CBSE
Class X Science
Sample Paper - 2

Time: 3 hrs. **Total Marks: 80**

General Instructions:

- The question paper comprises five sections – A, B, C, D and E. You are to attempt all the sections.
- All questions are compulsory.
- Internal choice is given in sections B, C, D and E.
- Question numbers 1 and 2 in Section A are one mark questions. They are to be answered in one word or in one sentence.
- Question numbers 3 to 5 in Section B are two marks questions. These are to be answered in about 30 words each.
- Question numbers 6 to 15 in Section C are three marks questions. These are to be answered in about 50 words each.
- Question numbers 16 to 21 in Section D are five marks questions. These are to be answered in about 70 words each.
- Question numbers 22 to 27 in Section E are based on practical skills. Each question is a two marks question. These are to be answered in brief.

SECTION A

1. What is meant by translocation with respect to transport in plants? (1)

2. Name any two elements present in fossil fuels in addition to carbon. (1)

SECTION B

3. Electrical resistivity of silver is $1{\cdot}60 \times 10^{-6}\Omega$m. What will be the resistance of a silver wire of length 10 m and cross-sectional area 2×10^{-3} m^2? (2)

OR

Three resistors of 6 Ω, 8 Ω, 10 Ω are connected in parallel. The potential difference of 5V is applied across the circuit. Calculate the current across the circuit.

4. What is meant by 'water of crystallisation' in a substance? Explain with an example. (2)

5. Describe how decomposers facilitate recycling of matter in order to maintain balance in the ecosystem. (2)

SECTION C

6. What is a reflex action? Describe the steps involved in a reflex action. (3)

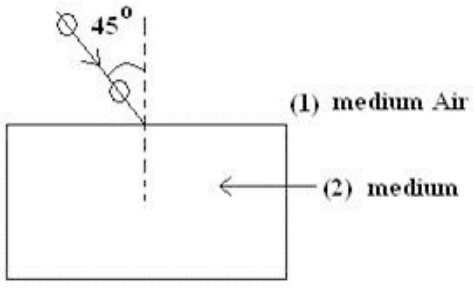
7. Explain natural selection with the help of suitable examples. (3)

OR

Distinguish between biodegradable and non-biodegradable substances. List two effects of each of them on our environment.

8. A student wants to obtain an erect image of an object using a concave mirror of 12 cm focal length. What should be the range of distance of the object from the mirror? State the nature and size of the image he is likely to observe. Draw a ray diagram to justify your answer. (3)

OR



A ray of light is incident at an angle of 45° at the interface of medium (1) and medium (2) as shown in the above diagram. Redraw this diagram in the answer book and complete it. If the angle of refraction is 30°, find the refractive index of medium (2) with respect to medium (1).

(Given that $\sin 45^0 = \frac{1}{\sqrt{2}}$ sin and $\sin 30^0 = \frac{1}{2}$)

If the second medium is water in place of medium (2), will the angle of refraction increase or decrease? Why? (Refractive index of water =4/3)

9. Consider the following elements: Na, Ca, Al, K, Mg and Li. (3)
(a) Which of these elements belongs to the 3rd period of the modern periodic table?
(b) Which of these elements belong to Group 1 of the modern periodic table?
(c) Which of these elements show a valency of +3?

10. Is it true that when a new species emerges, the old species is eliminated and why? (3)

11. What is organic evolution? How do embryological studies provide evidence for evolution? (3)

12. A water-insoluble calcium compound (A) on reacting with dil. H_2SO_4 released a colourless and odourless gas (B) with brisk effervescence. When this gas (B) was passed through lime water, the lime water turned milky and again formed compound A. Identify A and B, and write the chemical equations for the reactions involved. (3)

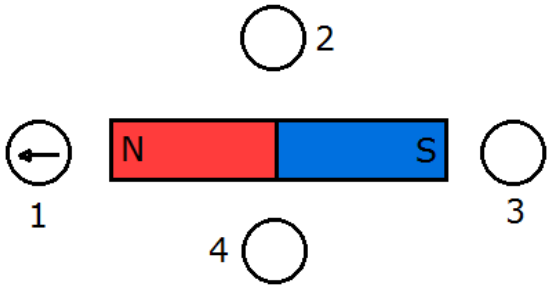
OR

(a) With the help of a suitable example, explain oxidation and reduction in terms of gain or loss of oxygen.

(b) Identify the substances which are oxidised and the substances which are reduced in the following reaction:

$$4Na_{(s)} + O_{2(g)} \longrightarrow 2Na_2O_{(s)}$$ (3)

13. The diagram below shows a bar magnet surrounded by 4 compasses. What directions will the compasses 2, 3 and 4 show? (3)



14. Identify the compound X on the basis of the reactions given below. Also, write the name and chemical formulae of A, B and C. (3)

$$\text{Compound 'X'} \xrightarrow{+Zn} \text{'A'} + H_{2(g)}$$
$$\text{Compound 'X'} \xrightarrow{+HCl} \text{'B'} + H_2O$$
$$\text{Compound 'X'} \xrightarrow{+CH_3COOH} \text{'C'} + H_2O$$

15. Karan's school organised a picnic at a wildlife sanctuary. The students noticed a streak of bright light through the canopy of the dense forest. Karan went near the canopy and saw that a few people were cutting trees. Karan informed his teacher who then contacted the police. (3)

(a) What values were exhibited by Karan and his teacher?

(b) What is the phenomenon due to which bright light was seen through the canopy? Explain the phenomenon.

SECTION D

16. Explain with an example how Metal X which is low in the reactivity series and Metal Y which is high in the reactivity series are obtained from their compounds by the reduction process. (5)

(a) Write the electronic configurations of sodium and chlorine. Show the formation of sodium chloride from sodium and chlorine by the transfer of electrons.

(b) List any two observations when a highly reactive metal is dropped in water.

17. Explain the process of photosynthesis in plants. List four factors which influence this process and describe how each of them affects the rate of the photosynthesis process. (5)

OR

(a) Write the three main steps which take place in chloroplasts during photosynthesis.

(b) How does stomata open and close?

(c) Which raw material is made available to plants for photosynthesis when stomata are open?

18. Draw a ray diagram for the following positions of the object placed in front of a convex lens: (5)

(a) Between optical centre and principal focus (F)

(b) Between F and 2F

(c) At 2F

How will the nature and position of the image formed change in cases (i) and (ii) in part (a) if the convex lens is replaced with a concave lens? Draw the corresponding ray diagram.

19. (5)

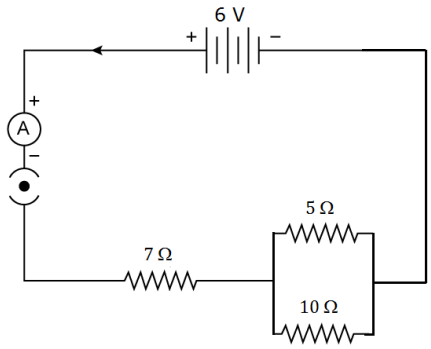
(a) Derive an expression for the heat produced in a conductor of resistance R when a current I flows through it for time t.

(b) Two identical resistors of resistance R are connected in series with a battery of potential difference V for time t. The resistors are then connected in parallel with the same battery for the same time t. Compare the heat produced in the two cases.

OR

(a) Deduce the expression for the equivalent resistance of the parallel combination of three resistors R_1, R_2 and R_3.

(b) Consider the following electric circuit:



Calculate:

(i) Resultant resistance

(ii) Total current

(iii) Voltage across 7-Ω resistor

20. (5)

(a) Why are covalent compounds generally poor conductors of electricity?

(b) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?

(c) Write the structural formula of two isomers of n-pentane C_5H_{12}.

OR

Draw the structures for the following compounds.

(a) Ethanoic acid

(b) Bromopentane

(c) Butanone

(d) Hexanal

Give three possible structural isomers for bromopentane?

21. (5)

(a) Draw a diagram showing the germination of pollen on the stigma. Label the style, male germ cell, ovule and female germ cell.

(b) What happens to the following parts of a flower after fertilisation—ovule, zygote, ovary?

SECTION E

22. To prepare a good temporary mount of Petunia leaf peel showing many stomata, where will the student get the peel from? (2)

23. Rohit is provided with a solenoid having 'n' fixed turns and made of an iron core. When the current is passed through the solenoid, the strength of the magnetic field is too high. What must be done by him to reduce the strength of the magnetic field without changing the number of turns and core of the solenoid? (2)

OR

What do you think must be the pole of the electromagnet if the current in the coil at that pole of the electromagnet is in the clockwise direction? Which rule helps you to determine the direction of current in the coil?

24. Two students perform an experiment with mirrors, one with a concave mirror and one with a convex mirror. The image formed by a concave mirror is real, while that of the convex mirror is virtual. Where the screen should be placed in both cases? (2)

25. Give any decomposition reaction which is used as a lab preparation method for oxygen gas. (2)

OR

What happens when a sheet of copper is put in ferrous sulphate solution?

26. Equal lengths of Mg ribbon are taken in test tubes A and B. Hydrochloric acid is added to test tube A, while acetic acid is added to test tube B. In which case the reaction would occur more vigorously and why? Write the chemical equations for reactions in test tubes A and B. (2)

27. What are the precautions taken during the experimental setup in proving that carbon dioxide is given out during respiration? (2)

OR

A student wanted to conduct an experiment to show that CO_2 is released during respiration. List two precautions which he/she must take in order to get accurate results.