CBSE
Class X Science
Sample Paper - 4
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 options in the given table are correct. [1]

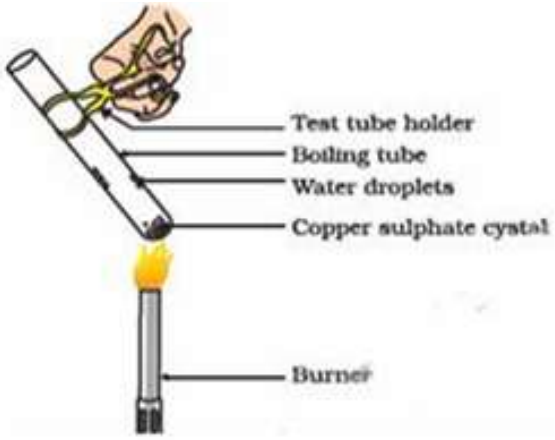
Option	Natural source	Acid Present
I	Orange	Oxalic acid
Ii	Sour milk	Lactic acid
Iii	Ant sting	Methanoic acid
Iv	Tamarind	Acetic acid

a) and (ii)
b) and (iv)
c) and (iii)
d) and (iv)

2. Metals like iron, copper, aluminium, and zinc are given to a student. The correct decreasing order of reactivity of these metals written by the student is: [1]

a) Zn > Fe > Al > Cu
b) Fe > Cu > Al > Zn
c) Al > Zn > Fe > Cu
d) Zn > Al > Fe > Cu

3. What happen when copper sulphate crystals are heated in a test tube: [1]



Statements:

i. It loses its water of crystallization.

ii. White coloured powder is formed.

Select the correct options for both statements.

a) Only (i) correct

b) Only (ii) correct

c) both (i) and (ii) correct

d) No Change

4. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ [1]

The above reaction is an example of:

a) Displacement reaction

b) Endothermic reaction

c) Exothermic reaction

d) Neutralisation reaction

5. Visualise the below reaction and predict 'X'. [1]

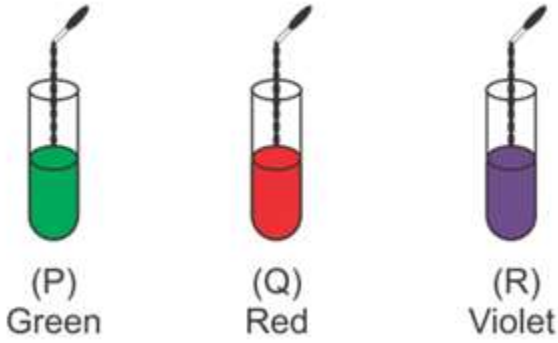
a) Acetic acid

b) Sodium hydroxide

c) Hydrochloric acid

d) Ethanol

6. On adding a few drops of universal indicator to three colourless solutions taken separately in three test tubes labeled P, Q, R respectively, the colours developed in the solutions are marked in the following figures. [1]



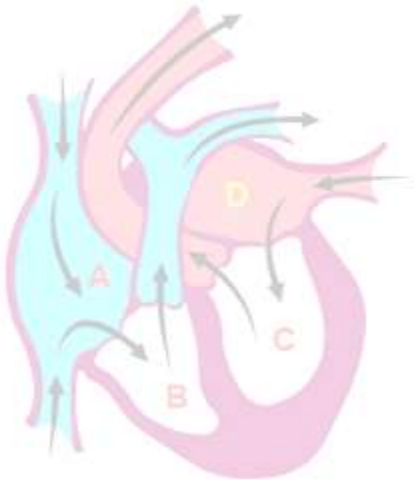
What is the correct decreasing order of pH values of the solutions?

a) P > Q > R
b) Q > P > R
c) R > Q > P
d) R > P > Q

7. $2NaOH + CO_2 \rightarrow A + H_2O$ [1]

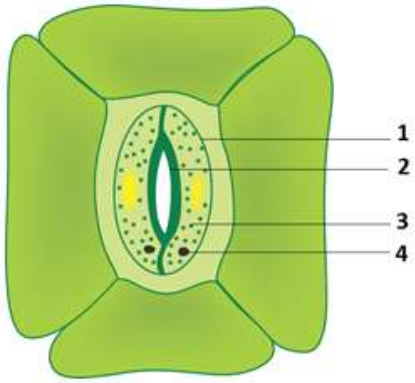
a) $NaHCO_2$
b) Na_2CO_3
c) H_2CO_3
d) $NaHCO_3$

8. What happens in chamber C of the heart in the given figure? [1]



a) Deoxygenated blood enters the heart and is supplied to body parts.
b) Oxygenated blood enters the heart and is supplied to body parts.
c) Oxygenated blood returns from the lungs and enters the aorta.
d) Deoxygenated blood returns from the lungs and enters the aorta.

9. Kriya draws the following sketch of the stomatal apparatus and labels its parts. The function of part 1 is [1]

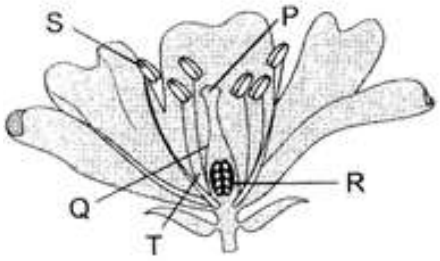


a) Opening and closing of stomata
b) Protection of inner cells
c) Exchange of gases
d) Exchange of water

10. Which of the following is NOT a direct conclusion to be drawn from Mendel's experiments? [1]

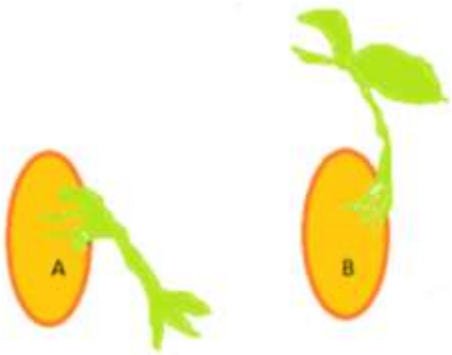
a) Only one parental trait is expressed.
b) Two copies of each trait are inherited in sexually reproducing organisms.
c) For recessive trait to be expressed, both copies should be identical.
d) Natural selection can alter the frequencies of an inherited trait.

11. Which of these labelled parts constitute the carpel of a flower? [1]



a) P and Q
b) S and T
c) P, Q and T
d) P, Q and R

12. How do movements in plants A and B differ from the movement of *Mimosa*? [1]



a) They are in response to stimuli.
b) They help the plant to adapt to the environment and adverse conditions.
c) They are important for growth and development.
d) All of the above

13. If a magnification of -1 is to be obtained using a convex lens of focal length 6 cm, then the object must be placed [1]

a) within 12 cm
b) at 6 cm
c) at 12 cm
d) beyond 12 cm

14. Which of the following factors does not affect the strength of an electromagnet? [1]

a) Increasing the number of turns in the coil.
b) Increasing the magnitude of the current in the coil.
c) Reversing the direction of current
d) Reducing the air gap between the poles of the magnet.

15. Given below are some food chains operating in an ecosystem.
Algae → Fish → Man
Grains → Chicken → Man
Grass → Goat → Man
With regard to various food chains, man is a: [1]

a) Producer
b) Consumer
c) Producer and consumer
d) Consumer and decomposer

16. Which of the following represents a group of biodegradable items? [1]

a) Polythene bags, old clothes, wilted flowers
b) Wilted flowers, pencil shavings, vegetable peels
c) Glass bangles, bronze statue, polythene bags
d) Pencil shavings, glass bangles, vegetable peels

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**: The colour of copper sulphate solution changes when iron nail is kept immersed in it. [1]
Reason: A displacement reaction takes place between iron and copper leading to formation of iron sulphate.

18. **Assertion**: All sepals together constitute the corolla. [1]
Reason: The function of sepals is to protect the flower in the bud stage.

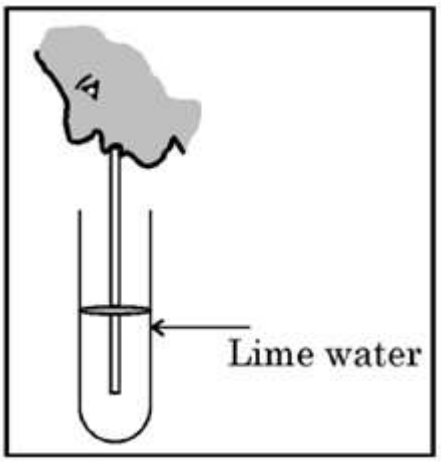
19. **Assertion**: Using jute bags while shopping is more environment friendly than using polythene bags. [1]
Reason: Jute is biodegradable while polythene is non-biodegradable.

20. **Assertion**: The blind spot is a small area of the retina insensitive to light.
Reason: At the junction of the optic nerve and the retina in the eye, there are many light-sensitive cells [1]

SECTION - B

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

21. Rayn is blowing air into lime water. Write your observation and reason for it? Write the chemical equation which can take place in the below experiment. [2]



22. Why is it said that sexual reproduction promotes diversity of characters in the offspring? [2]

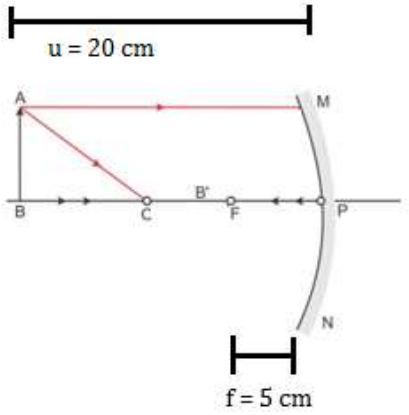
23. Why does blood in the arteries flow with jerks and is under pressure? [2]

OR

Differentiate between single circulation and double circulation found in vertebrates.

24. Why are heating elements used in electric iron and electric toasters made of alloys rather than pure metals? [2]

25. Observe the diagram and answer the questions given below: [2]



(i) Complete the given ray diagram.
(ii) Calculate the position of the image formed.

OR

The refractive index of glass for light going from air to glass is $\frac{3}{2}$. What will be the refractive index of glass for light going from glass to air?

26. Why a vegetarian food habit helps us in getting more energy? [2]

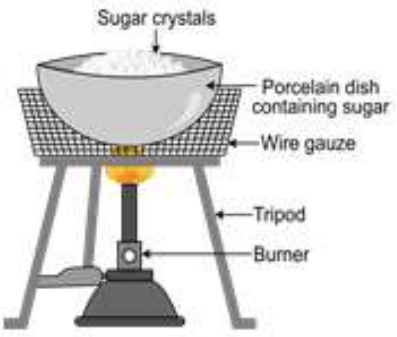
SECTION - C

Question No. 27 to 33 are short answer questions.

27. Observe the image and the answer questions given below the image. [3]

(a) Write observations?
(b) Write type of chemical reaction is this?
(c) Write chemical reaction involved in this experiment.

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



(a) Write observations.
(b) Write the type of reaction involved in this reaction.
(c) Write balanced chemical reaction.

OR

Arya added white powder while baking the cake to make them soft and fluffy. But the cake became bitter in taste and flat in texture. What must be the name of the powder added? What should have been added to the cake? What are the main ingredients in it? What are the functions of each ingredient? [3]

29. 'Reflex arcs continue to be more efficient for quick responses.' Justify this statement giving reason. [3]

30. Pure-bred tall (dominant) pea plants were crossed with pure-bred dwarf (recessive) pea plants. The progeny obtained was selfed to obtain the F_2 generation. [3]
(a) What would the plants of the F_1 generation look like?
(b) State the ratio of tall plants to dwarf plants in the F_2 generation.
(c) State the type of plants not found in the F_1 generation but which appeared in the F_2 generation, mentioning the reason for the same.

31. Answer the following: [3]
(a) What is the advantage of having two eyes instead of one?
(b) Explain the function of the iris.
(c) What is the difference in the defect of a person wearing spectacles of +1 D to a person wearing spectacles of –1 D?

32. How does the strength of the magnetic field at the centre of a circular coil of a wire depend on [3]
(a) Radius of the coil
(b) Number of turns of wire in the coil
(c) Draw the magnetic lines of force in case of a circular coil of a wire

33. [3]

Mention the factors on which the direction of force experienced by a current-carrying conductor placed in a magnetic field depends.

(a) Under what condition is the force experienced by a current-carrying conductor placed in a magnetic field maximum?

(b) A proton beam is moving along the direction of a magnetic field. What force is acting on the proton beam?

SECTION - D

Question No. 34 to 36 are long answer questions.

34. An organic compound A having the molecular formula C_3H_8O is a liquid at room temperature. Organic liquid A reacts with sodium metal to evolve a gas which burns causing a little explosion. When organic liquid A is heated with concentrated sulphuric acid at 170 °C, 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 substitution reactions with chlorine. [5]

a) What is compound A?

b) What is compound B?

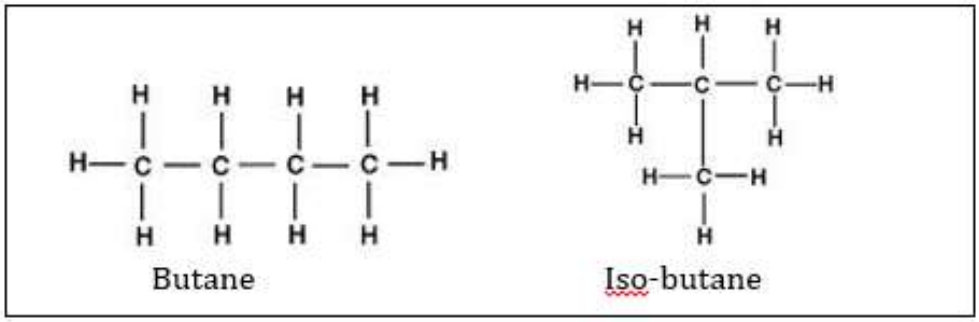
c) What type of reaction occurs when A is converted to B?

d) What is compound C?

e) What type of reaction occurs when B is converted to C?

OR

Observe the below structures. How are they related to each other? What is this phenomenon called? Write the definition of this phenomenon. Write the similar structures for the compounds with molecular formula C_5H_{12}. Write the name and general formula of homologous series from which C_5H_{12} belong. [5]



35. [5]

(a) Neha took three bread slices and kept them in the following conditions:
(i) Slice 1 in a dried and dark place
(ii) Slice 2 in moist and dark place
(iii) Slide 3 in refrigerator
What would she observe in each of the above conditions?

(b) Specify the events which occur in the reproductive system of a human female.
(i) if egg is fertilized
(ii) if egg is not fertilised

OR

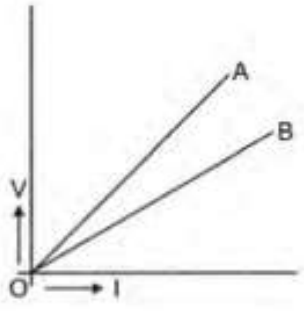
Study the table in which the levels of TSH in women are given. Answer the questions that follow based on the understanding of the given data and related concepts:

Age Range	Normal (mU/L)	Low (mU/L)
18-29 years	0.4-2.34 mU/L	< 0.4 mU/L
30-49 years	0.4-4.0 mU/L	< 0.4 mU/L
50-79 years	0.46-4.68 mU/L	< 0.46 mU/L

Women are at a greater risk for developing abnormal TSH levels during menstruation, while giving birth and after going through menopause.

(a) What does TSH stand for?
(b) A 35-year-old woman has TSH level 6.03 mU/L. What change should she bring in her diet to control this level?
(c) When do women face a greater risk of abnormal TSH level?
(d) State the consequence of low TSH level in the body.
(e) Name the mineral that is responsible for synthesis of hormone secreted by the thyroid gland.

36. Pooja is comparing the Voltage vs current graphs for two wires A and B, as shown in the figure below.



She knows that both wires are made of the same material and are of equal thickness. Using the given information determine which wire is longest and justify your answer.[5]

OR

(a) Which gas is filled in an electric bulb and why?

(b) What do you mean by resistance of a conductor? On what factors do the resistance of a conductor depend on and how? Write the SI unit of resistance.

(c) A current of 5.0 A flows through a 12 Ω resistor. What is the rate at which heat energy is produced in the resistor?

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. Metal A burns in air, on heating, to form an oxide A_2O_3 whereas another metal B bums in air only on strong heating to form an oxide BO. The two oxides A_2O_3 and BO can react with hydrochloric acid as well as sodium hydroxide solution to form the corresponding salts and water. And element E forms an oxide E_2O. An aqueous solution of E_2O turns red litmus paper blue. [4]

(a)

(i) What is the type or nature of oxide A_2O_3? Give the reason for the same.

(ii) What is the type or nature of oxide BO? Give reason for the same.

(b)

(i) Name one metal like A and write its oxide.

(ii) Name one metal like B and write its oxide.

OR

(b) Give an example of an oxide like E_2O. Write the type or nature of this oxide.

38. Guinea pigs having black eyes were crossed with guinea pigs having the same eye colour. The cross produced 100 offspring out of which 75 pigs had black eyes and 25 of them had white eyes. [4]

(a) What is the possible genotype of the parent guinea pigs?

(b) Which trait is dominant and which trait is recessive?

(c) What is the ratio of F_2 progeny obtained from this cross?

OR

Instead of the above cross, if there was a cross between short-haired guinea pigs and long-haired guinea pigs resulting in 400 pigs in F_2 generation, how many pigs would be long haired? Give reason for your answer.

39. Prabha wants to project the image of a candle flame on screen 60 cm in front of a mirror by keeping the flame at a distance of 15 cm from its pole. [4]

a) What type of mirror must be used?

b) What is the linear magnification of the image produced?

c) What does the value linear magnification indicate about the image?

OR

c) How much is the distance between the object and its image in the given case?