CBSE
Class X Science
Sample Paper 10

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

General Instructions:

1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
5. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50–60 words each.
6. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80–90 words each.
7. This question paper consists of a total of 30 questions.

Section A

1. Draw an unsymmetrical isomer of C_5H_{12} and give its IUPAC name. (1)

2. Define the term rancidity. (1)

3. Radhika went to an electronic shop to get her radio repaired. The electrician required resistances of 3 Ω and 14 Ω to repair the radio set. He had a large number of 4 Ω resistors. So, he made attempts but could not get the correct combination of 2.5 Ω and 12 Ω resistances. Radhika has studied the combination of resistors and helped the electrician to arrange the 4 Ω resistors to obtain the required resistances.

(a) How would Radhika have arranged the 4 Ω resistors to obtain the 3 Ω resistance? (1)

(b) How many 4 Ω resistors are used to obtain the 14 Ω resistance? (1)

(c) How did Radhika obtain the 14 Ω resistance using the 4 Ω resistors? (1)

(d) What happens to the current drawn from the power supply when it passes through a parallel combination of appliances? (1)

4. Observe the table carefully and answer the questions based on it.

Name of organism	Concentration of chemicals	Number of organisms
Green plants	0.04 ppm	65
Fish	2.07 ppm	42
Eagle	10.5 ppm	23

(a) What can you infer from the given data? (1)
(b) What is the term used to describe the given phenomenon? (1)
(c) Name any three harmful chemicals which get accumulated in a food chain. (1)
(d) Explain a consequence of the above phenomenon. (1)

5. The current drawn by an electric bulb of 40 W when it is connected to 220 V power supply is (1)

i) 0.30 A
ii) 0.18 A
iii) 5.5 A
iv) 0.88 A

OR

If the wire of length L is cut into three parts, the resistivity of the wire

i) becomes three times the initial value
ii) becomes one-third the initial value
iii) remains the same
iv) becomes two-thirds the initial value

6. Which of the following is not a fossil fuel? (1)

i) Cow dung cake
ii) CNG
iii) Kerosene
iv) Coal

7. A converging lens produces a magnification of +4. The object is placed (1)

i) at the focus
ii) between F and 2F
iii) between O and F
iv) beyond 2F

8. Two nucleotide sequences found in two species are almost exactly the same. This suggests that these species (1)

i) Contain identical DNA
ii) May have similar evolutionary histories
iii) Have the same number of mutations
iv) Are evolving into the same species

OR

Natural selection is called 'survival of the fittest'. Which of the following statements best describes an organism?

i) How strong it is as compared to other individuals of the same species.
ii) How much food and resources it is able to gather for its offspring.
iii) Ability to adapt to the environment in the niche it occupies.
iv) Number of fertile offspring it has.

9. The nucleus divides amitotically and one passes on to the outgrowth. This method occurs frequently in (1)

i) *Hydra*
ii) Yeast
iii) *Planaria*
iv) Bacteria

10. The acid which contains four hydrogen atoms (1)

i) Formic acid
ii) Sulphuric acid
iii) Nitric acid
iv) Acetic acid

11. Impure iron is purified by the process of (1)

i) Reduction
ii) Oxidation
iii) Redox
iv) Concentration

12. Elements and their atomic numbers are given in the table below. (1)

Elements	P	Q	R	S
Atomic No.	6	24	32	49

Which of the elements belongs to the same group?

i) P, Q
ii) P, R
iii) Q, R
iv) Q, S

OR

In Mendeleev's periodic table, which of the following pairs of elements is not in the order of atomic mass?

i) Al and Si
ii) Al and Mg
iii) Fe and Co
iv) Fe and Ni

For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below.

i) Both A and R are true, and R is the correct explanation of the assertion.
ii) Both A and R are true, but R is not the correct explanation of the assertion.
iii) A is true, but R is false.
iv) A is false, but R is true.

13. **Assertion**: The blue colour of copper sulphate solution does not change when an iron nail is kept in its solution.
Reason: Iron is more reactive than copper; hence, iron can displace copper. (1)

14. **Assertion**: A convex lens is used in a magnifying glass.
Reason: A convex lens produces a virtual, erect and magnified image when the object is placed within the focus of the lens. (1)

Section B

15. Element 'X' belongs to Period 3 and Group 13 of the modern periodic table. (3)
(a) Determine the valence electrons and the valency of 'X'.
(b) Molecular formula of the compound formed when 'X' reacts with an element 'Y' (atomic number = 8).
(c) Write the name and formula of the compound formed when 'X' combines with chlorine.

OR

Given below are four elements with their atomic numbers.

Element	A	B	C	D
Atomic No.	16	11	3	14

(a) Identify the elements which belong to the same group of the modern periodic table.
(b) Arrange the given elements in the decreasing order of atomic size.
(c) Write the formula of the oxide of B.
(d) Which of the above elements is a metalloid?

16. Give reasons for the following: (3)
(a) We boil the leaf in alcohol while testing for the presence of starch.
(b) It is dangerous to inhale air containing carbon monoxide.
(c) Plants excrete carbon dioxide as a waste only at night.

17. 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.

18. How is an electric current produced using a magnetic field? Describe an experiment to show the magnetic field lines around a current-carrying circular coil. (3)

19. Define the term atmospheric refraction. Name the colour of light which undergoes (i) more scattering and (ii) less scattering while passing through the atmosphere. Draw a ray diagram to show the formation of a rainbow. (3)

20. The image of an object placed at 15 cm in front of a lens is obtained at the other side of the lens on a screen at a distance of 30 cm from it. Find the focal length of the lens. What would be the nature and height of the image if the object is 2 cm high? (3)

OR

A convex mirror on a bus has a radius of curvature 2 m. If a scooter is located at 600 cm from this mirror, find the position, nature and magnification of the image formed in the mirror.

21. (3)

(a) Name two constituents of baking powder.
(b) How does baking powder differ from baking soda?
(c) Explain the action of baking powder in the making of cake (or bread). Write the equation of the reaction involved.

22. You have visited a zoo where you have observed that a fish is respiring at a faster rate as compared to a dog. Explain the reason for this. (3)

OR

What are the consequences of deficiency of haemoglobin in our body?

23. A cross was carried out between a pure-bred pea plant with axial flowers and a pure-bred pea plant with terminal flowers, and the F_1 progeny was obtained. This progeny was selfed to obtain the F_2 progeny. Answer the following questions: (3)

(a) What is the phenotype of the F_1 progeny and why?
(b) Give the phenotypic ratio of the F_2 progeny.
(c) Why is the F_2 progeny different from the F_1 progeny?

24. It is a well-known fact that a pregnant woman's health is the backbone of every family, society and thus nation. (3)

(a) Which tissue is responsible for providing nutrition from the mother to the growing embryo?
(b) According to you, what can be the likely measures to maintain a woman's health during pregnancy?

Section C

25. (5)

(a) What is a neuron? Draw a neat and labelled diagram of a neuron.

(b) What is a synapse? What happens at the synapse between two neurons? How are the messages carried across a synapse? Explain with the help of a labelled diagram.

OR

(a) Which part of the nervous system controls the reflex arc?

(b) With the help of a diagram trace the sequence of events which occur when we touch a hot object.

(c) Mention the part of the neuron which acquires information and the form in which information travels.

26. What is meant by refraction of light? Define refractive index in terms of speed of light in air and speed of light in refracting medium.

One student measures the angle of refraction as 25° in medium A, and the other student measures the angle of refraction as 23° in the other medium B for the same angle of incidence 40°. Find the refractive index of both media. In which medium does light travel faster? (5)

OR

Draw the ray diagrams and state the nature of the image and its position when the object is placed

(a) beyond the centre of curvature in front of the concave mirror

(b) at infinity in front of the convex mirror

27. Write the balanced chemical equation for the reactions taking place when (5)

(a) Zinc carbonate is calcinated.

(b) Zinc sulphide is roasted.

(c) Zinc oxide is reduced to zinc.

(d) Cinnabar is heated in air.

(e) Manganese dioxide is heated with aluminium powder.

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?

28. (5)

(a) List the factors on which the power consumed by an electrical appliance depends.

(b) A heater connected to a 230-V power source draws 5.5 A current. Calculate

(i) Electric power of the heater

(ii) Resistance of the heater

(iii) Cost of operating this heater for 20 hours if commercial electricity unit cost is Rs 4.

29. (5)

(a) List any two ways by which we can help in reducing the problem of waste disposal.

(b) Mention various threats to wildlife. What steps can be taken to conserve wildlife?

30. (5)

When a strip of red-brown metal X is placed in a colourless salt solution YNO_3, metal Y is set free and a blue-coloured salt solution $X(NO_3)_2$ is formed. The liberated metal Y forms a shining white deposit on the strip of metal X.

(a) What do you think metal X is?

(b) Name the salt YNO_3.

(c) What could be metal Y?

(d) Name the salt $X(NO_3)_2$.

(e) What type of reaction takes place between metal X and salt solution YNO_3?