CBSE
Class X Science
Sample Paper - 1

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 the basic difference between asexual reproduction and sexual reproduction? (1)

2. Name the process in which a harmful chemical enters the food chain and gets concentrated at each trophic level. (1)

Section B

3. Why do fish die when taken out of water? (2)

OR

Why do muscle cramps occur after heavy exercise?

4. An electric heater is used on a 220-V supply and it consumes a current of 3.4 A. Calculate: (a) its power and (b) its resistance when it is in use. (2)

5. What are groups and periods in the periodic table? Two elements X and Y belong to Groups 1 and 2, respectively, and are in the same period of the periodic table. How do the following properties of X and Y vary? (2)
 (a) Their valencies in forming oxides
 (b) Molecular formula of their chlorides.

Section C

6. (3)
 (a) How is plaster of Paris chemically different from gypsum? How are they interconverted? Write one use of plaster of Paris.
 (b) State the relation between hydrogen ion concentration of an aqueous solution and its pH. Provide the formula to show the relation between hydrogen ion concentration and pH.

OR

 (a) The pH of a cold drink is 5. What will be its action on blue and red litmus solutions?
 (b) The pH values of three acids A, B and C having equal molar concentrations are 5.0, 2.8 and 3.5, respectively. Arrange these acids in the order of increasing acid strengths.

7. Give reasons for the following: (3)
 (a) The glottis is guarded by the epiglottis.
 (b) Lung alveoli are covered with blood capillaries.
 (c) The tracheal wall is supported by cartilaginous rings.

8. Give reasons for the following: (3)
 (a) Oxidation of ethanol with CrO_3 produces ethanal, while ethanol when oxidised with alkaline $KMnO_4$ produces ethanoic acid.
 (b) Propanone forms an addition product with HCN.
 (c) Alcohol supplied for industrial purposes is mixed with copper sulphate.

9. How can a magnetic field be produced without using a magnet? Describe an experiment to show that a magnetic field exerts a force on a current-carrying conductor. (3)

10. Define the term dispersion of white light. Name the colour of light which bends (i) the most, (ii) the least, while passing through a glass prism.
 Draw a ray diagram to justify your answer. (3)

11. The image of an object placed at 60 cm in front of a lens is obtained on a screen at a distance of 120 cm from it. Find the focal length of the lens. What would be the height of the image if the object is 5 cm high? (3)

OR

A convex mirror used on a bus has a focal length of 200 cm. If a scooter is located at 400 cm from this mirror, find the position, nature and magnification of the image formed in the mirror.

12. No chemical reaction takes place when granules of a solid A are mixed with the powder of another solid B. However, when the mixture is heated, a reaction takes place between its components. One of the products, C, is a metal and settles in the molten state, while the other product D floats over it. It was observed that the reaction is highly exothermic.

Based on the given information, make an assumption about A and B and write a chemical equation for the chemical reaction indicating the conditions of reaction, physical state of reactants and products and thermal states of the reaction. Mention any two types of reactions under which the above chemical reaction can be classified. (3)

13. Why is the rate of breathing much faster in aquatic organisms than in terrestrial organisms? (3)

OR

Leaves of a healthy potted plant were coated with *Vaseline*. Will this plant remain healthy for long? Give reasons.

14. The genotype of green stemmed tomato plants is denoted as GG and that of purple stemmed tomato plants is denoted as gg. When these two are crossed with each other, (3)
(a) What colour of stem would you expect in the F_1 progeny?
(b) Give the percentage of purple-stemmed plants if F_1 plants are self-pollinated.

15. We hear and read about female foeticide which is a wrong practice. In some families, be it rural or urban, females are tortured for giving birth to a girl child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In your opinion, is the approach of society towards the mother in this regard correct or not? Explain the scientific reason. (3)

Section D

16.

   (a) Draw a diagram of the human alimentary canal and label the following: (5)
     (i) Part in which starch digestion starts.
     (ii) Part in which bile is stored.
     (iii) Part in which nutrients are absorbed.

   (b) Mention the role of hydrochloric acid in the stomach.
   (c) What function is served by the following?
     (i) Gastric sphincter
     (ii) Anal sphincter

OR

Observe the given diagram and answer the following questions:
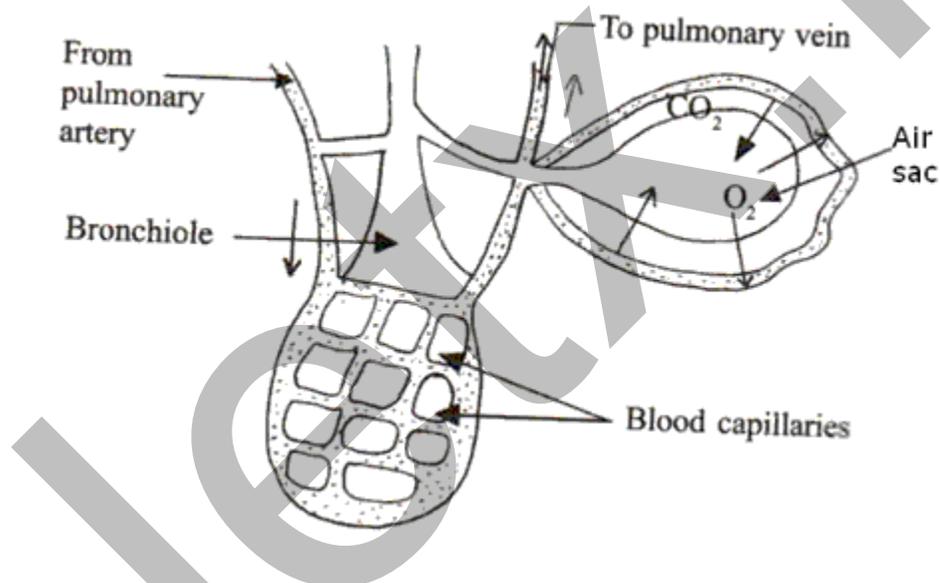
(a) Name the process shown in the given diagram.
(b) What type of air is present in the bronchiole?
(c) What type of blood does the pulmonary artery contain?
(d) What type of blood does the pulmonary vein contain?
(e) Name the corresponding structure found in plants.

17. What is meant by power of a lens? Name and define its SI unit.
One student uses a lens of focal length +50 cm and another of −50 cm. State the nature of each lens and find their powers. Which of the two lenses will always give a virtual, erect and diminished image irrespective of the position of the object?   (5)

OR

(a) Define:
  i. Centre of curvature of a spherical mirror
  ii. Pole of a spherical mirror
(b) State the mirror formula and its magnification.
(c) Using the same, find the distance at which an object should be placed for getting a real and inverted image at 45 cm using a concave mirror of focal length 20 cm.

18. Give reason why   (5)
  (a) Metals are good conductors, whereas non-metals are bad conductors of electricity.
  (b) Metals replace hydrogen from acids, whereas non-metals do not.
  (c) An iron knife dipped in a blue copper sulphate solution turns the blue solution light green.
  (d) Sodium is kept under kerosene.
  (e) Carbon cannot reduce the oxides of sodium or aluminium.

OR

  (a) Distinguish between ionic and covalent compounds under the following properties:
  (i) Strength of forces between constituent elements.
  (ii) Solubility of compounds in water.
  (iii) Electrical conduction in substances.

  (b) Distinguish between 'roasting' and 'calcination'. Which of these two is used for sulphide ores and why?

19.   (5)
  (a) List the factors on which the resistance of a conductor depends.
  (b) A 4-kW heater is connected to a 220-V power source. Calculate
    (i) Electric current passing through the heater
    (ii) Resistance of the heater
    (iii) Electric energy consumed in a 2-hour use of the heater

20.   (5)
  (a) Give three advantages of rain-harvested water stored underground.
  (b) 'Forests cannot be conserved only by legislation; local human intervention is also required'. Justify your answer with two examples.

21. An organic compound A having the molecular formula C_3H_8O is a liquid at room temperature. The organic liquid A reacts with sodium metal to evolve a gas which burns causing a little explosion. When the organic liquid A is heated with concentrated sulphuric acid at 170°C, it forms a compound B which decolourises bromine water. The compound B adds one molecule of hydrogen in the presence of Ni as a catalyst to form compound C which gives substitution reactions with chlorine. (5)

(a) What is compound A?

(b) What is compound B?

(c) What type of reaction occurs when A is converted to B?

(d) What is compound C?

(e) What type of reaction takes place when B is converted to C?

Section E

22. You are given a slide of *Amoeba* and asked to observe it through a compound microscope. What will be your observations? (2)

23. What will be the steps to study the different parts of an embryo of pea seed? (2)

OR

Students A, B and C were given five raisins each of equal weight. The raisins were soaked in distilled water at room temperature. A removed the raisins after 20 minutes, B after two hours and C after 40 minutes. If PA, PB and PC denote percentage absorption of water obtained by students A, B and C, respectively, then what will be the order of percentage absorption?

24. When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with brisk effervescence. Name this gas. Describe the method of testing this gas. (2)

25. A student adds a few drops of barium chloride solution to sodium sulphate solution. What is observed instantly in the test tube? Write the reaction, name the type of reaction and define. (2)

OR

Why does the forming capacity of soap increase in tap water in the presence of Na_2CO_3?

26. A student using the same two resistors, battery, ammeter and voltmeter sets up two circuits, connecting the two resistors, first in series and then in parallel. If the ammeter and voltmeter readings in the two cases are I1, I2 and V1, V2, respectively, then what will be the relation between I1 and I2 and V1 and V2, respectively? (2)

27. Four students A, B, C and D trace the path of a ray of light passing through a glass slab for an angle of incidence 40° and measure the angle of refraction. Values measured by each of them were 18°, 22°, 25° and 30°, respectively. Which student has performed the experiment correctly? (2)

OR

Monika has to determine the focal length of a concave mirror and a convex lens of focal length of about 15 cm each. She uses a distant tree as the object and obtains a sharp image of the tree, one by one, on a screen. If l_1 and l_2 are the distances between the mirror/lens and the screen in the two cases, then calculate l_1 and l_2. Also, state the nature of their respective images obtained on the screen.