CBSE
Class X Science
Sample Paper - 11

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. The potential difference across the wire having fixed resistance is tripled. By how much does the electric power increase? (1)

2. What is the function of the epiglottis? (1)

3. Mendeleev predicted the existence of certain elements not known at that time and named two of them as eka-aluminium and eka-silicon. Swati has been given an assignment in the class on Mendeleev's periodic table. She has to answer the following questions in the assignment:

(a) Name the element which has taken the place of (1)

(i) eka-aluminium (ii) eka-silicon

(b) Mention the period/periods of these elements in the modern periodic table. (1)

(c) Write the group/groups of these elements in the modern periodic table. (1)

(d) Classify these elements as metals, non-metals or metalloids. (1)

4. A concave mirror has focal length 10 cm. Answer the questions using the following table:

Sr.No	Object distance
(A)	u = -20
(B)	u= -15
(C)	u = Infinity
(D)	u = -5

(a) If object size is 2 cm, what would be the size of the image in case A? (1)
(b) Nature of the image when u = -15 (1)
(c) Nature of the image in case (D) (1)
(d) Position of the image in case (C) (1)

5. What is the major component of biogas? (1)
(a)Butane
(b)Hydrogen sulphide
(c)Methane
(d)Hydrogen

OR

What is the cause of the rise in sea water during high tide?
(a)Earth
(b)Moon
(c)Sun
(d)Mars

6. Which fuel has the highest calorific value? (1)
(a)Methane gas
(b)Biogas
(c)Hydrogen gas
(d)Natural gas

7. Electrical impulse travels in a neuron from (1)
(a) dendrite → axon → axonal end → cell body
(b) cell body → dendrite → axon → axonal end
(c) dendrite → cell body → axon → nerve ending
(d) axonal end → axon → cell body → dendrite

8. Which of the following helps in the conservation of wildlife? (1)
(a) Building zoos
(b) Breeding animals in captivity
(c) Establishment of national parks
(d) All of these

OR

When you buy rechargeable batteries, you help in

(a) Reducing resources
(b) Recycling resources
(c) Reusing resources
(d) Recharging resources

9. Self-pollination is seen in (1)

(a) Unisexual flowers
(b) Heterosexual flowers
(c) Bisexual flowers
(d) Homosexual flowers

10. Beryllium is the first element in Group 2 with atomic number 4. The atomic number of the second element in the same group is (1)

(a) 5
(b) 6
(c) 11
(d) 12

11. Oxides of alkaline earth metals are _____ in nature. (1)

(a) Acidic
(b) Basic
(c) Neutral
(d) None of these

12. Which of the following factors acts against speciation? (1)

(a) Gene flow
(b) Geographical isolation
(c) Genetic drift
(d) Variation

OR

Which of the following correctly shows the cascade of reactions which takes place in the expression of a particular character?

(a) Gene → Protein → mRNA → Phenotypic expression
(b) mRNA → Gene → Protein → Phenotypic expression
(c) Gene → mRNA → Protein → Phenotypic expression
(d) mRNA → Gene → Phenotypic expression → Protein

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: Food chains are limited to 4–5 trophic levels.
Reason: The flow of energy within trophic levels follows the 10% law. (1)

14. Assertion: A stick partly immersed in water appears to be bent.
Reason: Refraction of light when it passes from water into air. (1)

Section B

15. What would you observe when (3)
(a) Blue litmus is introduced into a solution of hydrogen chloride gas.
(b) Red litmus paper is introduced into a solution of ammonia in water.
(c) Red litmus paper is introduced in caustic soda solution.

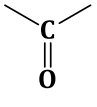
OR

What are the three chemicals formed by common salt and how are they formed?

16. What is the role of the following in the human digestive system? (3)
(a) Mucus
(b) Bicarbonate
(c) Trypsin

17. (3)
(a) What is the molecular formula and structure of the alcohol which can be thought to be derived from pentane?

(b) Write the names of the following functional groups:

(i) –CHO (ii) –OH (iii) –COOH (iv)  (v) –X

(c) What makes the candle flame yellow and luminous?

18. State and explain the principle of the electric motor. State the transformation of energy in the electric motor. (3)

19. Define refractive index. If light enters from air to glass having a refractive index 1.5, then calculate the speed of light in glass. (3)

20. The image of an object placed at 40 cm in front of a lens is obtained on a screen at a distance of 100 cm from it. Find the focal length of the lens. What would be the height of the image if the object is 4 cm high? (3)

OR

A concave mirror produces a two times magnified real image of an object placed at 20 cm in front of it. What is the position of the image? (3)

21. A homemaker wanted her house to be whitewashed. She bought 10 kg of quick lime from the market and dissolved it in 30 litres of water. On adding lime to water, she noticed that the water started boiling even when it was not being heated. Give reason for her observation. Write the corresponding chemical equation and name the product formed. (3)

22. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds? (3)

OR

Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets?

23. How do Mendel's experiments show that (3)
(a) Traits may be dominant or recessive
(b) Traits are inherited independently

24. 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 C

25.
(a) Write the three main steps which take place in the chloroplast during photosynthesis.
(b) How do stomata open and close?
(c) Which raw material is made available to plants for photosynthesis? (5)

OR

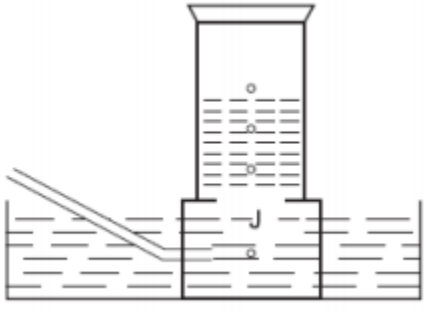
With the help of suitable diagrams, explain the various steps of budding in Hydra.

26. What is meant by linear magnification? Write the formula for magnification of spherical mirrors. What is the unit of magnification? Explain.
What is the nature of the image if the magnification is positive and negative? (5)

OR

(a) Define:
   i. Principal focus of a convex lens
   ii. Optical centre
(b) State the lens formula.
(c) Magnification produced by a spherical lens is −1. What is the nature of the image and lens?

27. A metal is treated with dilute sulphuric acid. The gas evolved is collected by the method shown in the following figure. (5)



Answer the following:
(i) Name the gas.
(ii) Name the method of collection of the gas.
(iii) Is the gas soluble or insoluble in water?
(iv) Is the gas lighter or heavier than air?
(v) Name the most reactive and the least reactive metal.

OR

A compound X which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water.
(a) Identify compound X.
(b) Write the chemical equation for its preparation.
(c) For what purpose is it used in hospitals?

28. (5)

(a) State and explain the heating effect of electric current.

(b) A potential difference of 220 V is applied across a resistance of 400 ohm in an electric heater. Calculate

(i) Electric current passing through the heater

(ii) Heat energy produced in joules in 5 seconds

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. Buckminsterfullerene is a spherical molecule in which 60 carbon atoms are arranged in interlocking hexagonal and pentagonal rings of carbon atoms.

(5)

(a) How many hexagons of carbon atoms are present in one molecule of buckminsterfullerene?

(b) How many pentagons of carbon atoms are present in one molecule of buckminsterfullerene?

(c) How is it related to diamond and graphite?

(d) Why is diamond used for making cutting tools but graphite is not?

(e) Why is graphite used for making dry cell electrodes but diamond is not?