

SAMPLE PAPER – 1

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

- In the redox reaction
$$\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$$

(A) MnO_2 is reduced to MnCl_2 & HCl is oxidized to H_2O
(B) MnO_2 is reduced to MnCl_2 & HCl is oxidized to Cl_2
(C) MnO_2 is oxidized to MnCl_2 & HCl is reduced to Cl_2
(D) MnO_2 is oxidized to MnCl_2 & HCl is reduced to H_2O
- Four students studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and dilute sodium hydroxide solution and presented their results as follows. The (✓) represents evolution of gas whereas (×) represents no reaction.

| | Zn | Na ₂ CO ₃ | | Zn | Na ₂ CO ₃ | | Zn | Na ₂ CO ₃ | | Zn | Na ₂ CO ₃ |
|------|----|---------------------------------|------|----|---------------------------------|------|----|---------------------------------|------|----|---------------------------------|
| HCl | ✓ | ✓ | HCl | ✓ | × | HCl | × | × | HCl | ✓ | ✓ |
| NaOH | ✓ | × | NaOH | ✓ | × | NaOH | ✓ | ✓ | NaOH | × | × |

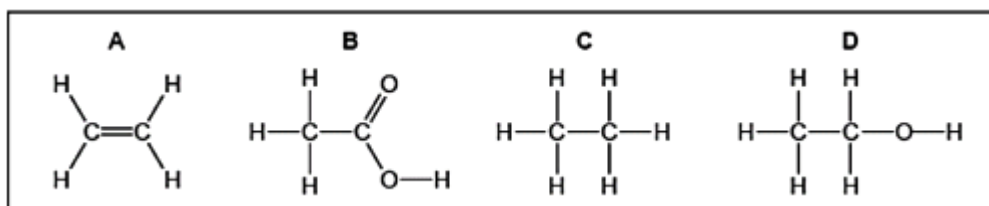
The right set of observations is that of student:

- (A) A (B) B (C) C (D) D
- The following pair of substances are available in the laboratory:
 - Zinc and dilute hydrochloric acid
 - Zinc and sodium hydroxide solution
 - Sodium bicarbonate and dilute hydrochloric acidWhich of these can be used to produce a colourless and odourless gas which gives a pop sound on burning?

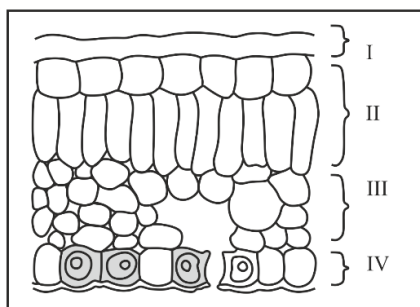
(A) (i) only (B) (ii) only (C) (i) and (ii) (D) (i) and (iii)

4. Which of the following substances are not ionic compounds?
 (i) KCl (ii) HCl (iii) CCl₄ (iv) NaCl
 (A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iii)
5. Jaya adds aqueous solution of barium chloride to an aqueous solution of sodium sulphate. She would observe that:
 (A) a pungent smelling gas is evolved
 (B) the colour of the solution turns red
 (C) a yellow precipitate is formed after some time
 (D) a white precipitate is formed immediately
6. An element forms basic oxide and readily forms ionic compounds. The element reacts with dilute acid to release hydrogen gas. Identify the nature of the element.
 (A) Nobel gas (B) Non-metal (C) Metal (D) Metalloid

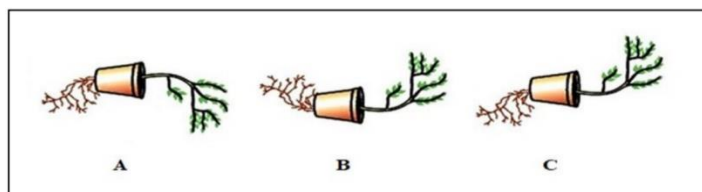
7. The formulae of four organic compounds are shown below. Choose the correct option



- (A) A and B are unsaturated hydrocarbons
 (B) C and D are saturated hydrocarbons
 (C) Addition of hydrogen in presence of catalyst changes A to C
 (D) Addition of potassium permanganate changes B to D
8. In the given transverse section of the leaf identify the layer of cells where maximum photosynthesis occurs.



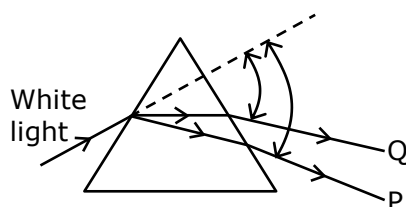
- (A) I, II (B) II, III (C) III, IV (D) I, IV
9. Observe the three figures given below. Which of the following depicts tropic movement appropriately?



- (A) B and C (B) A and C (C) B only (D) C only
10. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in
 (A) cytoplasm (B) mitochondria (C) chloroplast (D) nucleus

11. Upon observing slides showing stages of reproduction in Amoeba and yeast, student reported the following observations:
 (i) Budding was seen in the yeast cell.
 (ii) A chain of buds was seen due to reproduction in Amoeba.
 (iii) In Amoeba, the elongated nucleus was dividing to form two daughter nuclei.
 (iv) Single cells of Amoeba and Yeast were undergoing binary fission and budding respectively.
 The correct observations are:
 (A) (i) and (ii) only (B) (ii) only
 (C) (iii) and (iv) only (D) (i), (iii) and (iv) only
12. A plant bends towards the source of light when exposed to the light on only one side. Which of the following is the best explanation of the phenomena ?
 (A) It needs light for photosynthesis
 (B) The apices of their stems are attracted by light
 (C) Auxin accumulates on the shaded side to induce greater cell elongation on that side
 (D) Light stimulates the cells on the illuminated side to increase in length
13. A student wants to obtain an erect image of an object using a concave mirror of 10 cm focal length. What will be the distance of the object from mirror?
 (A) Less than 10 cm (B) 10 cm
 (C) between 10 cm and 20 cm (D) more than 20 cm

14. In the following diagram showing dispersion of white light by a glass prism, the colours 'P' and 'Q' respectively are –



- (A) Red and Violet (B) Violet and Red (C) Red and Blue (D) Orange and Green
15. In human males all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are
 (i) large chromosome (ii) small chromosome
 (iii) Y-chromosome (iv) X-chromosome
 (A) (i) and (ii) (B) (iii) and (i) (C) (iii) and (iv) (D) (ii) and (iv)
16. How much energy is transferred from one trophic level to other in a food chain?
 (A) 10% (B) 50% (C) 80% (D) 90%

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

17. **Assertion:** Silver bromide decomposition is used in black and white photography.
Reason: Light provides energy for this exothermic reaction.
18. **Assertion:** A genetist crossed a pea plant having violet flowers with a pea plant with white flowers, he got all violet flowers in first generation.
Reason: Violet colour gene is dominant.
19. **Assertion:** In plants there is no need of specialized respiratory organ.
Reason: Plants do not have great demands of gaseous exchange.
20. **Assertion:** A current carrying straight conductor experiences a force when placed perpendicular to the direction of magnetic field.
Reason: The net charge on a current conductor is always zero.

SECTION – B

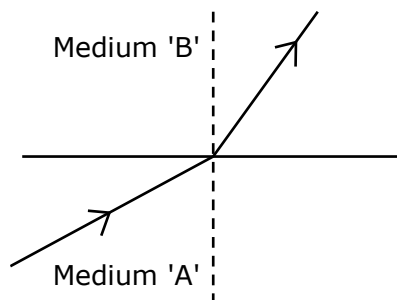
21. The following observations were made by a student on treating four metals P, Q, R and S with the given salt solutions:

| Sample | MgSO ₄ (aq) | Zn(NO ₃) ₂ (aq) | CaSO ₄ (aq) | Na ₂ SO ₄ (aq) |
|--------|------------------------|--|------------------------|--------------------------------------|
| P | No reaction | Reaction occurs | Reaction occurs | No reaction |
| Q | Reaction occurs | Reaction occurs | Reaction occurs | Reaction occurs |
| R | No Reaction | Reaction Occurs | No Reaction | No Reaction |
| S | No Reaction | No Reaction | No Reaction | No Reaction |

Based on the above observations:

- (a) Arrange the given samples in the increasing order of reactivity.
(b) Write the chemical formulae of products formed when Q reacts with CuSO₄ solution.
22. Where do plants get each of the raw material required for photosynthesis.
- OR**
- In birds and mammals the left and right side of the heart are separated. Give reasons.
23. Patients whose Gall bladder are removed are recommended to eat less oily food. Why?
24. Let the resistance of an electrical device remain constant, while the potential difference across its two ends decreases to one fourth of its initial value. What change will occur in the current through it? State the law which helps us in solving the above stated question.

25. A light ray enters from medium A to medium B as shown in the figure.
 (a) Which one of the two media is denser w.r.t other medium? Justify your answer.



- (b) If the speed of light in medium A is V_A and B is V_B , what is the refractive index of B with respect to A?

OR

- (a) A ray of light skirting from diamond is incident on the interface separating diamond and water. Draw a labeled ray diagram to show the refraction of light in this case.
 (b) Absolute refractive indices of diamond and water are 2.42 and 1.33 respectively. Find the value of refractive index of water w.r.t. diamond.
26. What are trophic levels? Give an example of a food chain and state the different trophic levels in it.

SECTION – C

27. Write the chemical equation for the reactions taking place when:
 (a) Iron reacts with steam
 (b) Magnesium reacts with dil. HCl
 (c) Copper is heated in air
28. (a) Explain the formation of calcium chloride with the help of electron dot structure. (Atomic numbers: Ca = 20; Cl = 17)
 (b) Why do ionic compounds not conduct electricity in solid state but conduct electricity in molten and aqueous state?

OR

The number of carbon compounds is more than those formed by all other elements put together. Justify the statement by giving three reasons.

29. Explain where and how urine is produced?
30. In humans, there is a 50% probability of the birth of a boy and 50% probability that a girl will be born. Justify the statement on the basis of the mechanism of sex-determination in human beings.
31. What is a solenoid? When does a solenoid behave as a magnet? Draw the pattern of the magnetic field produced inside it showing the direction of the magnetic field lines.
32. The power of a lens is +4D. Find the focal length of this lens. An object is placed at a distance of 50 cm from the optical centre of this lens. State the nature and magnification of the image formed by the lens and also draw a ray diagram to justify your answer.

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 reason.
- (b) What is an electric fuse? How is it connected in a circuit?

SECTION – D

34. Shristi heated Ethanol with a compound A in presence of a few drops of concentrated sulphuric acid and observed a sweet smelling compound B is formed. When B is treated with sodium hydroxide is gives back Ethanol and a compound C.
- (a) Identify A and C
- (b) Give one use each of compounds A and B.
- (c) Write the chemical reactions involved and name the reactions.

OR

- (a) What is the role of concentrated sulphuric acid when it is heated with Ethanol at 443 K. Give the reaction involved.
- (b) Reshu by mistake forgot to label the two test tubes containing Ethanol and Ethanoic acid. Suggest an experiment to identify the substances correctly? Illustrate the reactions with the help of chemical equations.
35. (A) Why is the flow of signals in a synapse is from axonal end of one neuron to dendritic end of another neuron but not the reverse?
- (B) What are the major part of brain? Mention the function of different parts.

OR

- (A) Draw diagram of brain and label
- | | |
|------------------|--------------|
| (i) cerebrum | (ii) medulla |
| (iii) cerebellum | (iv) pons |
- (B) Name the plant hormone responsible for the following:
- | | |
|--------------------------------|------------------------|
| (i) promotion of cell division | (ii) Inhibits growth |
| (iii) Promotes fruit ripening | (iv) Promotes dormancy |
36. (a) A lens produces a magnification of -0.5 . Is this a converging or diverging lens? If the focal length of the lens is 6 cm; draw a ray diagram showing the image formation in this case.
- (b) A girl was playing with a thin beam of light from a laser torch by directing it from different on a convex lens held vertically. She was surprised to see that in a particular direction, the beam of light continued to move along the same direction after passing through the lens. State the reason for her observation. Draw a ray diagram to support 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. We can quantitatively find the amount of H^+ ions present in a solution. We can judge how strong a given acid or base is, by making use of a universal indicator, which is a mixture of several indicators. The universal indicator shows different colours at different concentrations of hydrogen ions in a solution. A scale for measuring hydrogen ion concentration in a solution called pH scale has been developed. The p in pH stands for 'potenz' in German, meaning power.

On the pH scale we can measure pH generally from 0 (very acidic) to 14 (very alkaline). The pH of a neutral solution is 7.

Read the above passage and answer the following questions.

- (a) You have two solutions A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution has higher hydrogen ion concentration? Which of these is acidic and which one is basic?
- (b) What effect does the concentration of $H^+(aq)$ ion have on the acidic nature of the solution?

OR

Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is:

- (i) neutral (ii) strongly alkaline (iii) strongly acidic

- 38.** The transfer of pollen grains from the anther to the stigma of a flower is called pollination. It takes place by wind, water or insects. If the pollen grains are transferred from the anther to the stigma of the same flower it is known as self-pollination and if it is transferred from the anther of one flower to the stigma of another flower it is called cross-pollination.

Read the passage given above and answer the following questions:

- (a) Which part of the flower produce pollen grains?
- (b) Why are pollen grains need to be transferred?
- (c) Name the types of pollination.
- (d) Which region of pistil form fruit and seed.

- 39.** A students fixes a white sheet of paper on a drawing board. He places a bar magnet in the centre and sprinkles some iron filings uniformly around the bar magnet. The he taps gently and observed that iron filings arrange themselves in a certain pattern.

- (a) Why do iron filings arrange themselves in a particular pattern?
- (b) Which physical quantity is indicated by the pattern of field lines around the bar magnet?
- (c) State any two properties of magnetic field lines.

OR

Draw the magnetic field lines around a straight current carrying conductor.