CBSE
Class X Science
Sample Paper – 1
2024-25

Time: 3 hours. **Total Marks: 80**

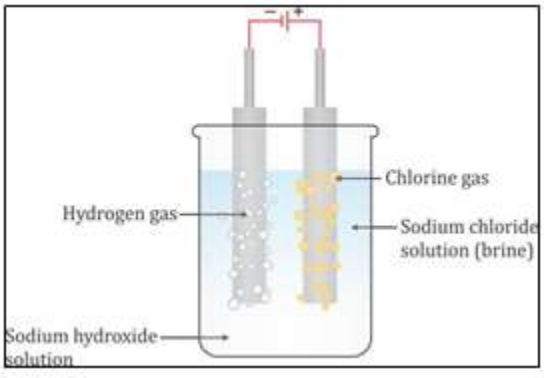
General Instructions:

1. *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.*
2. *Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.*
3. *Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.*
4. *Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.*
5. *Section D would have 3 Long Answer (LA) type questions carrying 05 marks each. 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. As per below set up, please select the valid statements mentioned below. [1]



i. Sodium hydroxide is formed near anode
ii. Chlorine is given off at anode
iii. Hydrogen gas is given off at cathode
iv. Hydrogen gas is given off at anode

a) i and iii
b) ii and iii
c) i and iv
d) only iv

2. Manjiri opened a bag of potato chips that had been sitting on the shelf for a long time and noticed they had a bad smell and taste. What process caused the chips to become rancid? [1]

a) Corrosion
b) Oxidation
c) Reduction
d) Hydrogenation

3. The functional group which is common between aldehydes and ketones is: [1]

a) Carbonyl group
b) Nitro group
c) Amide group
d) Hydroxyl group

4. Aluminium is extracted from its Al_2O_3 by: [1]

a) Calcination
b) Roasting
c) Electrolytic reduction
d) Thermit process

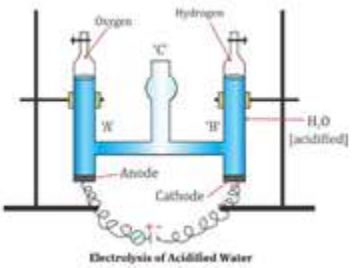
5. Meenal notices that the silver Diya after using for Diwali celebrations, kept in the open for a few days turned black. It must be due to the formation of: [1]

a) H_2S
b) AgS
c) $AgSO_4$
d) Ag_2S

6. Calcium oxide reacts with water to produce slaked lime. It is an example of: [1]

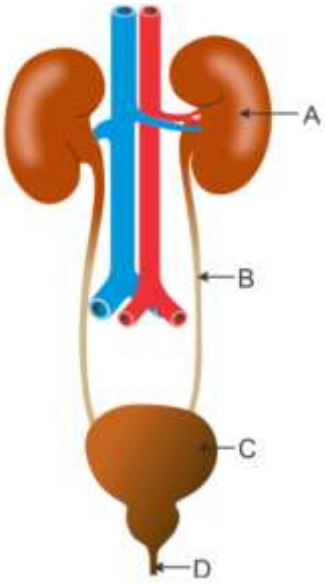
a) Decomposition reaction
b) Combination reaction
c) Displacement reaction
d) Oxidation reaction

7. Which type of reaction is taking place in the following experiment? [1]



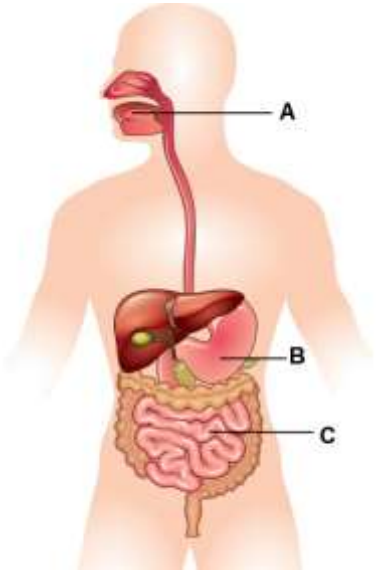
a) Displacement
b) Decomposition
c) Combination
d) Double displacement

8. Carefully study the diagram of the human excretory system with labels A, B, C and D. Select the option which gives the correct main function of the labelled organs. [1]



a) A is Kidney - Filters the blood and concentrates the filtrate to make urine.
b) B is Urethra – Expels urine out of the body
c) C is Urinary bladder – Dilutes the urine
d) D is Ureter – Transports urine to the urinary bladder

9. A, B and C are structures associated with the human digestive system. Identify the option which indicates the correct pairing of the enzyme produced and the food component digested by it. [1]



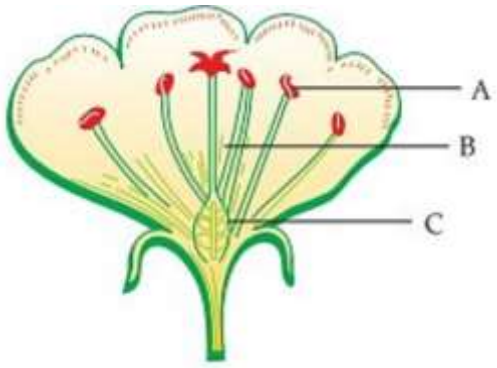
a) A: Amylase – Fat, B: Trypsin – Protein, C: Pepsin – Protein
b) A: Amylase – Starch, B: Pepsin – Protein, C: Lipase – Fats
c) A: Amylase – Protein, B: Trypsin – Fats, C: Pepsin – Protein
d) A: Amylase – Starch, B: Pepsin – Fats, C: Lipase – Protein

10. If a pea plant with violet flowers is crossed with a pea plant with white flowers, then what percentage of F_1 and F_2 generation respectively will bear violet flowers? [1]
a) 25%, 25%
b) 50%, 50%
c) 75%, 100%
d) 100%, 75%

11. The figure below shows the stages of ripening of a banana. Which hormone is responsible for this change? [1]

a) Auxin
b) Cytokinin
c) Ethylene
d) Abscisic acid

12. Which of these parts assist in the production of pollen grains? [1]

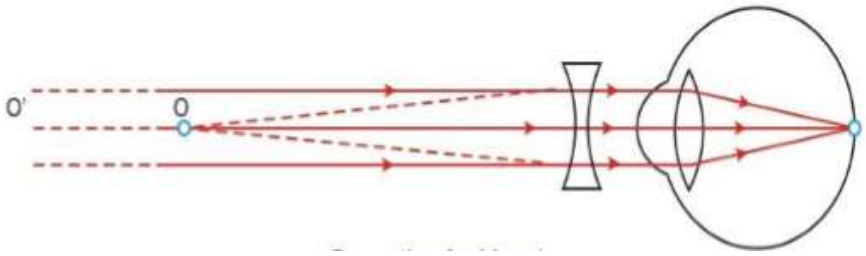


a) A only
b) B only
c) A and B
d) B and C

13. If the 'a' is object distance, 'b' is image distance and 'c' is focal length of concave mirror. Then the mirror formula is written as _____. [1]

a) $\frac{1}{a}-\frac{1}{b}=\frac{1}{c}$
b) $\frac{1}{b}-\frac{1}{c}=\frac{1}{a}$
c) $\frac{1}{c}+\frac{1}{b}=\frac{1}{a}$
d) $\frac{1}{a}+\frac{1}{b}=\frac{1}{c}$

14. The below ray diagram depicts [1]



a) Correction of myopia
b) Correction of hypermetropic eye
c) Correction of presbyopia
d) None of these

15. What is the ratio of the average amount of energy absorbed by the producers to the average amount of energy absorbed by the primary consumers? [1]

a) 1 : 2
b) 2 : 1
c) 1 : 10
d) 10 : 1

16. Which of the following groups of organisms do not constitute an appropriate food chain operating in an ecosystem? [1]

(i) Grass, rabbit, wolf, lion
(ii) Plankton, grasshopper, fish, man
(iii) Grass, wolf, snake, tiger
(iv) Grass, grasshopper, frog, snake, eagle

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

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:** A shiny white finish on walls is obtained after two to three days of white washing the walls.
Reason: Calcium oxide reacts with carbon dioxide to produce calcium hydrogen carbonate which gives a shiny white finish. [1]

18. **Assertion**: Sexual reproduction leads to a greater variety in population.
Reason: It plays an important role in the origin of new species. [1]

19. **Assertion**: If DDT is present in water bodies, then fish-eating birds accumulate maximum amount of DDT in their bodies.
Reason: Pesticides are not metabolized within the bodies of living organisms and get concentrated at each trophic level leading to bioaccumulation. [1]

20. **Assertion:** In an AC generator, increasing the strength of the magnetic field can increase the magnitude of the induced current.
Reason: A stronger magnetic field will induce a larger EMF in the armature coils. [1]

SECTION - B

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

21. Mention two chemical reactions which are characterised by the evolution of gas. [2]

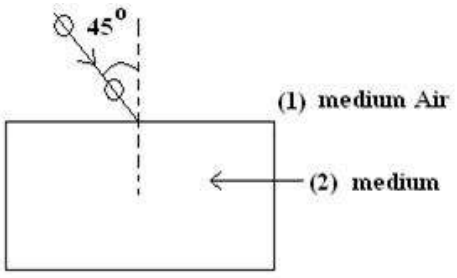
22. What could be the possible reason for the declining female–male sex ratio in our country? Suggest two measures to achieve the 1:1 ratio. [2]

23. What will happen if mucus is not secreted by the gastric glands? [2]

OR

Leaves of a healthy potted plant were coated with *Vaseline*. Will this plant remain healthy for long? Give reasons.

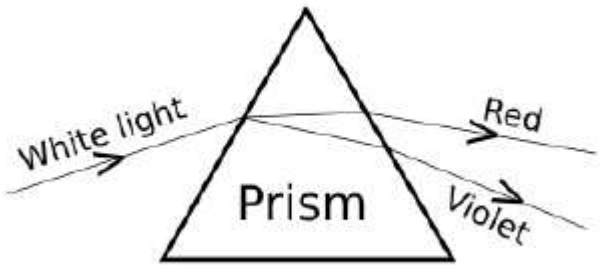
24. A ray of light is incident at an angle of 45° at the interface of medium (1) and medium (2) as shown in the above diagram. Redraw this diagram in the answer book and complete it. If the angle of refraction is 30°, find the refractive index of medium (2) with respect to medium (1).



(Given that $\sin 45^0 = \frac{1}{\sqrt{2}}$ sin and $\sin 30^0 = \frac{1}{2}$)

If the second medium is water in place of medium (2), will the angle of refraction increase or decrease? Why? (Refractive index of water = 4/3)

25.



A student observes the above phenomenon in the lab as a white light passes through a prism. Among many other colours, he observed the position of the two colours Red and

Violet. What is the phenomenon called? What is the reason for the violet light to bend more than the red light?

OR

A concave lens has focal length of 25 cm. At what distance should the object from the lens be placed so that if it forms an image at 20 cm distance from the lens? [2]

26. Our food grains such as wheat and rice, vegetables, and fruits, and even meat are found to contain varying amounts of pesticide residues. State the reason to explain how and why it happens. [2]

SECTION - C

Question No. 27 to 33 are short answer questions.

27. [3]

(a) Acids and bases ionize in water. Name the ions produced by each in water.

(b) If we have hydrochloric acid and acetic acid of equal concentration, then which will be a stronger acid? Give reason for the same.

(c) How will the concentration of hydrogen ions be affected if an acid is diluted? Name the concept used to determine the hydrogen ion concentration in solution.

28. Write three uses of each: [3]

(a) Bleaching powder

(b) Baking soda

OR

During a chemistry laboratory experiment, Nayana mixed manganese dioxide with hydrochloric acid. She observed the formation of manganese chloride, water, and chlorine gas. [3]

(a) Express the above reaction in the form of a balanced chemical equation.

(b) Identify with the reason the (i) reducing agent and the (ii) oxidising agent.

29. Transmission of nerve impulses between two neurons takes place through synapse. [3]

(a) What happens at the synapse between two neurons?

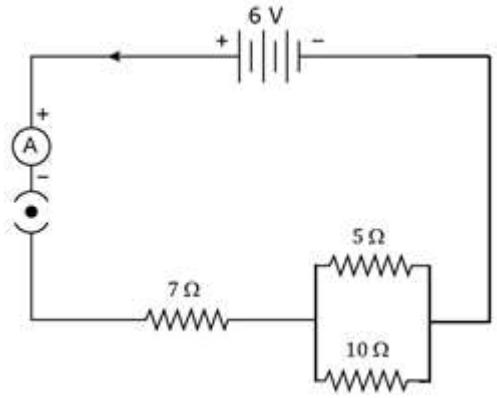
(b) Why is the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron but not the reverse?

30. A farmer crosses two heterozygous yellow seeded plants and obtains 100 plants in the F_1 generation. Work out the cross and find the number of green and yellow seeds respectively in the F_1 generation? [3]

31.

(a) What type of lens should we use to get a diminished, virtual, and erect image?
(b) Explain the above case with the help of ray diagram.
(c) State the characteristics of images formed in case of convex mirror.

32. From the following electric circuit: [3]



Calculate:

(i) Resultant resistance and current
(ii) Heat energy evolved when the circuit is switched on for 30 minutes

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

SECTION - D

Question No. 34 to 36 are long answer questions.

34. Riya learned about carbon and its unique properties during a chemistry class. She was curious about how carbon forms so many different compounds and why substances like diamond and graphite, though made of carbon, look and behave so differently. Explain: [5]

(a) Tetravalency of carbon (with diagram)
(b) Two allotropes of carbon based on characteristics.

OR

Distinguish between esterification and saponification reaction with the help of the chemical equations for each. State one use of each (i) esters, and (ii) saponification process.

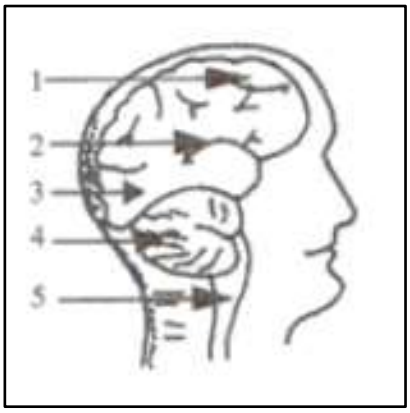
35. [5]

(a) In a tobacco plant, the male gametes have 24 chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
(b) Kashyap noticed that an organism by mistake was cut into parts. After some time, both parts developed into new individuals.
i) Name the mode of reproduction used by the organism.

ii) State the type of cells which carry out this process.
iii) Give one example of an organism which reproduces by the above method.

OR

The figure represents the human brain.



(a) Label the parts 1 – 5.
(b) State the function of part 4 and 5.
(c) How is the brain protected?

36. [3]

(a) For what position of the object does a convex lens form an erect and virtual image?
(b) What is regular reflection of light?
(c) What type of mirror is used as a shaving mirror? Support your answer with a reason.

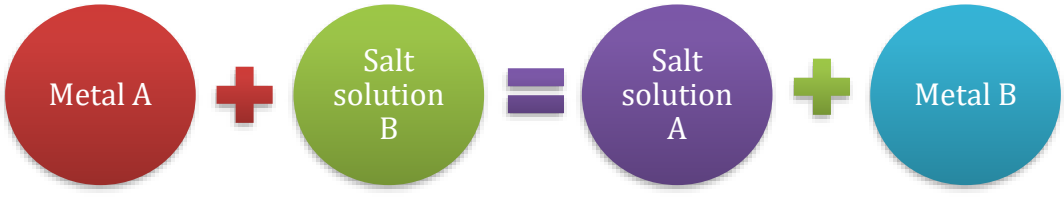
OR

Answer the following:
(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?

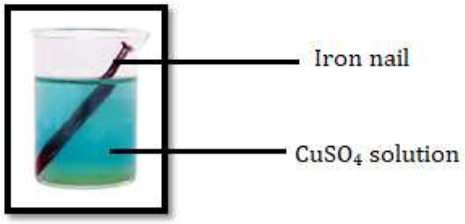
SECTION - E

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. The Activity metals is the arrangement of metals in decreasing order of their reactivity. In this series most reactive metal is potassium (K) and is placed at the top of the list and least reactive metal is gold (Au) which is placed at the bottom of the list. More reactive metal can displace less reactive metal from its solution. [4]



(a) Write observation for the set up shown in the below image.



(b) Soham dipped a strip of zinc in copper sulphate solution. What will he observe?

OR

(c) From the following articles which will corrode first? Support your answer with valid reason.

A. Aluminium bucket

B. Copper plate

C. Iron nails of garden gate

D. Cast iron kitchen utensil

38. In a cross between plants with purple flowers and plants with white flowers, the F_1 generation had all purple flowers. When the F_1 generation was self-bred, the F_2 generation gave rise to 100 individuals, 75 of which had purple flowers. Make a cross and answer. [4]

a) What is the ratio of purple and white flowered plants in F_2 generation?

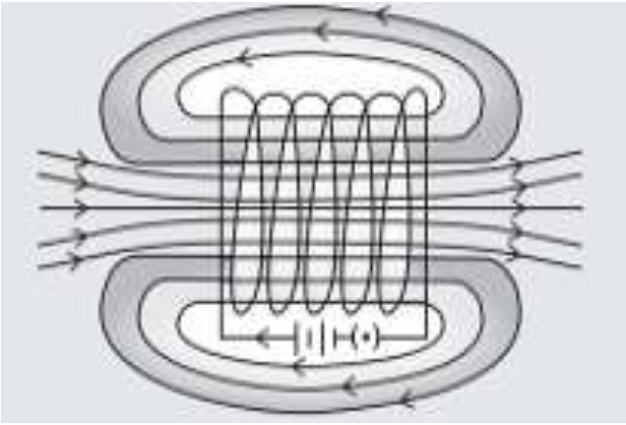
b) What are the genotypes of F_2 individuals?

c) If F_2 generation gave rise to 400 individuals, how many flowers would be pure homozygous? Give the genotype of these plants.

OR

c) Instead of the above cross, if there was a cross between tall and dwarf plants resulting in 100 individuals in F_2 generation, how many plants would have been dwarf? Give reason for your answer.

39. The pattern of magnetic field lines around a current carrying solenoid is shown in the figure. This pattern of the field is similar to the magnetic field around a bar magnet. In fact, one end of the solenoid behaves as a magnetic north pole, while another end behaves as the south pole. The field lines inside the solenoid are in the form of parallel straight lines. A strong magnetic field produced inside a solenoid can be used to magnetise piece of material like soft iron, when placed in magnet. The magnet so formed is called electromagnet. [4]



a) Which among the following statement best describes the solenoid?

a) Straight conductor carrying current.

b) A freely suspend bar magnet which align in north -south direction.

c) A closely wound cylindrical coil of insulated metallic wire.

d) None of the above

b) How is the field strength at all points is in case of uniform magnetic field?

c) How does the magnetic field vary inside a solenoid?

OR

c) A) Which magnet is the strongest?

B) Which magnet produces the field lines similar to those produces around a current – carrying solenoid?