SECTION-01

1. Define the term principal axis of a spherical mirror ? 1

OR

What is the magnification of the images formed by plane mirror?

2. Name the component of white light that deviates the least and the most while passing through a prism. 1
3. What is meant by the term hydrated salt ? 1
4. Name a non-metal which is lustrous and a metal which is non-lustrous. 1

OR

Give two examples of amphoteric oxides.

5. No two individuals are absolutely alike in population. Why ? 1
6. What happens to the resistance of a conductor when its area of cross-section is increased ? 1
7. Common salt besides being used in kitchen can also be used as the raw material for making

(i) washing soda. (ii) bleaching powder.
(iii) baking soda. (iv) slaked lime.

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

8. Which of the following is (are) true when HCl (g) is passed through water ?
(i) It does not ionise in the solution as it is a covalent compound.
(ii) It ionises in the solution.
(iii) It gives both hydrogen and hydroxyl ion in the solution.
(iv) It forms hydronium ion in the solution due to the combination of hydrogen ion with water molecule.

(a) (i) only (b) (b) (iii) only
(c) (ii) and (iv) (d) (iii) and (iv) 1

OR

Identify the basic salt from the following salts ?

(i) Na_2CO_3 (ii) NH_4Cl
(iii) $NaNO_3$ (iv) KCl 1

9. In torches, search lights and headlights of vehicles, the bulb is placed
(a) between the pole and the focus of the reflector.
(b) very near to the focus of the reflector.
(c) between the focus and centre of curvature of the reflector.
(d) at the centre of curvature of the reflector. 1
10. In which of the following, the image of an object placed at infinity will be highly diminished and point sized ?

(a) Concave mirror only (c) Convex lens only
(b) Convex mirror only (d) Convex mirror, concave mirror, concave lens and convex lens 1

OR

The image formed by a concave mirror is observed to be virtual, erect and larger than the object. Where should be the position of the object ?

(a) Between the focus and the centre of curvature (c) Beyond the centre of curvature
(b) At the centre of curvature (d) Between the pole of the mirror and its focus

11. Which of the following statements is correct regarding the propagation of light of different colours of white light in air ?
(a) Red light moves fastest
(b) Blue light moves faster than green light
(c) All the colours of the white light move with the same speed
(d) Yellow light moves with the mean speed as that of the red and the violet light 1

12. Two resistors of resistance 2 ohm and 4 ohm when connected to a battery will have
(a) same current flowing through them when connected in parallel.
(b) same current flowing through them when connected in series.
(c) same potential difference across them when connected in series.
(d) different potential difference across them when connected in parallel.

13. Which of the following correctly describes the magnetic field near a long straight wire ?
(a) The field consists of straight line perpendicular to the wire.
(b) The field consists of straight lines parallel to the wire.
(c) The field consists of radial lines originating from the wire.
(d) The field consists of concentric circles centred on the wire. 1

OR

For a current in a long straight solenoid N and S poles are created at the two ends. Among the following statements, the incorrect statement is :
(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
(d) The N and S-poles exchange position when the direction of current through the solenoid is reversed. 1

Directions : For question numbers 14-16 two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :
(a) Both A and R are true and R is correct explanation of the assertion.
(b) Both A and R are true but R is not the correct explanation of the assertion.
(c) A is true but R is false.
(d) A is false but R is true

14. **Assertion (A) :** Magnetic field lines never intersect.
Reason (R) : At a particular point magnetic field has only one direction. 1

15. **Assertion (A) :** Ozone is both beneficial and damaging.
Reason (R) : Stop the release of chlorofluorocarbons to protect the ozone. 1

16. **Assertion (A) :** Surgical methods are most effective methods of contraception.
Reason (R) : Surgical method blocks gametes transport and hence prevent fertilisation. 1

17. **Read the passage and answer the following questions.**
Suhana wanted her house to be white washed. She bought 10 kg of quicklime from the market and dissolved it in 30 L of water. On adding lime to water, she observed that the water started boiling even when it was not being heated.
(a) _____ is formed when water is added to quicklime.
(i) $CaCO_3$ (ii) CaO (iii) $Ca(OH)_2$ (iv) NaOH
(b) Write the reaction involved.
(c) The nature of the product formed is:
(i) Acidic (ii) Basic (iii) Neutral (iv) Both (i) and (ii)

(d) Which of the following statements is correct about the above reaction based on your observations?

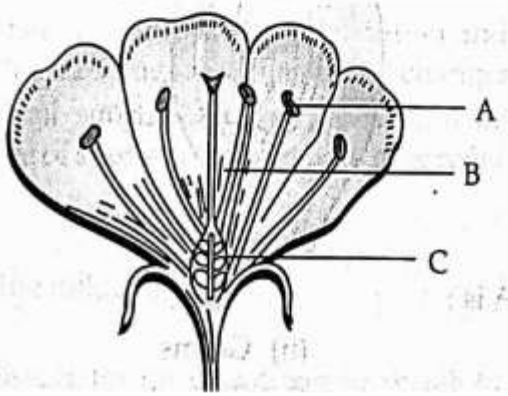
I. It is an endothermic reaction.
II. It is an exothermic reaction
III. The pH of the resulting solution will be more than seven.
IV. The pH of the resulting solution will be less than seven.

(i) I and II (ii) II and III
(iii) I and IV (iv) III and IV

(e) Which observation does not help us to determine whether a chemical reaction has taken place?

(i) Evolution of a gas (ii) Change in temperature
(iii) Change in state (iv) Change in pH 4

18. The given diagram represent the structure of a flower. Study the structure and answer the following questions.



(a) The labels A, B and C are
(i) Anther, Style and Ovary respectively.
(ii) Stamen, Stigma and Ovule respectively.
(iii) Anther, Style and Stigma respectively.
(iv) tamen, Fragment and Ovary respectively.

(b) Which of these is the function of part labelled as C ?
(i) Contains ovules which develop into seeds.
(ii) Attracts pollinators.
(iii) Protect rising buds.
(iv) Receive pollens

(c) When an insect sits on the flower of a plant then some particles from the little stalks in the flowers sticks to its body and when this insect sits on the flower of another plant, the particles get deposited in that flower. What are these particles ?

(i) Dust (ii) Pollens
(iii) Grains (iv) Seeds

(d) A student decides to study the impact of removing certain flower parts on fruit formation in plant species X. He chooses three separate plants that are growing in the same plot under uniform conditions. The data is given in the table below.

Plants	Part Removed	Impact on formation
1.	Anther	30% less fruit formed than average plants in the plot
2.	Stigma	No fruit formed
3.	Petal	No significant impact

Which of the following can be inferred from the above data ?

(i) Anthers and stigmas are crucial in sexual reproduction in species X.
(ii) Pollen grains are probably unable to germinate if they land on other parts of the carpel besides the stigma.
(iii) Species X is likely to be wind-pollinated.
(iv) Species X relies completely on cross-pollination.

(e) In a flowering plant, summarize the events that take place after fertilization. 4

19. Study the diagram given below and answer any four questions.

(a) The part labelled as A is :
(i) Dust
(ii) Germs
(iii) Pollen
(iv) Pollinators

(b) The role of part labelled as B is :
(i) Transport of male gametes to the ovary.
(ii) Transport of female gametes to the ovary
(iii) Contains ovules which develop into seeds.
(iv) All of these

(c) How many male gametes are produced by each pollen grain?
(i) One
(ii) Two
(iii) Three
(iv) Four

(d) What happens to the label A which falls on a suitable stigma.

(e) List two reasons for the appearance of variations among the progeny formed by sexua reproduction.

20. Read the following and answer any four questions.

A farmer is growing a crop regularly in his field. He uses chemical fertilizers, pesticides, organic manure as well as bio-fertilizers. Very close to his field is a factory which emits smoke as a byproduct. There is also a huge lake in the nearby area.

(a) A considerable increase in plant life in the lake was noticed after the farming activity intensified. The most likely reason for this could be:
(i) Chemical fertilizers leached into the lake from the field.
(ii) Pesticides leached into the lake from the field.
(iii) Organic manure leached into the lake from the field.
(iv) Smoke particles from the industry got settled in moist surroundings of the lake.

(b) Consider the following food chain in the same lake.
Aquatic plant → Small fish → Big fish → Birds
Which of the above organisms is likely to show minimum amount of pesticide concentration in them after considerable time?
(i) Aquatic plants.
(ii) Small fish.
(iii) Big fish.
(iv) Birds.

(c) Will the levels of this magnification be different at different levels of the ecosystem?

(d) An expert agriculturist suggests to the farmer to minimize the use of chemical fertilizers and instead use biofertilizers as they have many advantages over chemical fertilizers. Which of the following is NOT true for biofertilizers?
(i) They are economical
(ii) They help in reducing pollution in the lake
(iii) They are renewable
(iv) They require large set-up for their production.

(e) State a way to prevent accumulation of harmful chemicals in our bodies.

SECTION-B

21. Translate the following statement into chemical equation and then balance it : "A metal in the form of ribbon burns with a dazzling white flame and changes into a white powder.' 2

22. Bee-sting leaves a chemical substance that causes pain and irritation. Name the chemical substance. Identify the type of substance which may give relief on the sting area when applied on it. 2

OR

Write one word/term for the following :

(i) Water soluble base

(ii) A substance which dissociates on dissolving in water to produce hydrogen ions. $[H]^+(aq)$ ions]

I 23. (i) What were the limitations of Dobereiner's triad ?

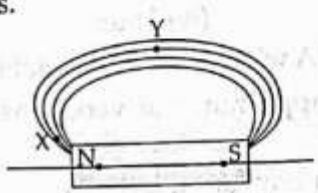
(ii) Why did Mendeleev leave some gaps in his periodic table ? 2

24. Give two advantages of sexual reproduction over asexual reproduction. 2

OR

Write two functions of each (i) Testis, (ii) Ovaries.

25. Magnetic field lines are shown in the given diagram. A student makes a statement that magnetic field at X is stronger than at Y. Justify this statement. Also redraw the diagram and mark the direction of magnetic field lines.



AII 26. What is a solenoid ? Mention two ways to increase the strength of the field of a solenoid. 2

SECTION C

27. You are provided with 90 mL of distilled water and 10 mL of concentrated sulphuric acid to prepare dilute sulphuric acid.

(i) What is the correct way of preparing dilute sulphuric acid ? Give reason.

(ii) How will the concentration of H_3O^+ ions change on dilution ? 3

28. What is a homologous series of carbon compounds? Give an example and list its three characteristics. 3

OR

What are covalent compounds ? How are they different from ionic compounds ? List any two properties of covalent compounds. 3

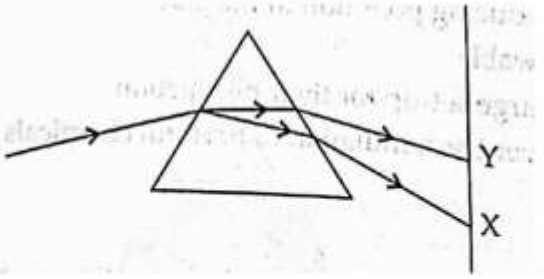
29. List in tabular form three distinguishing features between autotrophic nutrition and heterotrophic nutrition. 3

AI 30. A cross was made between pure breeding pea plants one with round and green seeds and the other with wrinkled and yellow seeds.

(i) Write the phenotype of F_1 progeny ? Give reason for your answer ?

(ii) Write the different types of F_2 progeny obtained along with their ratio when F_1 progeny was self-crossed ? 3

AI 31. In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum XY on the screen.



(i) Name the phenomenon.

(ii) State the colours seen at X and Y.

(iii) Why do different colours of white light bend at different angles through a prism? 3

32. Derive an expression for electric energy consumed in a device in terms of V, I and t, where V is the potential difference applied to it, I is the current drawn by it and t is the time for which the current flows ? 3

33. Draw a diagram to show the magnetic field lines around a bar magnet. List any two properties of magnetic field lines.

SECTION D

34. State the reason for the following :
    (i) Aluminium oxide is called an amphoteric oxide.
    (ii) An iron strip dipped in a blue copper sulphate solution turns the blue solution pale green.
    (iii) Hydrogen gas is not evolved when most metals react with nitric acid.
    (iv) Calcium does not occur in free state in nature.
    (v) Sodium or potassium metals are kept immersed under kerosene. 5

35. (a) Write the functions of following parts in human female reproduction system ?
    (i) Ovary, (ii) Oviduct, (iii) Uterus
    (b) Describe in brief the structure and function of placenta ? 5

OR

What is pollination ? How does it occur in plants ? How does pollination lead to fertilization ? Explain.

36. An object is placed at a distance of 30 cm from a concave lens of focal length 30 cm.
    (i) Use lens formula to determine the distance of the image from the lens.
    (ii) List four characteristics of the image (nature position, size, erect/inverted) in this case.
    (iii) Draw a labelled diagram to justify your answer of part (ii). 5

OR

(i) Draw a ray diagram to show the formation of image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus.

(ii) In the above ray diagram mark the object-distance (u) and the image-distance (v) with their proper signs (+ve or – ve as per the new Cartesian sign convention) and state how these distances are related to the focal length (f) of the convex lens in this case.

(iii) Find the power of a convex lens which forms a real, and inverted image of magnification –1 of an object placed at a distance of 20 cm from its optical centre. 5