CBSE
Class X Science
Sample Paper - 13

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. State the main difference between an endothermic reaction and an exothermic reaction. (1)

2. A boy dropped a bottle of hydrochloric acid on an egg shell and noticed bubbles of gas. Explain the chemical reaction involved. (1)

3. The magnetic field at any point is the combined effect of the magnetic field due to the current in the wire and the magnetic field of the Earth. Iron filings when placed near the wire carrying current are arranged in circles due to the magnetic field produced by the current flowing through the wire. However, at the point far away from the wire, the magnetic field due to the earth is predominant as compared to the magnetic field due to current due to which the iron filings are arranged in straight lines. The point where the two fields are equal and opposite is called the neutral point. At the neutral point, the net magnetic field is zero and the compass needle at this point rests in any direction.

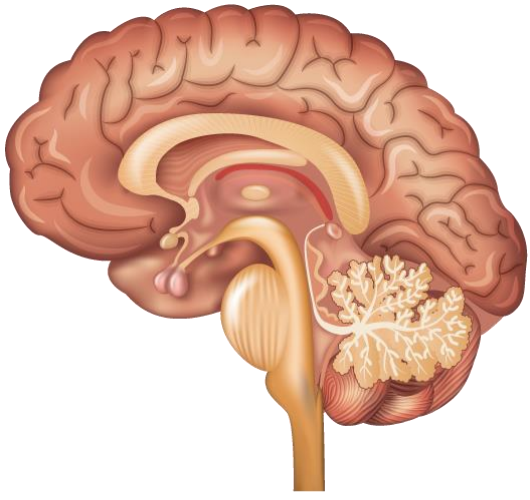
(a) How are the magnetic field lines at the point near the straight current-carrying conductor? (1)

(b) To what parameter is the magnitude of the magnetic field produced by the straight conductor directly proportional? (1)

(c) Which rule is used to find the direction of the magnetic field produced by the straight current-carrying conductor? (1)

(d) What according to the rule will be the direction of the current when lines of the magnetic field are in the anti-clockwise direction? (1)

4. Observe the figure carefully and answer the questions based on it:



(a) Name the part of the brain which maintains posture and equilibrium of the body.(1)
(b) Name the main thinking part of the brain. (1)
(c) What is the part of the brain that extends into the spinal cord? (1)
(d) Our mouth waters when we see food and also when we are hungry. Mention the part of the brain responsible for it. (1)

5. If the resistance of the wire is doubled, then the current for the constant potential difference will be (1)
(A) doubled
(B) halved
(C) one-fourth
(D) quadrupled

OR

If the resistivity of the material is 0.6 Ωm, then the material is
(A) a semi-conductor
(B) an insulator
(C) a conductor
(D) an alloy

6. If the ray of light is incident normally or perpendicularly on the surface of the mirror, then the angle of reflection will be (1)
(A) 90°
(B) 180°
(C) 0°
(D) >180°

7. Which of the following is not a characteristic of an ideal source of energy? (1)

(A) Does large amount of work per unit mass
(B) Is eco-friendly
(C) Is costly
(D) Is easy to store and transport

8. Which of the following makes a 3-chambered heart less efficient as compared to a 4-chambered heart? (1)

(A) Presence of a septum
(B) Mixing of blood in one ventricle
(C) Presence of only one ventricle
(D) Presence of two atria

OR

The opening and closing of stomata is regulated by
(A) Guard cells
(B) Epidermal cells
(C) Subsidiary cells
(D) Phloem cells

9. Which trophic level has the greatest number of individuals? (1)

(A) 1st trophic level
(B) 2nd trophic level
(C) 3rd trophic level
(D) 4th trophic level

10. What is the characteristic of a combination reaction? (1)

(A) A single reactant
(B) A single product
(C) More than one product
(D) Less than 2 reactants

11. What is the chemical name of zinc blende? (1)

(A) Zinc carbonate
(B) Zinc sulphide
(C) Zinc chloride
(D) Zinc oxide

12. Which four quantities a, b, c and d are required to balance the equation? (1)

$aFe + bH2SO4 \rightarrow cFeSO4 + dH2$

(A) 1, 1, 1, 1
(B) 2, 2, 2, 1
(C) 2, 2, 2, 1
(D) 2, 1, 2, 2

OR

What will be the colour of the precipitate formed in this reaction?

$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2NaCl$

(A) Blue
(B) White
(C) Red
(D) Yellow

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: When carbon dioxide gas is passed through lime water, a white precipitate is initially formed.
Reason: The white precipitate is of calcium carbonate which is formed during the reaction. (1)

14. Assertion: Atmospheric refraction causes advance sunrise and delayed sunset.
Reason: The time of sunrise to sunset is lengthened by about 2 minutes. (1)

Section B

15. State Maxwell's right-hand thumb rule. (3)

16. A few tapioca plants remained in the farmland after harvest. Harvesting was done in summer. Then there was a summer rain. When these plants were harvested and the tubers eaten raw, they tasted sweet. Can you explain the reason for the sweet taste of the tubers? (3)

17. Explain that it is a matter of chance whether a couple will give birth to a boy or a girl. (3)

18. An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or non-metal? Explain with the help of a suitable example. (3)

19. The genotype of green-stemmed tomato plants is denoted as GG and that of purple-stemmed tomato plants as gg. When these two are crossed,

(i) What colour of stem would you expect in their F_1 progeny?

(ii) Give the percentage of purple-stemmed plants if F_1 plants are self-pollinated.

(iii) In what ratio would you find the genotypes GG and Gg in the F_2 progeny? (3)

20. Three resistors of 10 Ω, 30 Ω and 50 Ω, respectively, are connected across a battery of 12 V. (3)

Calculate:

(a) Current through each resistor

(b) Total current in the circuit

(c) Total resistance of the circuit

OR

An electrical bulb is rated 220 V–100 W. What is the resistance of the bulb? Three such bulbs run simultaneously for 4 hours. What is the energy consumed? Calculate the cost of running these appliances if the per unit cost is Rs 2.80.

21. What is a dam? Why do we seek to build large dams? While building large dams, which three main problems should particularly be addressed to maintain peace among local people? Mention them.

OR

Differentiate between biodegradable and non-biodegradable substances with the help of one example each. List two changes in habit that people must adopt to dispose non-biodegradable waste for saving the environment. (3)

22. Corrosion is a serious problem. Every year an enormous amount of money is spent to replace damaged iron. What steps can be taken to prevent this damage? (3)

23. Answer the following: (3)

(a) A concave mirror produces a three times larger real image of an object placed at a distance of 20 cm in front of it. Find the position of the image and the nature of the image. Also, find the focal length of the mirror.

24. A student has mixed solutions of lead (II) nitrate and potassium iodide.

a. What was the colour of the precipitate formed? Can you name the compound precipitated?

b. Write the balanced chemical equation for this reaction.

c. What type of reaction is it? (3)

OR

Write one equation each for the decomposition reactions where energy is supplied in the form of (a) heat, (b) light and (c) electricity.

Section C

25. (5)

(a) List the three properties of magnetic field lines.

(b) Define electromagnet. State the principle on which the working of magnet is based.

(c) What are the factors affecting the strength of an electromagnet.

26. The following table shows the position of six elements A, B, C, D, E and F in the periodic table. (5)

Periods Groups	1	2	3 to 12	13	14	15	16	17	18
2	A					B			C
3		D			E				F

Using the above table, answer the following questions:

(a) Which element will form only covalent compounds?

(b) Which element is a metal with valency 2?

(c) Which element is a non-metal with valency 3?

(d) Out of D and E, which one has a larger atomic radius and why?

(e) Write the common name for the family of elements C and F.

27. Define evolution. How does it occur? Describe how fossils provide us with evidence in support of evolution. (5)

OR

Define the terms pollination and fertilisation. Draw a diagram of a pistil showing pollen tube growth into the ovule and label the following: Pollen grain, male gamete, female gamete and ovary

28. 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^oC, it forms a compound B which decolourises bromine water. Compound B adds one molecule of hydrogen in the presence of Ni as a catalyst to form compound C which gives a substitution reaction 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?

OR

A water-insoluble substance 'X' on reacting with dilute H_2SO_4 released a colourless and odourless gas accompanied by brisk effervescence. When the gas was passed through water, the solution obtained turned blue litmus red. On bubbling the gas through lime water, it initially became milky and the milkiness disappeared when the gas was passed in excess.

Identify the substance 'X' and write the chemical equations of the reactions involved.

29. (5)

(a) What does HIV stand for? Is AIDS an infectious disease? List any four modes of spreading AIDS.

(b) Explain how the lungs are designed in human beings to maximise the area for the exchange of gases. Why does the air passage not collapse when there is no air in it?

30. Draw the ray diagram and state the nature and position of the image formed when the object is placed at (5)

a) 2F in front of a convex lens

b) Anywhere between the optical centre and infinity of the concave lens

OR

a) What is the mirror formula? Give an expression for the mirror formula.

b) Define the following terms related to spherical mirrors:

i) Pole

ii) Centre of curvature

iii) Principal axis