CBSE
Class X Science
Sample Paper - 14

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. What is the commercial unit of energy? (1)

2. What is the role of decomposers in the environment? (1)

3. Ethane, ethene and ethanol are inter-convertible compounds when provided with suitable conditions and reagents. Ethanol can be converted to ethene which can then be changed to ethane.

Choose the correct word or phrase to complete the following sentence:

(a) The conversion of ethanol to ethane is an example of …….. (1)

(b) Converting ethanol to ethene requires the use of ……. (1)

(c) The conversion of ethene to ethane is an example of …….. (1)

(d) The catalyst used in the conversion of ethene to ethanol is commonly ……. (1)

4. The table shows the current in three electrical appliances when connected to a 240-V main supply.

Electrical appliance	Current drawn
Lamp	0.5 A
Electric toaster	4 A
Electric kettle	9 A

(a) Identify the electrical appliance having the highest electrical resistance. (1)

(b) Calculate the power rating of the kettle when connected to a 240-V main supply.(1)
(c) How much current would be drawn by an electric toaster when it is connected to a 120-V supply? (1)
(d) Calculate the power rating of the lamp when it is connected to a 240-V main supply. (1)

5. The incident ray makes an angle of 30^0 with a plane mirror. What is the total angle between the incident ray and the reflected ray? (1)
(a) 60^0
(b) 30^0
(c) 120^0
(d) 80^0

OR

The nature of the image formed by a plane mirror is
(a) Real
(b) Virtual
(c) Larger than the object
(d) Smaller than the object

6. Out of the following devices, which one is used to produce electricity? (1)
(a) Motor
(b) Voltmeter
(c) Generator
(d) Ammeter

7. 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

8. How many pollen grains are required to fertilise 10 ovules present in a particular carpel? (1)
(a) 5
(b) 10
(c) 20
(d) 15

OR

Multiple fission of a particular organism causes a disease in humans. What is the disease?
(a) Typhoid
(b) Malaria

(c) Dengue
(d) Chikungunya

9. A food web is more realistic than a food chain for showing the feeding relationships in ecosystems because (1)
(a) It compares the number of consumers to the number of microorganisms in an ecosystem.
(b) Food chains use only a small sampling of organisms.
(c) A food web explains why there are more producers than consumers.
(d) Producers are usually eaten by many different consumers and most consumers are eaten by more than one predator.

10. Which is the correct order of the reactivity of metals? (1)
(a) Ca > Ag > Al > Cu
(b) Ca > Cu > Ag > Al
(c) Ca > Al > Cu > Ag
(d) Cu < Ag < Al < Ca

11. The compound $CH_2=CH_2$ burns with a (1)
(a) Green sooty flame
(b) Yellow sooty flame
(c) Blue non-sooty flame
(d) Yellow non-sooty flame

12. Which of the following is an advantage of seismonastic movement in the mimosa plant? (1)
I → Protection from herbivores
II → Less exchange of heat
III → Higher survival value under environmental stress
(a) I and II
(b) II and III
(c) I and III
(d) I, II and III

OR

People living in hilly areas suffer from goitre because
(a) Soil is deficient in iodine
(b) Temperature is low
(c) Lot of moisture in the air
(d) Thyroid gland becomes less functional in colder environments

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**: Construction of dams faces environmental problems.
Reason: Dams contribute enormously to deforestation and the loss of biological diversity. (1)

14. **Assertion**: Fuel oil is a better fuel than coal.
Reason: Fuel oil burns completely and does not leave a residue. (1)

Section B

15. Give an example of a metal which (3)
(i) is a liquid at room temperature
(ii) can be easily cut with a knife
(iii) is the best conductor of heat
(iv) is a poor conductor of heat

16. What is translocation? Why is it essential for plants? (3)

OR

Offspring formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?

17. In the periodic table given below, lithium, carbon, oxygen and neon are placed in their correct positions and the positions of nine other elements are represented by letters. These letters are not the symbols for the elements. (3)

1	2	13	14	15	16	17	18
Lithium			Carbon		Oxygen	L	Neon
X			E		G	Q	
Y						R	
Z						T	

With reference to the table, answer the following questions:
(a) Give the letter of the most reactive metal.
(b) Give the letter of the most reactive non-metal.
(c) Name the family of elements represented by L, Q, R and T.
(d) Name one element in each case occurring in Groups 2, 13 and 15.

18. An electric appliance of 1.5 kW power rating operates on a 220-V main supply and has a current rating of 5 A. Is this fuse suitable for this electrical appliance? Explain.(3)

19. (3)

i) What is the horizontal field of view of the human eye when one eye is kept open?

ii) Define the least distance of distinct vision.

iii) What is the least distance of distinct vision for a normal human eye?

20. The image of an object placed at 25 cm in front of a concave mirror is obtained on a screen at a distance of 50 cm from it. Find the focal length of the lens. What would be the height of the image if the object is 2 cm high? (3)

OR

An object 4 cm in size is placed at a distance of 8 cm from a convex mirror of radius of curvature 20 cm. Find the nature, position and size of the image.

21. A compound X which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water. (3)

a) Identify compound X.

b) Write the chemical equation for its preparation.

c) For what purpose is it used in hospitals?

OR

Write the balanced equation for the following chemical reactions:

(i) Hydrogen + Chlorine $\rightarrow$ Hydrogen chloride

(ii) Barium chloride + Aluminium sulphate $\rightarrow$Barium sulphate + Aluminium chloride

(iii) Sodium + Water $\rightarrow$ Sodium hydroxide + Hydrogen

22. The conditions present on the early Earth that led to chemical evolution can only be recreated in the laboratory. Why? (3)

23. The circulatory system of humans undergoes a switch-over process. (3)

(a) Identify the stage at which it takes place.

(b) Mention its importance.

24. A pea plant with blue flowers denoted by BB is cross-bred with a pea plant with white flowers denoted by ww. (3)

(a) What is the expected flower colour in the F_1 progeny?

(b) What will be the percentage of plants bearing white flowers in the F_2 generation when the flowers of F_1 plants are self-pollinated?

State the expected ratio of the genotypes BB and Bw in the F_2 progeny.

Section C

25. Mention one function for each of these hormones: (5)

(a) Thyroxine
(b) Insulin
(c) Adrenaline
(d) Growth hormone
(e) Testosterone

26. What is hypermetropia? What are the causes of hypermetropia?
The near point of the hypermetropic eye is 0.9 m. What is the nature and power of the lens required to correct the defect? (5)

27. A compound X of sodium forms a white powder. It is a constituent of baking powder and is used in some antacid prescriptions. When heated, X gives out a gas Y and steam. The gas Y forms a white precipitate with limewater. Write the chemical formula and name of compound X and the chemical equation for its decomposition on heating. What is its role in baking powder and in antacids? (5)

OR

A compound X is bitter in taste. It is a component of washing powder and reacts with dil. HCl to produce brisk effervescence due to a colourless, odourless gas Y which turns limewater milky due to the formation of Z. When excess of CO_2 is passed, the milkiness disappears due to the formation of P. Identify X, Y, Z and P.

28. (5)

(a) Write the expression for the relationship between resistance and resistivity.
(b) A 1.25-kW electric oven is connected to a 230-V power source. Calculate
  (i) Electric current passing through the oven
  (ii) Resistance of the oven
  (iii) Electric energy consumed in a 4-hour use of the oven

OR

If three resistors of 6 Ω, 7 Ω and 10 Ω are connected in series. Calculate the equivalent resistance in the circuit.

(a) What is the potential difference across the three resistorsR_1, R_2 and R_3 in a series combination if the potential across the circuit is V?
(b) What is the current along each of the resistors in a series combination if the current flowing in the circuit is I?
(c) Is the equivalent resistance in the parallel combination of resistors more than the value of each individual resistor?

29. Briefly explain Darwin's theory of evolution. (5)

OR

How do Mendel's experiments show that
(a) traits may be dominant or recessive
(b) traits are inherited independently

30. A neutral organic compound A of molecular formula C_2H_6O on oxidation with acidified potassium dichromate gives an acidic compound B. Compound A reacts with B on warming in the presence of conc. H_2SO_4 to give a sweet smelling substance C. What are A, B and C? Also provide the chemical reactions involved. (5)