to bake a cake and added baking soda to the cake batter. Explain with a balanced reaction, the role of the baking soda. Mention any other use of baking soda.

35. With the help of suitable diagrams, explain the various steps of budding in Hydra.

OR

(i) List the three events that occur during the process of photosynthesis. Explain the role of stomata in this process.

(ii) Describe an experiment to show that "sunlight is essential for photosynthesis."

36. Rishi went to palmist to show his palm. The palmist used a special lens for this purpose.

(i) State the nature of the lens and reason for its use.

(ii) Where should the palmist place/hold the lens so as to have a real and magnified image of an object?

(iii) If the focal length of this lens is 10 cm and the lens is hold at a distance of 5 cm from the palm, use lens formula to find the position and size of the image.

OR

(i) A security mirror used in a big showroom has a radius of curvature 5 m. If a customer is standing at a distance of 20 m from the cash counter, find the position, nature and size of the image formed in the security mirror.

(ii) Neha visited a dentist in his clinic. She observed that the dentist was holding an instrument fitted with a mirror. State the nature of this mirror and the reason for its use in the instrument used by dentist.

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. The melting points and boiling points of some ionic compounds are given below:

Compound	Melting Point (K)	Boiling Point (K)
NaCl	1074	1686
LiCl	887	1600
CaCl ₂	1045	1900
CaO	2850	3120
MgCl ₂	981	1685

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every elements tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.

(i) Show the electron transfer in the formation of magnesium chloride.

(ii) List two properties of ionic compounds other than their high melting and boiling points.

(iii) While forming an ionic compounds say sodium chloride how does the sodium atom attain its stable configuration?

OR

(iii) Give reasons :

(a) Why do ionic compounds in the solid state not conduct electricity?

(b) What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride?

38. Human body is made up of five important components, of which water is the main component. Food as well as potable water are essential for every human being. The food is obtained from plants through agriculture. Pesticides are being used extensively for a high yield in the fields. These pesticides are absorbed by the plants from the soil along with water and minerals and from the water bodies these pesticides are taken up by the aquatic animals and plants. As these chemicals are not biodegradable, they get accumulated progressively at each trophic level. The maximum concentration of these chemicals gets accumulated in our bodies and greatly affects the health of our mind and body.

(i) Why is the maximum concentration of pesticides found in human beings?

(ii) Give one method which could be applied to reduce our intake of pesticides through food to some extent.

(iii) Various steps in a food chain represent:

(A) Food web (B) Trophic level (C) Ecosystem (D) Biomagnification

(iv) With regard to various food chains operating in an ecosystem, man is a:

(A) Consumer

(B) Producer

(C) Producer and consumer

(D) Producer and decomposer

39. Electric circuit is the path for transmitting electric current. An electric circuit includes a device that gives energy to the charged particles constituting the current, such as a battery or a generator; devices that use current, such as lamps, electric motors, or computers; and the connecting wires or transmission lines. Electric circuits are classified in several ways. A direct-current circuit carries a current that flows only in one direction. An alternating-current circuit carries a current that pulsates back and forth many times each second, as in most household circuits. Study the circuit given below and answer the following questions.

(i) In case of an overload, will the fuse protect the electric oven from damage? Justify your answer.

(ii) If the oven has a rating of 13 A, what should be the minimum rating of the fuse?

OR

(iii) Mention the colour convention for live, neutral and earth wires. Pick out the wire used as a safety measure for electrical appliance with metallic body.

