CBSE
Class X Science
Sample Paper – 3
2024-25

Time: 3 Hours **Total Marks: 80**

General Instructions:

i. *All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.*
ii. *Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.*
iii. *Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.*
iv. *Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.*
v. *Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.*
vi. *Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.*

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1-20. There is no negative mark for incorrect response.

1. Which of the following is/are acidic in nature? [1]

A. 
B. 
C. 
D. 

(a) B and D
(b) A and C
(c) A and B
(d) C and D

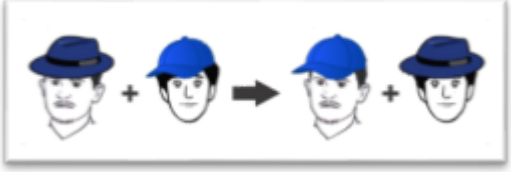
2. Reaction between P and Q forms compound R. P loses electron and Q gains electron. Which of the following properties is not shown by R? [1]

(a) Conducts electricity in molten state
(b) Has low melting point
(c) Has high melting point
(d) Occurs as solid

3. Neha had antique article shown below which was not in use and lost its shining brown surface and gained a green coating. It is due to formation of: [1]

(a) $CuCO_3$
(b) CuO
(c) $Cu(OH)_2$
(d) $Cu(NO_3)_2$

4. Visualise and name the reaction which suits this image. [1]



(a) Combination reaction
(b) Decomposition reaction
(c) Oxidation reaction
(d) Displacement reaction

5. 2 ml each of concentrated HCl, HNO_3 and a mixture of concentrated HCl and concentrated HNO_3 in the ratio of 3 : 1 were taken in test tubes labelled as P, Q and R. A small piece of metal was put in each test tube. No change occurred in test tubes P and Q but the metal dissolved in test tube R respectively. The metal could be: [1]

(a) Al
(b) Au
(c) Cu
(d) Ag

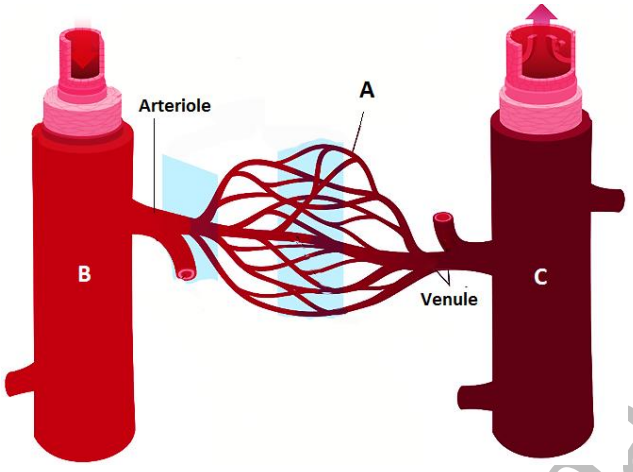
6. Nishant added 2 ml of acetic acid to 5 ml water and shook the test tube for a minute. What would he have noticed? [1]

(a) The acid formed a separate layer on the top of the water.
(b) Water formed a separate layer on the top of the acid.
(c) A pink and clear solution is formed.
(d) A clear and homogeneous solution is formed.

7. Robin is writing few statements, but he is confused whether the statements are correct or not. Will you help him find the correct statements? [1]

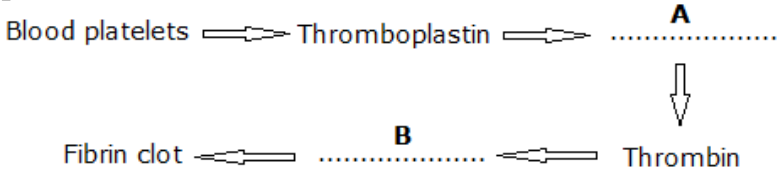
(a) Washing soda is used in removing permanent hardness of water.
(b) Baking soda is used in soda-acid fire extinguisher.
(c) Bleaching powder is used to make drinking water free from germs.
(d) All the above.

8. Observe the figure carefully and select the option which correctly states the function of parts A, B and C. [1]



(a) A – Exchange of materials between blood and tissue cells
B - Carry blood away from the heart
C – Carry blood towards the heart
(b) A – Carry blood towards the heart
B - Carry blood away from the heart
C – Exchange of materials between blood and tissue cells
(c) A – Exchange of materials between blood and tissue cells
B - Carry blood towards the heart
C –Carry blood away from the heart
(d) A – Carry blood away from the heart
B - Exchange of materials between blood and tissue cells
C – Carry blood towards the heart

9. Complete the cascade of events during blood clotting. [1]

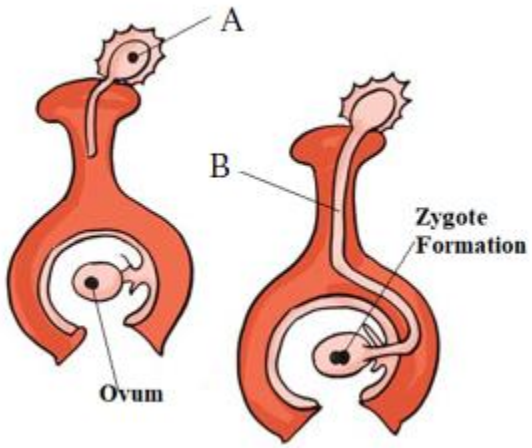


(a) A → Prothrombin, B → Fibrinogen
(b) A → Fibrinogen, B → Prothrombin
(c) A → Thrombokinase, B → Prothrombin
(d) A → Prothrombin, B → Thrombokinase

10. Which of the following is a totally impossible outcome of Mendel's monohybrid cross? [1]

(a) 3 tall and 1 short plant
(b) 24 tall and 8 short plants
(c) 8 tall and 0 short plants
(d) 4 tall plants and 1 medium height plant

11. The given diagram shows an important event in the process of reproduction in plants. Identify the event and label the parts A and B correctly. [1]



(a) Fertilisation, A – Germinating pollen grain, B – Pollen tube
(b) Pollination, A – Ruptured pollen grain, B – Synergids
(c) Fertilisation, A – Pollen tube, B – Style
(d) Pollination, A – Germinating pollen grain, B – Pollen tube

12. The given plant movement is [1]

(a) Thigmotropism – Nastic movement
(b) Thigmonasty – Nastic movement
(c) Thigmonasty – Tropic movement
(d) Thigmotropism – Tropic movement

13. Current produced in a conductor when it moves perpendicular to magnetic field is known as [1]

(a) Conductor current
(b) Electric current
(c) Magnetic current
(d) Induced current

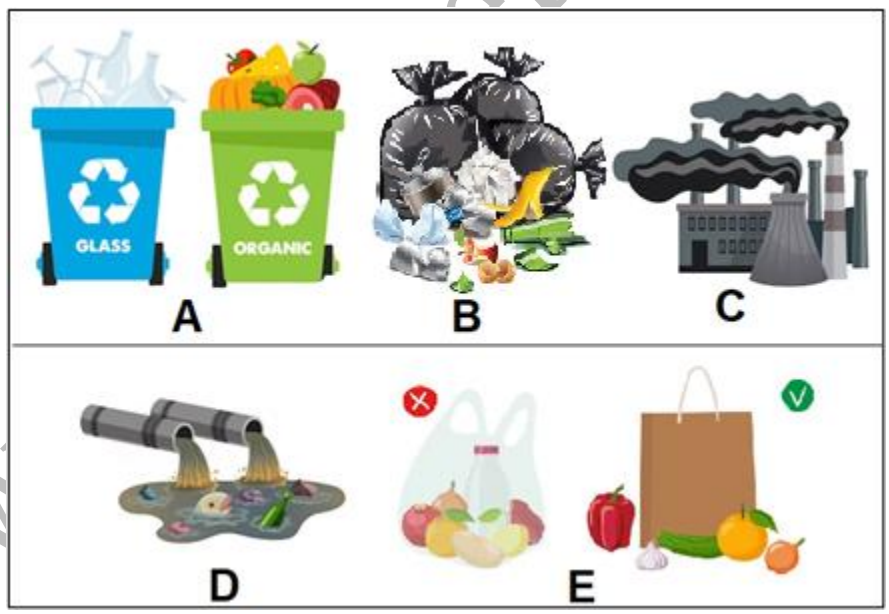
14. Two resistors 4Ω and 2Ω are connected in series, and the potential difference of 12 V is applied across the combination. Then, the current through the circuit is: [1]

(a) 4 A
(b) 2 A
(c) 1 A
(d) 4.5 A

15. Which of the following belongs to the same trophic level in a food chain? [1]
Eagle, Grass, Deer, Rabbit, Lion

(a) Grass and Deer
(b) Rabbit and Eagle
(c) Eagle and Deer
(d) Deer and Rabbit

16. Which of the following lifestyle changes will have a positive impact on the environment? [1]



(a) B and C
(b) C and D
(c) A and E
(d) A and D

Question No. 17 to 20 consists of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true, and R is the correct explanation of A

(b) Both A and R are true, and R is not the correct explanation of A

(c) A is true but R is false

(d) A is False but R is true

17. **Assertion:** When an acid reacts with a base, then salt and water are formed.
Reason: This is an example of redox reaction.

18. **Assertion:** Menstruation occurs if fertilisation of the ovum by the sperm fails to take place. [1]
Reason: Corpus luteum stops producing progesterone hormone in case of no fertilisation.

19. **Assertion**: Food chains are limited to 4–5 trophic levels. [1]
Reason: The flow of energy within trophic levels follows the 10% law.

20. **Assertion (A)**: The user does not get a severe electric shock on touching the damaged metallic body of electric appliance.
Reason (R): In earthing, metallic body of appliance is connected deep inside the earth. [1]

SECTION - B

Question No. 21 to 26 are very short answer questions.

21. How is plaster of Paris prepared from gypsum? For what purpose is it used in hospitals? [2]

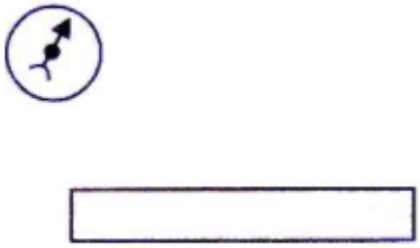
22. Protozoans reproduce by binary fission as well as multiple fission. Give one example. Which process is better and why? Give your opinion.

23. Why are glomeruli considered as dialysis bags? [2]

OR

How would it affect the digestion of proteins and carbohydrates in the duodenum if the pancreatic duct is blocked?

24. Copy the figure below which shows a plotting compass and a magnet. Label the North pole of the magnet and draw the field line on which the compass lies. [2]



25. What is the focal length of a concave mirror if the radius of curvature is 12 cm? What is the nature of the image formed by a concave mirror when an object is placed between its focus and pole? [2]

OR

Where will the image form if the object is placed at the centre of curvature in front of concave mirror? Also state the nature of the image.

26. Mention four eco-friendly activities which you practice in your daily life. [2]

SECTION - C

Question No. 27 to 33 are short answer questions.

27. A silvery white metal P is in the form of ribbons. Upon ignition, it burns with a dazzling white flame to form white powder Q. When water is added to the powder Q, it partially dissolves to form a substance R which is used as an antacid. [3]

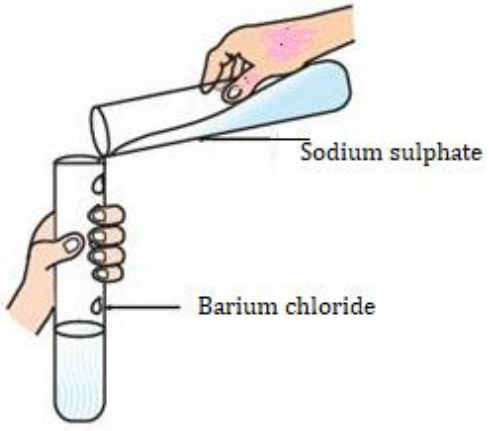
(a) What is metal P?

(b) Name the white powder Q.

(c) What is the substance R?

(d) Write the chemical reactions that are taking place.

28. Observe the given figure and answer the following questions. [3]

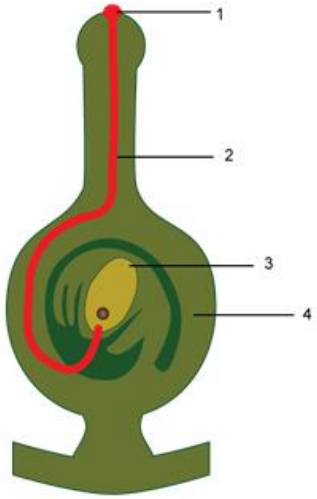


(a) Write the complete balanced reaction for the reaction that takes place in the above experiment.
(b) Type of reaction involved in the reaction.
(c) Is there any precipitate formed? If any precipitate formed, write the colour of the precipitate.

OR

Madhuri prepares HCl gas in her school laboratory using certain chemicals. She puts both dry and wet blue litmus papers in contact with the gas. [3]
(a) Name the reagents used by Madhuri to prepare HCl gas.
(b) Explain the colour changes observed with the dry and wet blue litmus paper.
(c) Show the formation of ions when HCl gas combines with water.

29. The diagram given alongside shows a type of tropism. Study the same and answer the questions that follow: [3]



(a) Name and define the type of tropism shown in the diagram.
(b) Label the guidelines (1) to (4).
(c) Name two effective stimulants that help in the growth of part (2).

30. Does the sex of a child depend on the father or is it just a matter of chance? Discuss.[3]

31. [3]
(a) What is the nature of the image formed by a convex mirror when the object is placed between the pole and infinity?
(b) What is diffused reflection of light?
(c) Which mirror is used as a rear-view mirror? Why?

32. 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]

33. The values of potential difference V applied across a resistor and the corresponding values of current I flowing in the resistor are given below:

Potential difference, V (in volts)	2.5	5.0	10.0	15.0	20.0	25.0
Current, I (in amperes)	0.1	0.2	0.4	0.6	0.8	1.0

a) Draw the V-I graph for given value of current and potential difference.
b) What is the nature of the V-I graph plotted for the above values of potential difference and current?
c) Which law is illustrated by such type of graph? [3]

SECTION - D

Question No. 34 to 36 are long answer questions.

34. [5]

(a) What is a homologous series? Explain with an example.
(b) State two characteristics of a homologous series.
(c) The molecular formula of an organic compound is $C_{18}H_{36}$. Name its homologous series.
(d) Select the hydrocarbons which belong to the same homologous series. Give the name of each series.
CH_4, C_2H_2, C_2H_4, C_2H_6, C_4H_{10}, C_3H_4, C_3H_6
(e) What is meant by 'heteroatom'? Give examples. Write the names and formulae of two organic compounds containing different heteroatoms.

OR

Mugdha was asked by her chemistry teacher to identify common elements in the items shown in the following images. Explain the type bonding formed by this element. Explain the bonding in graphite.


35. [5]

(a) How are variations useful for species if there is drastic alteration in the niches?

(b) Explain how the uterus and placenta provide necessary conditions for proper growth and development of the embryo after implantation?

OR

(a) Ratna saw a snake and instantly jumped back. Later, she slowly moved away from the snake. What is the difference between the two actions of instantly jumping and slowly walking away?

(b) Which part of the brain will control the following actions?

(i) cycling (ii) body temperature(iii) heartbeat

36.

(a) Distinguish between a bar magnet and an electromagnet.

(b) State Fleming's left-hand rule.

(c) Positively charged particles moving towards the west are deflected towards the north by a magnetic field. What will be the direction of the magnetic field?

OR

(a) State the Joule's law of heating and given equation for it.

(b) Compare the heat produced when two identical resistors of resistance 'R' with a potential difference of 'V' for time 't' are connected in a

(i) Series combination

(ii) Parallel combination

SECTION - E

Question No. 37 to 39 are case - based/data -based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. We know that on the basis of reactivity of different metals with oxygen, water, and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivity. This arrangement of metals is known as activity series or reactivity series of metals. The base of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a meal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive. [4]

(a) Give one example each of:

i. The element which is less reactive than hydrogen.

ii. The element which is more reactive than hydrogen.

(b)

i. Give two examples of metals which react vigorously with oxygen.

ii. Give the correct order of reactivity for the given metals: Al, Na, Cu, Mg.

OR

(c) Sameera has two types of nails to hang beautiful murals she received as her birthday gifts.

Type A: Iron nails are of pure strong iron.

Type B: Iron nails of zinc coated iron.

A.  B. 

Which type of nails should Sameera prefer and why? Explain what sacrificial metal is.

38. 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. [4]

(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?

OR

(c) Instead of the above cross, if there was a cross between violet flowered and white flowered plants resulting in 400 plants in F_2 generation, how many plants would bear violet flowers? Give reason for your answer.

39. Ananya places an object is placed at the different locations in front of an optical device. The optical device used is convex lens. Following are the distances at which the object was placed from a convex lens. The focal length of this convex lens used is 15 cm:

i. 35 cm
ii. 30 cm
iii. 20 cm
iv. 10 cm [4]

a) Which position of the object will produce a magnified real image?

b) An image produced will be magnified virtual image when an object is placed at

c) Which position of the object will produce a diminished real image?

OR

d) What is the object distance when an image produced will be of same size as the object?