CBSE
Class X Science
Sample Paper 1

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. Why is electrolysis of water an endothermic reaction? (1)

2. Why are isotopes of an element with different atomic masses placed at the same position in the periodic table? (1)

3. Answer question numbers 3(a)–3(d) on the basis of your understanding of the following paragraph and the related studied concepts.

Many times we hear about a building catching fire due to a short circuit. Sometimes, if an electrical appliance in our house is switched on, the fuse wire melts and the electric supply shuts down. The home electrical connection consists of 'live', 'neutral' and 'earth' wires. The 'live' wire and 'neutral' wires have a potential difference of 220 V. The 'earth' wire is connected to the ground. Due to a fault in equipment, the two wires come in contact with each other and a large current flows through it producing heat. If any inflammable substance comes in contact with it, it can catch fire. When a high current flows in a circuit, the fuse wire melts and breaks the circuit and damage is avoided. In summers, huge electrical power is used in the evenings due to home lighting, fans, air conditioners etc. Thus, excessive current is drawn from the transformer supplying the electricity, and if the capacity of the transformer is insufficient, its fuse wire melts and the supply shuts down.

(a) Which type of circuit, series or parallel, is preferred while connecting electrical appliances at home? (1)

(b) What is the frequency of the AC supply in India? (1)

(c) Which condition occurs when too many appliances of high power rating are connected to a single socket? (1)

(d) 'Live and neutral wires have a potential difference of 220 V'. Explain the meaning of this statement in detail. (1)

4. Given below is a representation of a type of pollution. Study the picture and answer the questions:

(a) Name the type of pollution shown in the picture. (1)

(b) How does this pollution affect human health? (1)

(c) Write one measure to reduce this pollution. (1)

(d) State one gaseous compound that leads to the depletion of the ozone layer and creates 'ozone holes'. (1)

5. The size of the pupil of the eye is adjusted by

i) ciliary muscles

ii) optic nerve

iii) iris

iv) retina (1)

OR

Red colour of the Sun at the time of sunrise and sunset is because

i) Red colour is least scattered.

ii) No light is scattered.

iii) Red colour is scattered most.

iv) Blue colour is scattered most.

6. Linear magnification produced by a plane mirror is

i) -1
ii) 1
iii) <1
iv) >1 (1)

7. A device used to measure potential difference is

i) voltmeter
ii) galvanometer
iii) ammeter
iv) potentiometer (1)

8. If a person is unable to strum a guitar, which part of the brain is affected? (1)

i) Thalamus
ii) Pons
iii) Cerebrum
iv) Cerebellum

OR

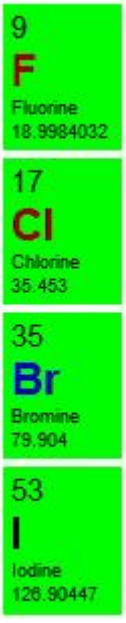
Plants sleep during the night as there is no sunlight. This process is called

i) Phototaxis
ii) Phototropism
iii) Photonasty
iv) Thigmonasty

9. Differences between organisms in a species are described as variation. Which of the following would you describe as continuous variation? (1)

i) Hair colour
ii) Eye colour
iii) Weight
iv) Sex

10. How many electrons do the following elements have in their outermost shells?



i) 1
ii) 4
iii) 2
iv) 7

(1)

11. The following arrangement of elements represents which type of early classification?

Sa (Do)	Re (Re)	Ga (Mi)	Ma (Fa)	Pa (So)	Da (La)	Ni (Ti)
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Ti	Cr	Mn	Fe
Co, Ni	Cu	Zn				

i) Dobereiner's Triad
ii) Newlands' Octave
iii) Mendeleev's Periodic Table
iv) Modern Periodic Table

12. Element 'Z' has the electronic configuration 2, 8. Name element 'Z' and determine its atomic number.

i) Neon, 10
ii) Argon, 10
iii) Neon, 8
iv) Helium, 10 (1)

OR

The Law of Octaves was applicable only up to element

i) Sodium
ii) Copper
iii) Calcium
iv) Zinc

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**: Physical and chemical properties of an element are a periodic function of their atomic numbers.
Reason: By using the atomic numbers, we can find out the number of valence electrons. (1)

14. **Assertion**: To produce hydel electricity, high rise dams are constructed on the river to obstruct the flow of water and thereby collect water in larger reservoirs.
Reason: Kinetic energy of flowing water is converted to electrical energy. (1)

SECTION B

15. (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.

16. 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.

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 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)

19. 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)

20. 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.

21. 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)

22. 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.

23. 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 stem colour would you expect in the F_1 progeny?
(b) Give the percentage of purple-stemmed plants if F_1 plants are self-pollinated.

24. Describe three methods to limit the family size. State the principle involved in each. (3)

SECTION C

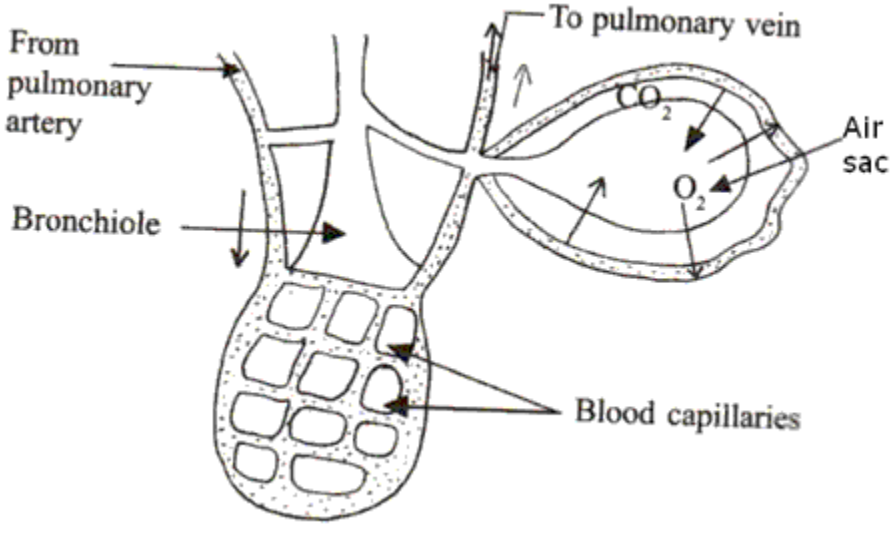
25.

(a) Draw a diagram of the human alimentary canal and label the following: (5)
  (i) Part in which digestion of starch 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.

26. 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.

27. 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 nail 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?

28. (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

29. (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.

30. An organic compound A with the molecular formula C_3H_8O is a liquid at room temperature. It 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?