

**ST. MARTIN'S DIOCESAN SCHOOL**  
**DELHI CANTT.**  
**PRE BOARD EXAMINATION (2025-2026)**  
**CLASS: X**  
**SUBJECT: SCIENCE (086)**  
**SET-II**

**DURATION: 03 HRS**

**M.M: 80**

**General Instructions:**

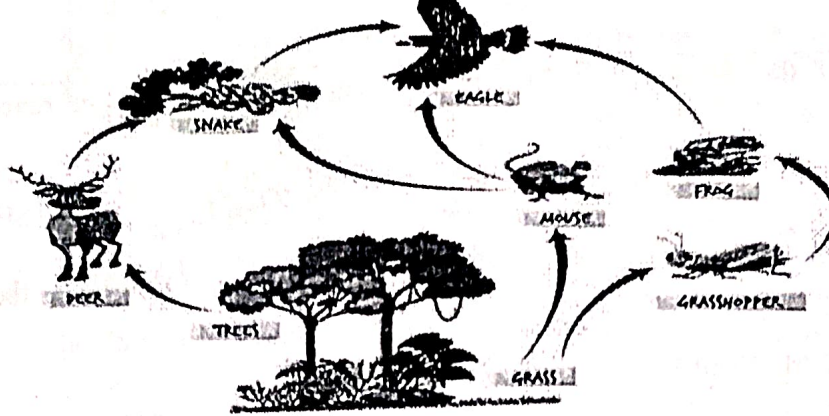
- (i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section-A		Marks
1	The decomposers are not included in the food chain. The correct reason for the same is because decomposers: A. Act at every trophic level of the food chain B. Do not breakdown organic compounds C. Convert organic material to inorganic forms D. Release enzymes outside their body to convert organic material to inorganic forms	1
2	A cross between pure tall and pure short pea plants gives hybrid tall pea plants in the first generation. What would be the genotypic ratio in the offspring of the second generation if these F <sub>1</sub> plants were self-pollinated? A. 3:1 B. 9:3:3:1 C. 1:2:1 D. 1:1	1
3	During cellular oxidation of Glucose, ATP is produced along with formation of other products in this reaction. Which of the following events is associated with production of maximum ATP molecules per molecule of Glucose during this process? Synthesis of A. Ethanol in yeast B. Lactic acid in muscle cells C. Carbon dioxide in yeast cells D. Carbon dioxide in human cells	1
4	In snails individuals can begin life as male and depending on environmental conditions they can become female as they grow. This is because A. male snails have dominant genetic makeup. B. female snails have dominant genetic makeup. C. expression of sex chromosomes can change in a snail's life time. D. sex is not genetically determined in snails.	1
5	A certain class of herbicides does not allow pollen tube formation. Which of the following processes does it inhibit? A. Cross-pollination B. Self-pollination C. Seed dispersal D. Fertilisation	1



6	Plants use completely different process for excretion as compared to animals. Which one of the following processes is NOT followed by plants for excretion? A. They can get rid of excess water by transpiration. B. They selectively filter toxic substances through their leaves. C. Waste products are stored as resins and gums in old xylem. D. They excrete waste substances into the soil around them.	1
7	Consider the following statements concerning food chains: (i) Removal of 80% tigers from an area resulted in greatly increased growth of vegetation (ii) Removal of most of the carnivores resulted in an increased population of herbivores. (iii) The length of the food chains is generally limited to 3 – 4 trophic levels due to energy loss (iv) The length of the food chains may vary from 2 to 8 trophic levels Which two of the above statements are correct? A. (i), (iv) B. (i), (ii) C. (ii), (iii) D. (iii), (iv)	1
The following two questions consist 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.		
8	<b>Assertion (A):</b> Omnivores receive 10% of their energy from the trophic level below them. <b>Reason (R):</b> An omnivore is always in the trophic level just above herbivores.	1
9	<b>Assertion (A):</b> An organism with 24 chromosomes undergoes binary fission to give rise to daughter cells with 12 chromosomes each. <b>Reason (R):</b> Binary fission gives rise to two identical daughter cells.	1
10	A person suffering from liver disease is advised to avoid fatty and highly acidic foods. Give a reason why each of the foods mentioned should be avoided by a person suffering from liver disease.	2
11	<u>Attempt either option A or B.</u> A. Marked decline in the thickness of ozone layer was noticed in the 1980s. Which human activity can be held accountable for this change? What is the possible effect of this on human health? <b>OR</b> B. Straws made from palm leaves are organic. These single-use drinking straws are made of dried leaves that naturally fall to the ground. Paper straws are made of food-grade paper and water-based adhesive or glue. Both paper straws and palm leaf straws are biodegradable. (i) State an advantage of palm leaf straws over paper straws. (ii) Why can single-use palm straws be recycled again?	2
12	Study the food web shown below.	2





- (i) Identify and write the food chain from the food web shown, in which the eagle will receive the highest percentage of the energy from the producers.
- (ii) Which organism will be the most affected when a non-biodegradable pesticide is introduced into the soil? What is the phenomenon responsible for this called?

13	Show the cross between two pea plants having round and green seeds (RRyy) and, identify the percentage of the following with respect to the F <sub>1</sub> generation: (i) gametes having both the round and yellow seed traits (ii) offspring having the same genotype as the parents (iii) offspring having the same phenotype as the parents	3
14	State any three reasons to justify the use of contraceptive methods.	3
15	All human chromosomes are not paired. Most human chromosomes have a maternal and a paternal copy and we have 22 such pairs. But one pair of sex chromosomes are odd in not always being a perfect pair. Women have a perfect pair of sex chromosomes. But man has a mismatched pair in which one is normal sized while the other is a short one. <u>Attempt either subpart A or B.</u> A. In humans, how many chromosomes are present in a zygote and in each gamete?  OR B. A few reptiles rely entirely on environmental cues for sex determinations. Comment. C. What type of chromosomes can sperm carry? D. Why has been prenatal sex determination prohibited by law in India?	4
16	<u>Attempt either option A or B.</u> A. (i) Certain specialised cells in animals called stem cells have the ability to divide and differentiate into different cell types. This helps in the replacement of a damaged organ. Name and explain two methods of asexual reproduction that are similar to specialized stem cells and occur mostly in multicellular organisms. (ii) Identify TWO pairs of reproductive organs in males and females that are functionally similar to each other. Justify.  OR B. (i) Sagar saw a beautiful rose and smelled it. As he was smelling it, he happened to touch a thorn and pull his hand away. State TWO differences and similarities each in the way the nervous system performs the two actions (smelling- voluntary, pulling hand away- reflex) (ii) Are all involuntary actions reflex actions? Justify.	5



17	Which of the following is not an example of decomposition reaction? (a) $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ (b) $\text{Ca}(\text{OH})_2(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l})$ (c) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s}) \rightarrow \text{CuSO}_4(\text{s}) + 5\text{H}_2\text{O}(\text{l})$ (d) $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$	1
18	In the balanced equation, $\text{Cu} + x\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + y\text{NO}_2 + 2\text{H}_2\text{O}$ the values of x and y are (a) 3 and 5 (b) 8 and 6 (c) 4 and 2 (d) 7 and 1	1
19	Brine is an (a) aqueous solution of sodium hydroxide (b) aqueous solution of sodium carbonate (c) aqueous solution of sodium chloride (d) aqueous solution of sodium bicarbonate	1
20	What happens when a solution of an acid is mixed with a solution of a base in a test tube? (i) Temperature of the solution decreases (ii) Temperature of the solution increases (iii) Temperature of the solution remains the same (iv) Salt formation takes place (a) (i) and (iv) (b) (i) and (iii) (c) (ii) only (d) (ii) and (iv)	1
21	$\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow \dots + \text{H}_2\text{O}$ (a) $\text{Al}(\text{OH})_3$ (b) $\text{Na}_2\text{O}$ (c) $\text{NaAlO}_2$ (d) $\text{AlNaO}_2$	1
22	Which of the following is the formula of Butanoic acid? (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ (b) $\text{COOH}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$ (c) $\text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3$ (d) $\text{CH}_2-\overset{\text{COOH}}{\text{CH}}-\text{CH}_2-\text{COOH}$	1
23	$\text{C}_3\text{H}_8$ belongs to the homologous series of (a) Alkynes (b) Alkenes (c) Alkanes (d) Cyclo alkanes	1
The following two questions consist 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.		
24	Assertion (A): The acid must always be added to water with constant stirring. Reason (R) : Mixing of an acid with water decreases the concentration of $\text{H}^+$ ions per unit volume.	1
25	What is a reduction reaction? Identify the substances that are oxidised and the substances that are reduced in the following reactions. (Board Term I, 2015) (a) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$	2
26	<u>Attempt either option A or B.</u> A. An element 'X' is stored in kerosene, and cannot be extracted from its ore using a reducing agent. 'X' forms an ionic compound on reaction	3



with chlorine.

- (i) Can we store 'X' in water? Give reason to support your answer.  
(ii) Identify element 'X'. Name the process used and write the equation for extraction of 'X' from its ore.

OR

B. The domes of many building in Europe are made of copper. These domes now appear greenish in colour.

- (i) Why do the domes appear greenish though copper is orange-red in colour?  
(ii) In your opinion, should the copper domes be replaced by iron domes to overcome the problem of change of colour of copper domes?

Domes used to be made from thin sheets of metals. Why did the ancient architects use copper to make domes?

Amrita electrolysed distilled water using the set-up shown in figure 1. She was expecting two gases to be evolved at the anode and cathode respectively

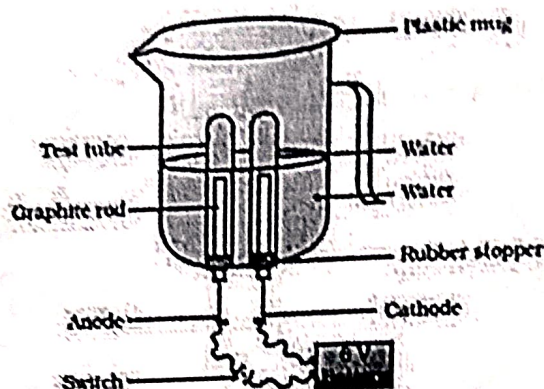


Fig.1

Suddenly, she realised that the bulb in the circuit did not glow when she used distilled water (figure 2)

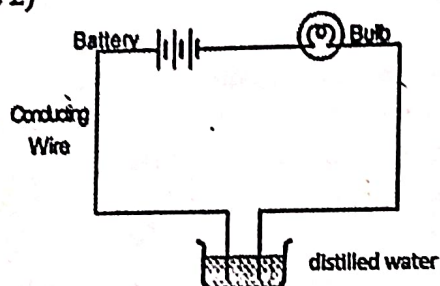


Fig. 2

After this realization, she added a substance to the distilled water for electrolysis to take place.

Answer the following questions based on the information given above:

- A. Which gas was she expecting to be formed at the anode and which one at the cathode respectively?  
B. Why did the bulb not glow when Amrita passed electricity through distilled water?  
C. Which substance was added by Amrita to distilled water to get the expected result?

Attempt either option A or B.

A.

- (i) It is observed that covalent compounds are bad conductors of electricity. Give reason.  
(ii) Carbon can neither form  $C^{4+}$  cation or  $C^{4-}$  anion. Why?  
(iii) Draw electron dot structure of ethanol.

OR

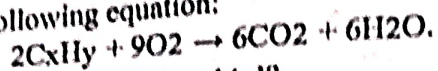


	<p>B.</p> <p>(i) What are soaps? Explain the mechanism of cleansing action of soap with the help of a labeled diagram.</p> <p>(iii) Detergents are better than soaps. Justify.</p>	5
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29

Attempt either option A or B.

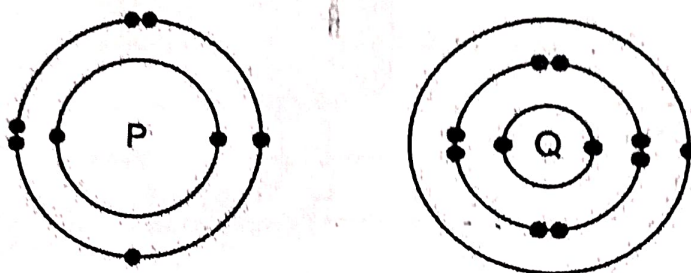
A. A hydrocarbon with the formula  $C_xH_y$  undergoes complete combustion as shown in the following equation:



- What are the values of 'x' and 'y'?
- Give the chemical (IUPAC) name of the hydrocarbon.
- Draw its electron dot structure.
- Name the alcohol which on heating with conc.  $H_2SO_4$  will produce the above hydrocarbon  $C_xH_y$ .
- Write a balanced chemical equation for the reaction of  $C_xH_y$  with hydrogen gas in presence of Nickel.

OR

B. The electronic structures of atoms P and Q are shown below



Based on the information given above, answer the following questions:

- If P and Q combine to form a compound, what type of bond is formed between them?
- Give the chemical formula of the compound formed.
- The compound so formed is dissolved in water. Is the resultant solution acidic or basic in nature? Justify your answer.
- Write the chemical equation for the reaction between 'Q' and ethanol.
- What will be the formula of the compound formed when 'P' undergoes bonding with carbon?

### Section-C

30

An optical device which always produces images of  $m = +1$  is :

- Plane mirror
- Convex mirror
- Concave mirror
- Convex lens

1

31

14. The strength of the magnetic field inside a current carrying long straight solenoid is :

- maximum at its centre.
- minimum at its centre.
- maximum at the ends and minimum at its centre.
- uniform throughout its length.

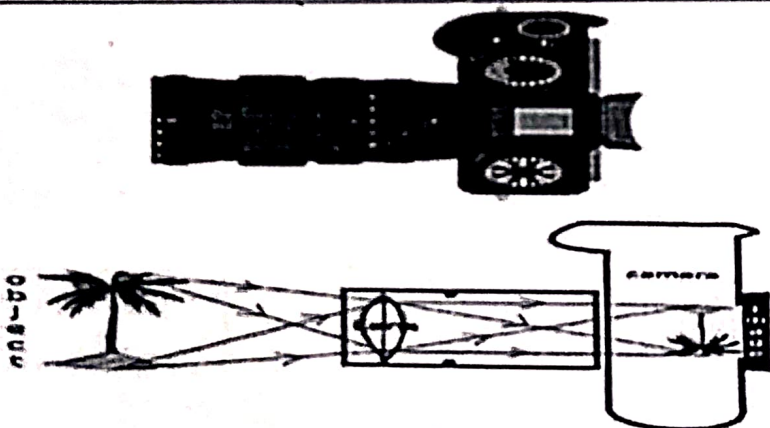
1

The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both A and R are true, and R is the correct explanation of A.
- 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.

	Assertion (A) : In our homes we receive supply of electric power through a main supply. One of the wires in this supply, usually with red insulation, is called live wire and another wire with green insulation is called neutral wire. Reason (R) : In our country, the potential difference between the live wire and the neutral wire is 220 volts.	1
35	In a household circuit, an electric heater of power <u>1500 W</u> and a fan of power <u>500 W</u> are connected in parallel to a 220 V supply. A fuse rated for <u>10 A</u> is connected to the circuit to protect it from excessive current. Calculate the total current drawn by the heater and the fan.	2
34	If $R_s$ and $R_p$ respectively are the total resistances of the series and parallel combinations of the three resistors of resistances $R_1$ , $R_2$ and $R_3$ , then write the relationships among (I) $R_s$ , $R_1$ , $R_2$ and $R_3$ and (II) $R_p$ , $R_1$ , $R_2$ and $R_3$ .  OR A copper wire has a length $L=2$ m, a cross-sectional area $A=0.5 \text{ mm}^2$ , and resistivity $\rho=1.7 \times 10^{-8} \Omega\text{-m}$ . Calculate the resistance of another wire made of the same material whose length is twice the length of the wire but has the same cross-sectional area.	2
35	Two resistors, $R_1=6 \Omega$ and $R_2=12 \Omega$ , are connected in parallel to a 24V battery. The circuit operates for 5 minutes. (i) Calculate the total heat generated in both resistors. (ii) If each resistor has a power rating of 100 W, determine whether it is safe to use these resistors in the circuit	3
36	State Ohm's law. Give reason why the shape of voltage versus current ( $V-I$ ) graph for a conductor should be a straight line passing through the origin.	3
37	In a straight conductor, the current is flowing vertically downwards. State the pattern of the magnetic field lines around the conductor. Name the rule which helps us to determine the direction of the magnetic field lines in this case.	3
38	 <p>The above image is that of a Digital Single Lense Reflector (DSLR) Camera which are used to take high resolution photographs by professional photographers. The second image of the above two is a schematic diagram of how an image is formed on the sensor of the camera. Based on your understanding of the lenses, answer the following questions. A. What type of lens is used in the DSLR camera shown in the image? B. What type of image is formed on the sensor? Attempt either subpart C or D. C. A photographer is using a DSLR camera with a lens of focal length <math>f=50</math> mm to take a close-up photograph of a small object. The lens projects an image onto the camera sensor that is located 60 mm behind the lens. Calculate the object distance (i.e., the distance between the object and the lens).</p>	4



**OR**

D. A photographer is using a DSLR camera to take a picture of a flower. The flower is positioned 150 mm away from the camera lens. The actual height of the flower is 80 mm, and the image height formed on the camera's sensor is measured to be 20 mm. Calculate the focal length of the camera lens.

39

(a) (i) Define the term power of accommodation of human eye. What happens to the image distance in the eyes when the distance of an object is increased gradually from about 5 m to 500 m from our eyes? Name and explain the role of the part of human eye responsible for it in this case.

(ii) A person is unable to see distinctly the objects placed beyond 2 m from his eyes. Name the defect of vision the person is suffering from. List two possible causes of this defect and write the type of lenses used for the correction of this defect.

**OR**

(b) (i) Name and explain the phenomenon of light responsible to make the path of a beam of light visible when it enters a smoke/dust-filled room through a small hole. Also state the dependence of the colour of the light we receive on the size of the particles of the medium through which the light passes.

(ii) A person suffering from presbyopia needs spectacles having bifocal lenses. If the power of two lenses used in his spectacles is  $+2.0\text{ D}$  and  $-0.5\text{ D}$ , which one of the two lenses is for the correction of his distant vision and what is its focal length?

5



**Page-12 Pre-Board-II Exam. (2025-26)****Class- X****Subject- Science**

M.M. 80

Time- 3 hrs

**General Instructions:**

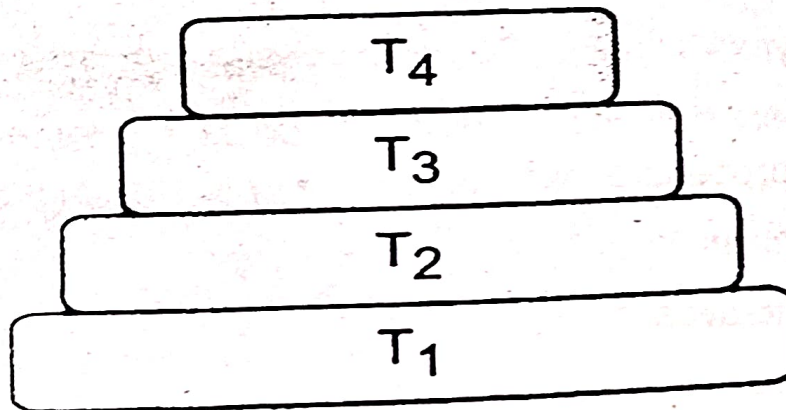
- (i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

**SECTION -A**

1. Which is the correct sequence of air passage during inhalation?
  - (a) Nostrils → larynx → pharynx → trachea → lungs
  - (b) Nasal passage → trachea → pharynx → larynx → alveoli
  - (c) larynx → nostrils → pharynx → lungs
  - (d) Nostrils → pharynx → larynx → trachea → alveoli
2. A person's kidneys are damaged. Which life process is most immediately affected, and what procedure might be necessary to sustain their life?
  - (a) Respiration; Ventilation
  - (b) Digestion; Gastric bypass
  - (c) Excretion; Dialysis
  - (d) Circulation; Transfusion
3. Which of the following statements are true about the brain ?\*
  - (i) The main thinking part of brain is hind brain.
  - (ii) Centres of hearing, smell, memory, sight etc. are located in fore brain.
  - (iii) Involuntary actions like salivation, vomiting, blood pressure are controlled by the medulla in the hind brain.



- (iv) Cerebellum does not control posture and balance of the body.
- (a) (i) and (ii) (b) (i), (ii) and (iii)  
(c) (ii) and (iii) (d) (iii) and (iv)
4. The correct sequence of reproductive stages seen in flowering plants is
- (a) gametes, zygote, embryo, seedling  
(b) zygote, gametes, embryo, seedling  
(c) seedling, embryo, zygote, gametes  
(d) gametes, embryo, zygote, seedling
5. Which of the following character can be acquired during an individual's lifetime but cannot be inherited by their offspring?
- (a) Size of body (e.g., gaining muscle mass through exercise)  
(b) Colour of skin (natural complexion)  
(c) Texture of hair (curly or straight)  
(d) Colour of eyes
6. The text in the image is:



"In the given figure above the various trophic levels are shown in a pyramid. At which trophic level is maximum energy available ?

- (a) T<sub>4</sub> (b) T<sub>2</sub> (c) T<sub>1</sub> (d) T<sub>3</sub>

7. During a shopping trip, you notice different waste disposal options for various items. You want to practice environmentally friendly habits. Which of the following is the most eco-friendly practice?



- A) Disposing of used plastic bottles by burying them in the soil to decompose quickly.
- B) Carrying a reusable cloth bag for purchases and sorting kitchen waste into biodegradable and non-biodegradable bins.
- C) Throwing all waste (food peels, paper, plastic bags) into a single large bin for easy collection.
- D) Using disposable plastic plates at a party to avoid washing dishes.

The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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.

8. Assertion (A): a geneticist crossed a pea plant having violet flowers with the pea plant with white flowers, he got all white flowers in first generation.

Reason (R): White colour gene is not passed on to the next generation.

9. Assertion (A): Plastic is a major cause of land pollution.

Reason (R): Plastics are non-biodegradable and remain in the environment for long periods.

10. There is a person who is suffering from pneumonia. He/she has fluid filled in his/her Lungs.

- What will be the impact of above on exchange of gases in the lungs?
- What will be its impact on the working of the body?

OR

What type of respiration takes place in human muscles during vigorous exercise and Why? (2)

11. Explain why:

- (a) The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.



(b) Plants do not release carbon dioxide gas during the daytime but do so at night. (1+1)

12. A gas 'X' which is a deadly poison is found at the higher levels of the atmosphere and performs an essential function. Name the gas and write the function performed by this gas in the atmosphere. Which chemical is linked to the decrease in the level of this gas? Name an appliance in which this harmful chemical is used ? ( $\frac{1}{2} \times 4$ )

13. Draw the structure of a neuron and explain its function. (2+1)

14. How is the sex of the child determined in human beings ? Draw a diagrammatic sketch showing the sex determination in human beings.

15. Read the following information and answer the questions that follow:

While doing an experiment, students took two similar plants and placed them in a dark room for three days. Then one of the plants was kept in sunlight for about 6 hours. After that, they tested one leaf from each plant using iodine solution. One turned blue black, the other did not.

**Attempt either subpart (a) or (b).**

a. Considering the given data, what do you think was the aim of the experiment? Justify your answer.

OR

b. Write two essential steps to be taken while doing iodine test on the leaves.

c. Why did one leaf fail to turn blue black?

d. Why are the plants kept in the dark room?

**16. Attempt either option A or B.**

A: (a) Write any two differences between the transport of materials in xylem and phloem.

(b) Draw the excretory system in human beings and label the parts which perform the following functions:

(i) forms urine

(ii) is a long tube which collects urine from kidney



(iii) stores urine until it is passed out.

OR

B: (a) Draw a diagram of human digestive system and label the part/s:

(i) which secretes amylase

(ii) which produces bile juice.

(iii) where the process of digestion gets completed.

(b) What are the methods used by plants to get rid of excretory products?  
(any two)

### SECTION – B

17. A student mixes an aqueous solution of sodium sulphate with an aqueous solution of barium chloride. A white precipitate is formed. What type of reaction is this, and what is the white precipitate? (1)

A. Combination reaction; barium chloride

B. Decomposition reaction; sodium chloride

C. Displacement reaction; sodium sulphate

D. Double displacement reaction; barium sulphate

18. Which of the following methods would be ineffective in preventing rancidity in food items? (1)

A. Storing food at low temperature

B. Storing food in an airy room

C. Adding antioxidants

D. Storing food in airtight containers.

19. A doctor advises a patient with acidity to take an antacid, which property of antacid is being used here? (1)

A. Its bitter taste

B. its acidic nature

C. its basic (alkaline) nature

D. its ability to produce gas



20. A substance 'A' does not dissociate completely into its ions in aqueous solutions. It is sour in taste and reacts with baking soda. Identify substance A. (1)

A. Weak base

B. Strong base

C. Strong acid

D. Weak acid

21. An oxide of a metal 'M' reacts with both acids and bases to form salt and water. The element 'M' is likely to be : 1

A. Aluminium

B. Sulphur

C. Magnesium

D. Sodium

22. The pH value of a salt solution is 7. Choose the correct combination of its parent acid and parent base from which this salt is made. (1)

A. Strong acid + strong base

B. Strong acid + weak base

C. Weak acid + strong base

D. Weak acid + weak base

23. Ethanol is an organic compound with a specific functional group. Which of the following options correctly identifies the functional group present in it? 1

A. Carboxylic acid

B. Aldehyde

C. Alcohol

D. Ketone

The following question consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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.

24. Assertion (A): Methanal and ethanal have similar chemical properties.

Reason (R) : They belong to the same homologous series. (1)

25. What would you observe when zinc is added to a solution of iron sulphate? Write the chemical reaction that takes place. (2)

26. Attempt either option A or B:



A: Identify the type of reaction taking place in the following cases. Also, write one observation in every case :

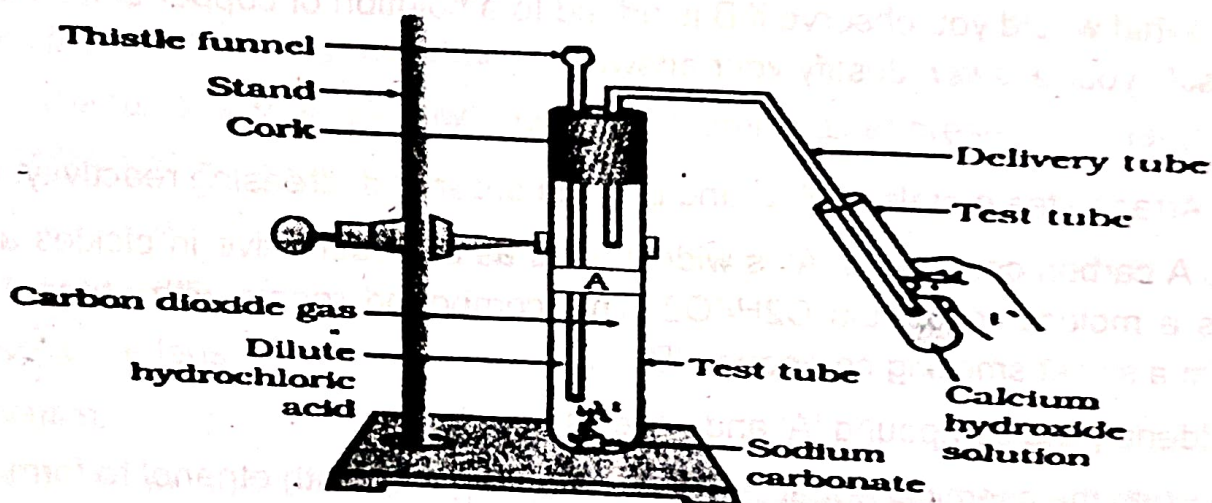
- Lead nitrate powder is heated in a boiling tube.
- Electric current is passed through water mixed with a few drops of dilute sulphuric acid.
- Copper powder is heated in air.

OR

B: Translate the following statements into chemical equations (with state symbols) and then balance them :

- Hydrogen gas reacts with nitrogen to form ammonia.
- Hydrogen sulphide gas burns in air to give water and Sulphur dioxide. (3)

27. Study the figure given below and answer the following questions:



- Write the chemical equation for the reaction taking place in the larger test tube.
- Write one observation related to the chemical reaction taking place in the smaller test tube.
- What can you say about the nature of sodium carbonate from this reaction? Justify your answer. (3)



28. Samples of 4 metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows.

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	No	Yes
B	Displacement	Yes	No reaction	Yes
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the table to answer the following questions about metal A, B, C and D.

- Which is the most reactive metal?
- Which is the least reactive metal?
- What would you observe if B is added to a solution of copper sulphate? Justify your answer.

OR

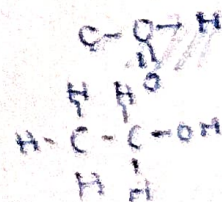
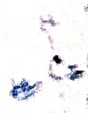
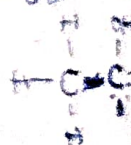
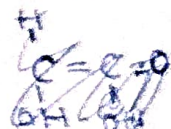
- Arrange the metals A, B, C and D in the order of decreasing reactivity. (4)

29. A carbon compound 'A' is widely used as a preservative in pickles and has a molecular formula  $C_2H_4O_2$ . This compound reacts with ethanol to form a sweet smelling compound 'B'.

- Identify the compound 'A' and write its structure.
- Write the chemical equation for the reaction of 'A' with ethanol to form compound 'B'. State the role of presence of an acid in the reaction.
- How can we get compound 'A' back from 'B'?
- How can 'A' be obtained from ethanol?
- Name the gas produced when compound 'A' reacts with washing soda.

OR

- Name a commercially important carbon compound having functional group  $-OH$  and write its molecular formula.





(ii) Write chemical equation to show its reaction with

- (a) Sodium metal
- (b) Excess conc. Sulphuric acid
- (c) Ethanoic acid in the presence of an acid catalyst
- (d) Acidified potassium dichromate

Also write the name of the product formed in each case. (5)

### SECTION -C

30. The basic cause of refractive error that makes far-away objects look blurry is

- (a) decrease in the focal length of eye-lens.
- (b) increase in the focal length of eye-lens.
- (c) decreasing curvature of eye-lens.
- (d) weakening of ciliary muscles

31. In the formation of rainbow, the role of water droplet presents in water fountains is to act as a

- (a) glass slab
- (b) convex lens
- (c) concave lens
- (d) prism

The following question consist of two statements—Assertion (A) and Reason (R). Answer these questions by 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.

32. Assertion (A): A concave mirror always forms a real and inverted image.

Reason (R) : Real images are formed when reflected rays actually meet.



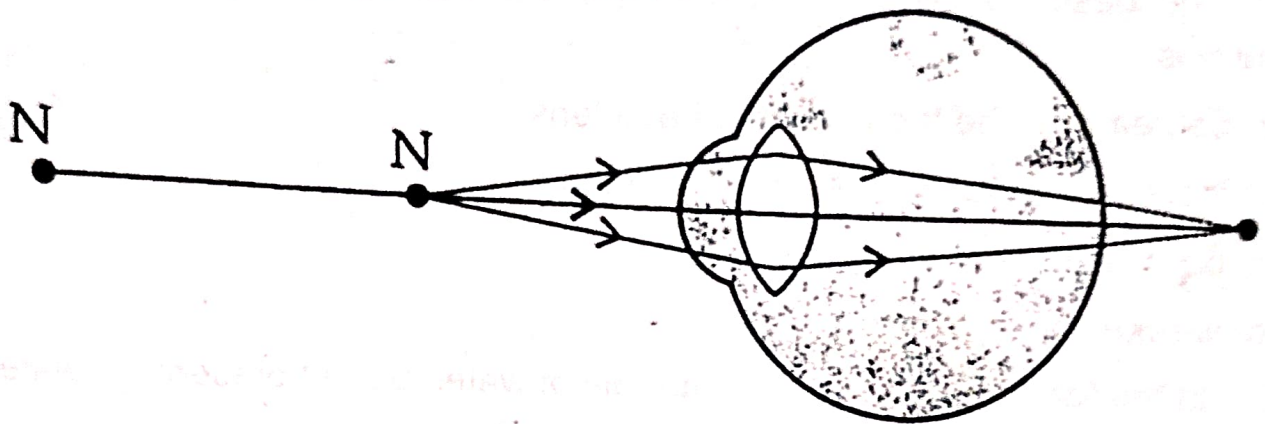
33. A real image  $\frac{2}{3}$  rd of the size of the object is formed by a convex lens when the object is at a distance of 12 cm from it. Find the focal length of the lens.

34. The resistance of wire of 0.01 cm radius is 10 W. If the resistivity of the wire is  $50 \times 10^{-8} \text{ Wm}$ , find the length of this wire.

OR

List the factors on which the resistance of a conductor in the shape of a wire depends.

35. A ray Diagram of the human eye is given below



- (i) Which defect of vision is represented in this case?
- (ii) What could be the two causes of this defect?
- (iii) With the help of a diagram show how this defect can be corrected using a suitable lens.

36. Two resistors  $3 \Omega$  and unknown resistor are connected in a series across a 12 V battery. If the voltage drop across the unknown resistor is 6 V, find

- (a) potential across  $3 \Omega$  resistance
- (b) the current through unknown resistor 'R'
- (c) equivalent resistance of the circuit.

37. A current carrying conductor is placed in a magnetic field. Now answer the following.



- (i) List the factors on which the magnitude of force experienced by conductor depends.
- (ii) State the rule which helps, in finding the direction of motion of conductor.
- (iii) If initially this force was acting from right to left, how will the direction of force change if the:

(a) direction of magnetic field is reversed?  $\longrightarrow$

(b) direction of current is reversed?

Q38 A compound microscope is an instrument which consists of two lenses L1 and L2. The lens L1 called objective, forms a real, inverted and magnified image of the given object. This serves as the object for the second lens L2 ; the eye piece. The eye piece functions like a simple microscope or magnifier. It produces the final image, which is inverted with respect to the original object, enlarged and virtual.

38. (a). What is the value and sign of magnification (according to the new Cartesian sign convention) of the image formed by L1?

(A) Value = Less than 1 and Sign = Positive

(B) Value = More than 1 and Sign = Positive

(C) Value = Less than 1 and Sign = Negative

(D) Value = More than 1 and Sign = Negative

38. (b) What is the value and sign of magnification (according to the new Cartesian sign convention) of the image formed by L2 ?

(A) Value = Less than 1 and Sign = Positive

(B) Value = More than 1 and Sign = Positive

(C) Value = Less than 1 and Sign = Negative

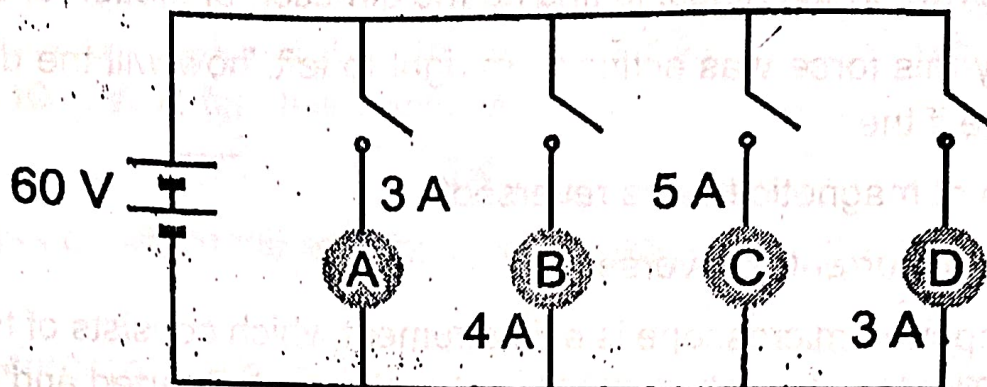
(D) Value = More than 1 and Sign = Negative

38. (c) If power of the eye piece (L2) is 5 diopters and it forms an image at a distance of 80 cm from its optical centre, at what distance should the object be?

OR

38.(c) What types of lenses must be L1 and L2? Justify your answer.

39. In the circuit given below A, B, C and D are four lamps connected with a battery of 60 V.



Analyse the circuit to answer the following questions : (1+2+1+1)

- What kind of combination are the lamps arranged (in series or parallel)?
- Explain with reference to your above answer, what are the advantages (any two) of this combination of lamps?
- Explain with proper calculations which lamp glows the brightest.
- Find the total resistance of the circuit.

OR

- Consider a conductor of resistance 'R', Length 'L', thickness 'd' and resistivity ' $\rho$ '. Now this conductor is cut into four equal parts. What will be the new resistivity of each of these parts? Why?
- Find the resistance if all of these parts are connected in :  
(a) Parallel (b) Series
- Out of these combinations of resistors mentioned above in the previous part, for a given voltage which combination will consume more power and why?