

KVS ZONAL INSTITUTE OF EDUCATION &
TRAINING, MUMBAI

The cover features a central title 'COMPETENCY BASED QUESTIONS IN SCIENCE FOR CLASS X SESSION 2026-27' in large, bold, blue and green fonts. Above the title is the KVS logo with the motto 'तत् त्वं पूष्यन अपावृणु' and 'केन्द्रीय विद्यालय संगठन'. To the right is a 'COMPETENCY THINK • APPLY SOLVE • EXCEL' logo with a lightbulb icon. The background includes a blue silhouette of a head with scientific icons (atom, microscope, DNA), a microscope, test tubes, a globe, an open book, and a stack of books labeled 'PHYSICS', 'CHEMISTRY', 'BIOLOGY', and 'EARTH SCIENCE'. Scientific diagrams like a right-angled triangle with sides h , b , and c , the formula $a^2 + b^2 = c^2$, the formula $F = ma$, and a sine wave are also present. At the bottom, six circular icons represent competencies: 'THINK CRITICALLY', 'ANALYZE DEEPER', 'APPLY KNOWLEDGE', 'SOLVE PROBLEMS', 'MAKE CONNECTIONS', and 'PERFORM BETTER'. The editor's name 'Gajendra L Kapde' is listed below the title. The KVS ZIET Mumbai logo is in the bottom left corner, and a photograph of the institute building is in the bottom right corner.

तत् त्वं पूष्यन अपावृणु
केन्द्रीय विद्यालय संगठन

**COMPETENCY
BASED
QUESTIONS**
IN
SCIENCE
FOR CLASS X
SESSION 2026-27

Aligned with NEP 2020 & NCF 2023
and CBSE Competency Framework 2025-26

PHYSICS
CHEMISTRY
BIOLOGY
EARTH SCIENCE

THINK CRITICALLY
ANALYZE DEEPER
APPLY KNOWLEDGE
SOLVE PROBLEMS
MAKE CONNECTIONS
PERFORM BETTER

Edited by:
Gajendra L Kapde

KVS ZIET MUMBAI
ज्ञानम् परम् बलम्

KVS ZONAL INSTITUTE OF
EDUCATION AND TRAINING, MUMBAI
आंचलिक शिक्षा एवं प्रशिक्षण संस्थान, मुंबई
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CLASS – X COMPETENCY BASED QUESTIONS

CHAPTER 1- CHEMICAL REACTIONS AND EQUATIONS

MCQ

- Which of the following is not a physical change?
 - Boiling of water to give water vapour
 - Melting of ice to give water
 - Dissolution of salt in water
 - Combustion of liquefied petroleum gas
- The following reaction is an example of a $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
 - Displacement reaction
 - combination reaction
 - redox reaction
 - neutralization reaction
 - i) and iv)
 - ii) and iii)
 - i) and iii)
 - iii) and iv)
- Which of the following statements about the given reaction are correct $3\text{Fe(s)} + 4\text{H}_2\text{O (g)} \rightarrow \text{Fe}_3\text{O}_4 \text{ (s)} + 4\text{H}_2\text{(g)}$
 - Iron metal is getting oxidized
 - Water is getting reduced
 - Water is acting as reducing agent
 - Water is acting as oxidizing agent
 - i), ii) and iii)
 - iii) and iv)
 - i), ii) and iv)
 - ii) and iv)
- Which of the following are exothermic processes?
 - Reaction of water with quicklime
 - Dilution of an acid
 - Evaporation of water
 - Sublimation of camphor
 - i) and ii)
 - ii) and iii)
 - i) and iv)
 - iii) and iv)
- A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
 - Potassium permanganate is an oxidizing agent. It oxidises ferrous sulphate.
 - Ferrous sulphate acts as an oxidizing agent and oxidises potassium permanganate.
 - The colour disappears due to dilution; no reaction is involved.
 - Potassium permanganate is an unstable compound and decomposes in the presence of ferrous sulphate to a colourless compound.
- Which among the following is (are) double displacement reaction (s)?
 - $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$
 - ii) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
 - iv) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
 - v) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
 - i) and iv)
 - ii) only
 - i) and ii)
 - iii) and iv)
- Which among the following statement (s) is(are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to

- i) the formation of silver by decomposition of silver chloride
 - ii) Sublimation of silver chloride
 - iii) Decomposition of chlorine gas from silver chloride
 - iv) Oxidation of silver chloride
 - a) i) only
 - b) i) and iii)
 - c) ii) and iii)
 - d) iv) only
8. Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed?
- i) It is an endothermic reaction
 - ii) it is an exothermic reaction
 - iii) the pH of the resulting solution will be more than 7
 - iv) the pH of the resulting solution will be less than 7
 - a) i) and ii)
 - b) ii) and iii)
 - c) i) and iv)
 - d) iii) and iv)
9. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?
- i) Displacement reaction
 - ii) Precipitation reaction
 - iii) Combination reaction
 - iv) Double displacement reaction
 - a) i) only
 - b) ii) only
 - c) iv) only
 - d) ii) and iv)
10. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is
- a) 1 : 1
 - b) 2 : 1
 - c) 4 : 1
 - d) 1 : 2
11. Which of the following is (are) an endothermic process (es)?
- i) Dilution of sulphuric acid
 - ii) Sublimation of dry ice
 - iii) Condensation of water vapours
 - iv) Evaporation of water
 - a) i) and iii)
 - b) ii) only
 - c) iii) only
 - d) ii) and iv)
12. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?
- a) Lead sulphate (insoluble)
 - b) Lead acetate
 - c) Ammonium nitrate
 - d) Potassium sulphate
13. Which of the following gases can be used for storage of fresh sample of oil for a long time?
- a) Carbon dioxide or oxygen
 - b) Nitrogen or oxygen

- c) Carbon dioxide or helium
d) Helium or nitrogen
14. The following reaction is used for the preparation of Oxygen gas in the laboratory
 $2 \text{KClO}_3 \xrightarrow{\text{heat}} 2 \text{KCl(s)} + 3 \text{O}_2$
 Which of the following statement is correct about the reaction?
 a) it is a decomposition reaction and endothermic in nature
 b) It is a combination reaction
 c) It is a decomposition reaction and a component by release of heat
 d) It is a photochemical decomposition reaction and exothermic in nature
15. Which one of the following processes involves chemical reaction
 a) Storing of Oxygen gas under pressure in a gas cylinder
 b) Liquefaction of air
 c) Keeping petrol in a China dish in the open
 d) Heating copper wire in presence of air at high temperature

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true

1. Assertion (A) : Decomposition of vegetable matter into compost is an example of exothermic reactions.

Reason (R) : Exothermic reaction are those reactions in which heat is evolved.

2. Assertion (A) : When HCl is added to zinc granules, a chemical reaction occurs.

Reason (R) : Evolution of a gas and change in colour indicate that the chemical reaction is taking place.

3. Assertion (A) : Calcium carbonate when heated gives calcium oxide and water.

Reason (R) : On heating calcium carbonate, decomposition reaction takes place.

4. Assertion (A) : Brown fumes are produced when lead nitrate is heated.

Reason (R) : Nitrogen dioxide gas is produced as a by product due to the decomposition of lead nitrate

VERY SHORT ANSWER QUESTIONS (2 MARKS)

- Why should magnesium ribbon be cleaned using a sand paper before burning it?
- What is a skeletal equation?
- Write the balanced chemical equation involved in the burning of a magnesium ribbon.
- 1 g of copper powder was taken in a China dish and heated. What change takes place on heating? When hydrogen gas is passed over this heated substance, a visible change is seen in it. Give the chemical equations of reactions, the name and the colour of the products formed in each case.
- Why decomposition reactions are known as reverse of combination reactions.
- Identify the substances that are oxidised and the substances that are reduced in the following reactions.
 (a) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

- (b) $2\text{PbO} + \text{C} \rightarrow 2\text{Pb} + \text{CO}_2$
7. What change is observed when silver chloride is left exposed to sunlight. Mention what type of reaction is this.
8. Why volume of oxygen and hydrogen gases liberated at anode and cathode are different during electrolysis of water.

SHORT ANSWER QUESTIONS (3 MARKS)

1. Balance the following equations.
- $\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
 - $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O}$
 - $\text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$
2. Write the chemical reaction and balance the chemical equation in each of the following cases:
- Magnesium nitride reacts with water.
 - ii) Steam is passed over heated iron.
 - iii) Oxidation of glucose in the cells of our body.
3. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions.
- Zinc reacts with silver nitrate to produce zinc nitrate and silver.
 - Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide.
4. On heating blue coloured powder of copper (II) nitrate in a boiling tube, black copper oxide, O_2 and a brown gas X is formed.
- Identify the type of reaction and the gas X.
 - Write balanced chemical equation of the reaction.
 - Write the pH range of aqueous solution of the gas X.
5. a) Classify the following reactions into different types:
- $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
 - $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$
 - $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
 - $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- b) Translate the following statement into a balanced chemical equation:
Barium chloride reacts with Aluminium sulphate to give aluminium chloride and barium sulphate.
6. Write two observations when lead nitrate is heated in a test tube?
- Name the type of reaction.
 - Write a balanced chemical equation to represent the above reaction.
7. 2 gram of silver chloride is taken in a China dish and the China dish is placed in sunlight for some time. What will be the observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction.
8. You might have noted that when copper powder is heated in a China dish, the reddish brown surface of copper powder becomes coated with a black substance.
- Why has this black substance formed?
 - What is this black substance formed?
 - Write the chemical equation of the reaction that takes place.
 - How the black coatings on the surface can turn reddish brown?

9. Decomposition reactions require energy in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat light and electricity.

LONG ANSWER QUESTIONS (5 MARKS)

1. a) Why is respiration considered an exothermic reaction?
b) Identify the substance that is oxidized and reduced in the reaction:
$$\text{CuO (s)} + \text{Zn (s)} \rightarrow \text{Cu (s)} + \text{ZnO (s)}.$$

c) Identify the oxidizing agent and reducing agent in the reaction:
$$3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$
2. a) What change in colour is observed when white silver chloride is left exposed to sunlight? State the type of chemical reaction in this change.
b) Why do potato chips manufacturers fill the packet of chips with nitrogen gas?
c) Why do gold and platinum not corrode in moist air?
3. What happens when quick lime is dissolved in water? Write the balanced chemical equation. Write the type of reaction that has occurred.
Write balanced equation for the following:
i) Magnesium(s) + Hydrochloric acid(aq) $\rightarrow$ Magnesium chloride(aq) + Hydrogen(g)
ii) Zinc carbonate (s) $\rightarrow$ Zinc oxide (s) + Carbon dioxide (g)
iii) Silver chloride (s) $\rightarrow$ Silver (s) + Chlorine (g)
4. a) An iron knife kept dipped in a blue copper sulphate solution turns the blue solution light green. Why?
b) During electrolysis of water, gas collected in one test tube is double than other. why?

CASE BASED QUESTION (4 MARKS)

1. Chemical Reactions in which heat is released along with the formation of products are called exothermic chemical reactions. All combustion reactions are exothermic reactions. That during a chemical reaction atoms of one element do not change into those of another element. Nor do atoms disappear from the mixture or appear from elsewhere. Actually, chemical reactions involve the breaking and making of bonds between atoms to produce new substances.
- 1.1. Carbon + oxygen $\rightarrow$ carbon dioxide what type of reaction is it?
- combination reaction
 - decomposition reaction
 - displacement reaction
 - double displacement reaction
- 1.2. A white salt on heating decomposes to give brown fumes and yellow residue is left behind. The yellow residue left is of
- lead nitrate
 - nitrogen oxide
 - lead oxide
 - oxygen gas

1.3. Which of the following reactions represents a combination reaction?

- a. $\text{CaO (s)} + \text{H}_2\text{O (l)} \rightarrow \text{Ca (OH)}_2 \text{ (aq)}$
- b. $\text{CaCO}_3 \text{ (s)} \rightarrow \text{CaO (s)} + \text{CO}_2 \text{ (g)}$
- c. $\text{Zn(s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{ZnSO}_4 \text{ (aq)} + \text{Cu(s)}$
- d. $2\text{FeSO}_4 \text{ (s)} \rightarrow \text{Fe}_2\text{O}_3 \text{ (s)} + \text{SO}_2 \text{ (g)} + \text{SO}_3 \text{ (g)}$

1.4. Complete the following statements by choosing correct type of reaction for X and Y.

Statement 1: The heating of lead nitrate is an example of 'X' reaction.

Statement 2: The burning of magnesium is an example of 'Y' reaction.

- a) (a)X-Combination,Y-Decomposition
- b) (b)X-Decomposition,Y-Combination
- c) (c)X-Combination,Y-Displacement
- d) (d) X- Displacement, Y-Decomposition

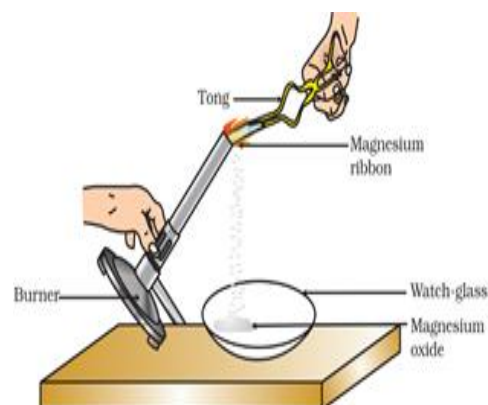
2. The earlier concept of oxidation and reduction is based on the addition or removal of oxygen or hydrogen elements so, in terms of oxygen and hydrogen, oxidation is addition of oxygen to a substance and removal of hydrogen from a substance. On the other hand, reduction is addition of hydrogen to a substance and removal of oxygen from a substance. The substance which gives oxygen to another substance or removes hydrogen from another substance in an oxidation reaction is known as oxidizing agent, while the substance which gives hydrogen to another substance or removes oxygen from another substance in a reduction reaction is known as reducing agent.

2.1. A redox reaction is one in which

- a. both the substances are reduced
- b. both the substances are oxidized
- c. an acid is neutralized by the base
- d. one substance is oxidized while the other is reduced.

2.2. In the reaction, $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow \text{S} + 2\text{HCl}$

- a. H_2S is the reducing agent.
- b. HCl is the oxidizing agent.
- c. H_2S is the oxidizing agent.



d. Cl_2 is the reducing agent.

2.3. Which of the following processes does not involve either oxidation or reduction?

- a. Formation of slaked lime from quicklime.
- b. Heating mercuric oxide.
- c. Formation of manganese chloride from manganese oxide (MnO_2).
- d. Formation of zinc from zinc blende.

2.4. $\text{Mg} + \text{CuO} \rightarrow \text{MgO} + \text{Cu}$

Which of the following is wrong relating to the above reaction?

- a. CuO gets reduced
- b. Mg gets oxidised.
- c. CuO gets oxidised.
- d. It is a redox reaction

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CHAPTER 2- ACIDS, BASES AND SALTS

MCQ QUESTIONS

1. What happens when a solution of an acid is mixed with a solution of a base in a test tube?
 - i. The temperature of the solution increases
 - ii. The temperature of the solution decreases
 - iii. The temperature of the solution remains same
 - iv. Salt formation takes place
 - a) i only
 - b) i & iii
 - c) ii & iii
 - d) i & iv
2. An aqueous solution turns red litmus paper blue. Excess addition of which of the following solution would reverse the change?
 - a) Baking powder
 - b) lime
 - c) ammonium hydroxide solution
 - d) hydrochloric acid
3. During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to
 - a) Absorb the evolved gas
 - b) Moisten the gas
 - c) Absorb moisture from the gas
 - d) Absorb chloride ions from the evolved gas
4. Which of the following salts does not contain water of crystallization?
 - a) Blue vitriol
 - b) Baking soda
 - c) Washing soda
 - d) Gypsum
5. Sodium carbonate is a basic salt because it is a salt of
 - a) Strong acid and strong base
 - b) Weak acid and weak base
 - c) Strong acid and weak base
 - d) Weak acid and strong base
6. Calcium phosphate is present in tooth enamel. Its nature is
 - a) Basic
 - b) Acidic
 - c) Neutral
 - d) Amphoteric
7. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the colour of this pH paper to greenish blue?
 - a) Lemon juice
 - b) vinegar
 - c) common salt
 - d) an antacid
8. Which of the following gives the correct increasing order of acid strength?
 - a) Water < acetic acid < hydrochloric acid
 - b) Water < hydrochloric acid < acetic acid
 - c) Acetic acid < water < hydrochloric acid
 - d) Hydrochloric acid < water < acetic acid
9. If a few drops of a concentrated acid accidentally spill over the hand of a student, what should be done?
 - a) Wash the hand with saline solution

- b) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate
 - c) After washing with plenty of water apply solution of sodium hydroxide on the hand
 - d) Neutralize the acid with a strong alkali
10. Sodium hydrogen carbonate when added to acetic acid evolves a gas. Which of the following statements are true about the gas evolved?
- i. It turns lime water milky
 - ii. It extinguishes a burning splinter
 - iii. It dissolves in a solution of sodium hydroxide
 - iv. It has a pungent odour
- a) i & ii
 - b) i, ii & iii
 - c) ii, iii & iv
 - d) i & iv

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1) Assertion (A): The HCl gas shows acidic behaviour in the water.

Reason(R): The pH of dry HCl gas is 1.5.

2) Assertion (A): The acid must always be added to water with constant stirring.

Reason(R): Mixing of an acid with water decreases the conc. of H^+ ions per unit volume.

3) Assertion (A): The organic compounds such as $C_6H_{12}O_6$ and C_2H_5OH contain hydrogen but they do not conduct electricity in the water.

Reason(R): Acids produce H_3O^+ ions in the solutions.

4) Assertion (A): Phenolphthalein is a synthetic acid-base indicator.

Reason(R): Phenolphthalein does not give any colour with acids but gives pink colour with bases.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Answer the following questions:
 - i) What are olfactory indicators? Give any two examples.
 - ii) Name and write the formula of the products of chlor-alkali process.
2. What is baking soda chemically called? Give reactions involved in its preparation. Write one of its use.
3. Name the products formed in each case when
 - a) Hydrochloric acid reacts with caustic soda.
 - b) Granulated zinc reacts with caustic soda.
 - c) Carbon dioxide is passed in lime water.
4. (i) Stain of curry on a white cloth becomes reddish brown when soap is scrubbed on it and turns yellow again when the cloth is washed with plenty of water.
 ii) Curd should not be kept in copper or brass vessels. What is done to protect it?
5. State reason for the following statements:

- a) Tap water conducts electricity whereas distilled water does not.
- b) Dry hydrogen chloride gas does not turn blue litmus red whereas dilute hydrochloric acid does.
6. Do the basic solutions have H^+ ions? If yes then why these are basic.
7. (a) Why is hydrochloric acid a strong acid and acetic acid a weak acid?
(b) Explain why aqueous solution of an acid conducts electricity.
8. You have four solutions A, B, C and D. The pH of solution A is 6, B is 9, C is 12 and D is 7,
 - i) Identify the most acidic and most basic solutions.
 - ii) Arrange the above four solutions in the increasing order of H^+ ion concentration
9. Dry pellets of a base 'X' when kept in open absorbs moisture and turns sticky. The compound is also formed by chlor-alkali process. Write chemical name and formula of X.
10. A student dropped few pieces of marble in dilute hydrochloric acid, contained in a test tube. The evolved gas was then passed through lime water. What change would be observed in lime water? What will happen if excess of gas is passed through lime water? With the help of balanced chemical equations for all the changes explain the observation.

SHORT ANSWER QUESTIONS (3 MARKS)

1. You are provided with 90 ml of distilled water and 10 ml of concentrated 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?
2. a) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?
b) Dry HCL gas does not change the colour of dry litmus paper. Why?
3. pH has a great importance in our daily life. Explain by giving three examples.
4. a) A solution x gives orange colour when a drop of it falls on pH paper while another solution y gives bluish colour when a drop of it falls on pH paper. What is the nature of both the solutions? Determine the pH of solutions X and Y.
b) Out of HCL and acetic acid which one is a weak acid and why? Explain with the help of an example.
5. Sodium hydrogen carbonate is a basic salt. Justify this statement. How is it converted into washing soda?
6. A white powder is added while baking cakes to make it soft and spongy. Name its main ingredients. Explain the function of each ingredient. Write the chemical reaction taking place when the Powder is heated during baking?
7. 1 gram of solid sodium chloride is taken in a clean and dry test tube and 2 ml of concentrated sulphuric acid is added to it. If the gas evolved is tested first with dry and then with a blue litmus paper, in which case will the litmus paper change colour? Give reason for your answer. What inference can be drawn about the nature of the evolved gas? Support your answer with chemical equation for the reaction.
8. a) For the preparation of cakes, baking powder is used. If at home your mother uses baking soda instead of baking powder, how will it affect the taste of the cake and why?
b) How is baking soda converted into baking powder?
c) What makes the cake soft and spongy?

9. A white powder is used by doctors to support fractured bones
 - a) Write the name and chemical formula of the Powder.
 - b) How is this powder prepared?
 - c) When this white powder is mixed with water, a hard solid mass is obtained. Write a balanced chemical equation for this change.
 - d) Give one more use of this white powder.

LONG ANSWER QUESTIONS (5 MARKS)

1. For making cake, baking powder is taken. If at home, your mother uses baking soda instead of baking powder in cake,
 - a) how will it affect the taste of the cake and why?
 - b) how can baking soda be converted into baking powder?
 - c) what is the role of tartaric acid added to baking soda?
2. Write balanced equations to represent the reaction of hydrochloric acid with
 - a) Zinc metal, b) metal carbonate, c) metal hydrogen carbonate.
3. A milkman adds a very small amount of baking soda to fresh milk.
 - a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
 - b) Why does this milk take a long time to set as curd?
4. Write down the chemical name and formulae for the following compounds:
 - i) Bleaching powder ii) Washing soda iii) Plaster of paris.
 For each one of this, write down the reaction showing the preparation.
5. What is a neutralization reaction? Give two examples.
 - a) What is a universal indicator? What is its advantage?
 - b) Name a strong base and a weak base.

CASE BASED QUESTION (4 MARKS)

A scale for measuring hydrogen ion concentration in a solution, called pH scale has been developed. The p in pH stands for 'potenz' in German, meaning power. On the pH scale we can measure pH generally from 0 (very acidic) to 14 (very alkaline). pH should be thought of simply as a number which indicates the acidic or basic nature of a solution. Higher the hydronium ion concentration, lower is the pH value. The pH of a neutral solution is 7. Values less than 7 on the pH scale represent an acidic solution. As the pH value increases from 7 to 14, it represents an increase in OH⁻ ion concentration in the solution, that is, increase in the strength of alkali

- 1) You have two solutions, A and B. The pH of solution A is 6 and pH of solution B is 8. Which solution has more hydrogen ion concentration? 1
- 2) Between solution A Ph 6 and solution B Ph 8 Which of these is acidic and which one is basic? 1
- 3) Do basic solutions also have H⁺ (aq) ions? If yes, then why are these basic? 2

Or
Under what soil condition do you think a farmer would treat the soil of his fields with quick lime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate)? 2

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CHAPTER 3- METALS AND NON METALS

MCQ

- Which of the following property is generally not shown by metals?
 - Electrical conduction.
 - Sonorous in nature.
 - Dullness.
 - Ductility.
- The ability of metals to be drawn into thin wire is known as
 - Ductility.
 - Malleability.
 - Sonorousity.
 - Conductivity.
- Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?
 - Good thermal conductivity
 - Good electrical conductivity.
 - Ductility.
 - High melting point.
 - i and ii.
 - i and iii.
 - ii and iii.
 - i and iv.
- Which one of the following metals does not react with cold as well as hot water?
 - Sodium.
 - Calcium.
 - Magnesium.
 - Iron.
- Which of the following oxides (s) of iron would be obtained on prolonged reaction of iron with steam?
 - FeO
 - Fe₂O₃
 - Fe₃O₄
 - Fe₂O₃ and Fe₃O₄.
- What happens when calcium is treated with water?
 - It does not react with water.
 - It reacts violently with water.
 - It reacts less violently with water.
 - Bubbles of hydrogen gas form stick to the surface of calcium
 - i and iv.
 - ii and iii.
 - i and ii.
 - iii and iv
- Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?
 - H₂SO₄
 - HCl
 - HNO₃
 - All of these.
- The composition of Aqua regia is
 - Dilute HCl : Conc HNO₃
3 : 1
 - Conc HCL : dil HNO₃
3: 1
 - Conc HCL : Conc HNO₃
3 : 1

- c) Dil HCl : dil HNO₃
3 : 1
9. Which of the following are not ionic compounds?
- v) KCl
 - vi) HCl
 - vii) CCl₄
 - viii) NaCl
- a) i and ii.
b) ii and iii
c) iii and iv
d) i and iii
10. Which one of the following properties is not generally exhibited by ionic compounds?
- a) Solubility in water.
 - b) Electrical conductivity in solid state.
 - c) High melting and boiling points.
 - d) Electrical conductivity in molten state.
11. Which of the following metals exist in their native state in nature?
- i) Cu. ii) Au. iii) Zn. iv) Ag
- a) i and ii.
b) ii and III.
c) ii and iv
d) iii and iv.
12. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining? I) Au ii) Cu. iii) Na. iv) K
- a) i and ii
 - b) i and iii.
 - c) ii and iii.
 - d) iii and iv
13. Silver articles become black on prolonged exposure to air. This is due to the formation of
- a) Ag₃N.
 - b) Ag₂O.
 - c) Ag₂S.
 - d) Ag₂S and Ag₃N
14. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of
- a) Gallium.
 - b) Aluminium.
 - c) Zinc.
 - d) Silver.
15. Stainless steel is very useful materials for our life. In stainless Steel, iron is mixed with
- a) Nickel and chromium
 - b) Copper and chromium
 - c) Nickel and copper
 - d) Copper and gold

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true

1. Assertion (A) : Hydrogen gas is not evolved when a metal reacts with nitric acid.
Reason (R) : Nitric acid is a strong oxidising agent.

2. Assertion (A) : Highly reactive metals are obtained by electrolytic reduction.
Reason (R) : In the electrolytic reduction, metal is deposited at the cathode.

3. Assertion (A): Bronze is an alloy of copper and tin.
Reason (R) : Alloys are heterogeneous mixture of metals with other metals and non-metals.

4. Assertion (A) : Zinc oxide is amphoteric in nature.
Reason (R): Zinc oxide reacts with both acids and bases

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. $\text{Fe} + \text{ZnSO}_4 \longrightarrow$ No reaction. Give reason
2. Differentiate between nature of oxides of magnesium and sulphur.
3. Give reason:
 - a) Sodium and potassium are stored in kerosene
 - b) ionic compounds have higher melting points.
4. Mention the names of the metals for the following:
 - a) Two metals which are alloyed with iron to make stainless steel.
 - b) Two metals which are used to make jewellery.
5. Give reason for the following:
 - (a) School bells are made up of metals.
 - (b) Electric wires are made up of copper.
6. Give reason for the following:
 - (a) Aluminium oxide is considered as an amphoteric oxide.
 - (b) Ionic compounds conduct electricity in molten state.
7. Why are ionic compounds usually hard?
8. How is it that ionic compounds in the solid state do not conduct electricity but they do so when in molten state?
9. What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides: Na_2O , ZnO , Al_2O_3 , CO_2 , H_2O
10. Explain what is galvanisation. What purpose is served by it?

SHORT ANSWER QUESTIONS (3 MARKS)

1. Give reasons:

- a) Platinum, gold and silver are used to make jewellery.
 - b) Metals like Sodium and potassium are stored under oil.
 - c) Why do ionic compounds not conduct electricity in the solid state.
2. What are amphoteric oxides? Give an example. Write balanced chemical equations to justify your answer.
 3. Write chemical equations for the reactions taking place when:
 - a) A piece of calcium metal is placed in water.
 - b) Steam is passed over red hot iron.
 - c) Zinc sulphide is heated in air.
 4. Write chemical equations for the reaction taking place when
 - a) Zinc carbonate is calcinated.
 - b) Cinnabar is heated in the air.
 - c) Manganese dioxide is heated with aluminium powder.
 5. Name the ore of Mercury. With the help of balanced chemical equations, explain the process of extraction of Mercury from its ore.
 6. Give reasons for the following:
 - a) Carbon is not used for the extraction of aluminium from Aluminium oxide.
 - b) Aluminium easily combines with oxygen but still it can be used for making kitchen utensils.
 - c) Metals conduct electricity.
 7. Distinguish between roasting and calcination by giving chemical equations.

LONG ANSWER QUESTIONS (5 MARKS)

1. Explain how the following metals are obtained from their compounds by the reduction process:
 - a. Metal X which is low in the reactivity series.
 - b. Metal Y which is in the middle of the reactivity series.
 - c. Metal Z which is high up in the reactivity series.
2. Give reasons for the following :-
 - a) Metals are good conductors of electricity whereas non-metals are not.
 - b) Ionic compounds have usually high melting and boiling points.
 - c) Ionic compounds conduct electricity in molten state.
3.
 - a) Write the electronic configuration of Sodium and Chlorine.
 - b) Show the formation of sodium chloride from sodium and chlorine by the transfer of electrons. Name the cation and anion present in the ionic compound formed.
4.
 - a) What do you mean by amphoteric oxide?
 - b) Give an example of a metal which
 - i) Is a liquid at room temperature.

- ii) Is kept immersed in kerosene for storing.
 - iii) Is both malleable and ductile.
 - iv) Is the best conductor of heat.
5. Describe 'electrolytic refining' of impure copper with the help of labelled diagram to illustrate it.

CASE BASED QUESTION (4 MARKS)

Different metals show different reactivities towards oxygen. Metals such as potassium and sodium react so vigorously that they catch fire if kept in the open. Hence, to protect them and to prevent accidental fires, they are kept immersed in kerosene oil. At ordinary temperature, the surfaces of metals such as magnesium, aluminum, zinc, lead, etc., are covered with a thin layer of oxide. The protective oxide layer prevents the metal from further oxidation. Iron does not burn on heating but iron filings burn vigorously when sprinkled in the flame of the burner. Copper does not burn, but the hot metal is coated with a black colored layer of copper(II) oxide. Silver and gold do not react with oxygen even at high temperatures.

1. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be
 - a) calcium
 - b) carbon
 - c) silicon
 - d) iron
2. Which of the following methods is suitable for preventing an iron frying pan from rusting?
 - (a) Applying grease
 - (b) Applying paint
 - (c) Applying a coating of zinc
 - (d) All of the above
3. Give an example of a metal which
 - a) is a liquid at room temperature.
 - b) can be easily cut with a knife.
 - c) is the best conductor of heat.
 - d) is a poor conductor of heat.

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CHAPTER 4- CARBON AND ITS COMPOUNDS

MCQ

1. Carbon exists in the atmosphere in the form of
 - a) Carbon monoxide only
 - b) Carbon monoxide in traces and carbon dioxide
 - c) Carbon dioxide only
 - d) Coal
2. Which of the following statements are usually correct for carbon compounds?
 - i) These are good conductors of electricity
 - ii) These are poor conductors of electricity
 - iii) They have strong forces of attraction between their molecules
 - iv) They do not have strong forces of attraction between their molecules.
 - a) i and iii
 - b) ii and iii
 - c) i and iv
 - d) ii and iv
3. A molecule of ammonia has
 - a) Only single bond
 - b) Only double bonds
 - c) Only triple bonds
 - d) Two double bonds and one single bond.
4. Buckminsterfullerene is an allotropic form of
 - a) Phosphorus
 - b) Sulphur
 - c) Carbon
 - d) Tin
5. $\text{CH}_3\text{-CH}_2\text{-OH} \xrightarrow{\text{alk. KMnO}_4 + \text{heat}}$ $\text{CH}_3\text{-COOH} + \text{H}_2\text{O}$
In the above given reaction, alkaline potassium permanganate acts as
 - a) Reducing agent
 - b) Oxidizing agent
 - c) Catalyst
 - d) Dehydrating agent.

6. Oil on heating with hydrogen in the presence of palladium or nickel catalyst forms fat. This is an example of

- a) Addition reaction
- b) Substitution reaction
- c) Displacement reaction
- d) Oxidation reaction

7. In which of the following compounds, -OH is the functional group?

- a) Butanone
- b) Butanol
- c) Butanoic acid
- d) Butanal

8. The soap molecule has a

- a) Hydrophilic head and a hydrophobic tail
- b) Hydrophobic head and a hydrophilic tail
- c) Hydrophobic head and hydrophobic tail
- d) Hydrophilic head and hydrophilic tail

9. Identify the unsaturated compounds from the following

- i) Propane
- ii) Propene
- iii) Propyne
- iv) Chloropropane

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

10. Chlorine reacts with saturated hydrocarbons at room temperature in the

- a) Absence of sunlight
- b) Presence of sunlight
- c) Presence of water
- d) Presence of hydrochloric acid

11. In the soap micelles

- a) The ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster.

- b) Ionic end of soap is in the interior of the cluster and the carbon chain is out of the cluster.
- c) Both ionic end and carbon chain are in the interior of the cluster.
- d) Both ionic end and carbon chain are on the exterior of the cluster.

12. Pentane has the molecular formula C_5H_{12} . It has

- a) 5 covalent bonds
- b) 12 covalent bonds
- c) 16 covalent bonds
- d) 17 covalent bonds

13. Ethanol reacts with sodium to form two products. These are

- a) Sodium ethanoate and hydrogen
- b) Sodium ethanoate and oxygen
- c) Sodium ethoxide and hydrogen
- d) Sodium ethoxide and oxygen

14. Vinegar is a solution of

- a) a) 50% to 60% acetic acid in alcohol
- b) b) 5% to 8% acetic acid in alcohol
- c) c) 5% to 8% acetic acid in water
- d) d) 50% to 60% acetic acid in water

15. Mineral acids are stronger acid than carboxylic acids because

- i) Mineral acids are completely ionized
 - ii) Carboxylic acids are completely ionized
 - iii) Mineral acids are partially ionised
 - iv) Carboxylic acids are partially ionised
- a) i and iv
 - b) ii and iii
 - c) i and ii
 - d) ii and iv

ASSERTION - REASON TYPE QUESTION

Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

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- (c) A is true but R is false.
- (d) A is false but R is true

1. Assertion(A) : Carbon is the only element that can form large number of compounds.
Reason (R) : Carbon is tetravalent and shows the property of catenation.

2. Assertion(A) : If the first member of a homologous series is methanal, its third member will be propanal.
Reason (R) : All the members of a homologous series show similar chemical properties.

3. Assertion(A) : Diamond and graphite are allotropes of carbon.

Reason (R) : Some elements can have several different structural forms while in the same physical state. These forms are called allotropes.

4. Assertion(A) : Carbon compounds can form chain, branched and ring structures.

Reason (R) : Carbon exhibits the property of catenation.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Write the functional group present in (i) ethanol and (ii) ethanoic acid and also draw their structures.
2. Draw the structures of the first member of alkane and alkene series to show the bonding between the two carbon atoms.
3. Draw the structures of possible isomers of butane, C_4H_{10} .
4. State the reason why carbon can neither form C^{4+} cations nor C^{4-} anions, but forms covalent bonds. Also state reasons to explain why covalent compounds are bad conductors of electricity.
5. What are hydrocarbons? Distinguish between saturated and unsaturated hydrocarbons.

SHORT ANSWER QUESTIONS (3 MARKS)

1. What happens when hydrogen is added to a vegetable oil in the presence of nickel? Name the reaction and write one difference between the physical property of the vegetable oil and the product obtained in this reaction. Write the role of nickel in this reaction.
2. Write the name and structure of a carbon compound in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound.
3. What are isomers? Isomers of the first three members of alkane series are not possible. Give reason to justify this statement and draw two structures of butane.
4. Write the molecular formula of ethanol. What happens when it is heated with concentrated sulphuric acid at 443 Kelvin? Write the chemical equation for the reaction stating the role of concentrated H_2SO_4 in this reaction.
5. A compound X on heating with excess concentrated sulphuric acid at 443 Kelvin gives an unsaturated compound Y. X also reacts with sodium metal to evolve a colourless gas Z. Identifying X, Y and Z. Write the equation of the chemical reaction of formation of Y and also write the role of sulphuric acid in the reaction.
6. What happens when?
 - i. Ethanol is burnt in air?
 - ii. Ethanol is heated with excess concentrated sulphuric acid at 443 Kelvin?
 - iii. A piece of sodium is dropped in ethanol?
7. The molecular formula of two carbon compounds is C_4H_8 and C_3H_8 . Which one of the two is most likely to show addition reaction? Justify your answer. Also give the chemical equation to explain the process of addition reaction in this case.
8. An organic compound A is a constituent of antifreeze. This compound on heating with oxygen forms another organic compound B which has the molecular formula $C_2H_4O_2$. Identify the compounds A and B. Write a chemical equation of the reaction that takes place to form the compound B.

9. What are esters? How are they formed? Where do they occur in nature? Write two uses of esters.
10. Complete the following chemical equations
- $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \square$
 - $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{(conc.)H}_2\text{SO}_4} \square$
 - $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \square$

LONG ANSWER QUESTIONS (5 MARKS)

- What are detergents?
 - Write merits & demerits of using detergents for cleaning.
 - Explain the mechanism of the cleansing action of soap.
- Draw the electron-dot structure of ethene.
 - Which of the following compounds can have a double bond?
 C_4H_{10} , C_5H_8 , C_5H_{10}
 - Name the following compounds:
 - $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CHO}$
 - $\text{CH}_3\text{-CH}_2\text{-Br}$
- Identify the functional group in the following compounds
 - Ethanoic acid
 - Butanone
 - Ethanol
 - Propanal
 - Give an example of addition reaction in unsaturated hydrocarbon.
- Why does carbon forms large number of compounds?
 - Name any two allotropes of carbon.
 - How many covalent bonds are there in a molecule of ethane, C_2H_6 ?
 - Draw the isomers of pentanone
- What are esters?
 - Name an ester formed when ethanoic acid reacts with ethanol.
 - Write a balanced chemical equation for it.

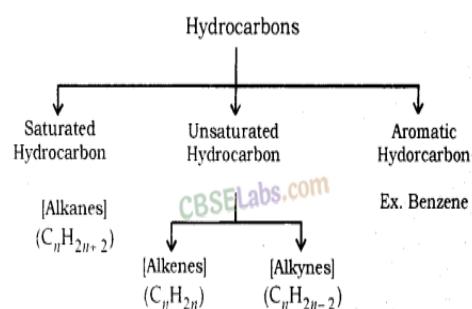
CASE BASED QUESTION (4 MARKS)

Nisha observed that the bottoms of cooking utensils were turning black in colour while the flame of her stove was yellow in colour. Her daughter suggested cleaning the air holes of the stove to get a clean, blue flame. She also told her mother that this would prevent the fuel from getting wasted.

- Identify the reasons behind the sooty flame arising from the stove.
- Why do you think the colour of the flame turns blue once the air holes of the stove are cleaned?
- Can you distinguish between saturated and unsaturated compounds by burning them? Justify your answer by giving two points

OR Draw the structural formulae of ethane and butane

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CHAPTER 5- LIFE PROCESSES

MCQ

1. Which of the following statements about the autotroph is correct:
 - a) They synthesise carbohydrates from carbon dioxide and water in the presence of sunlight and chlorophyll.
 - b) The store carbohydrates in the form of starch.
 - c) They convert carbon dioxide and water into carbohydrates in the absence of sunlight.
 - d) They constitute the first trophic level in food chains.
2. In which of the following groups of microorganisms, food materials are broken down outside the body and absorbed?
 - a) Mushroom, green plants, amoeba,
 - b) Yeast, mushroom, bread mould
 - c) Paramecium, amoeba, cuscutea
 - d) Cuscuta, lice, tapeworm
3. Select the correct statement
 - a) Heterotrophs do not synthesise their own food
 - b) Heterotrophs utilise solar energy for photosynthesis
 - c) Heterotrophs synthesise their own food
 - d) Heterotrophs are capable of converting carbon dioxide and water into carbohydrates
4. Which is the correct sequence of parts in human alimentary canal
 - a) Mouth, stomach, small intestine, oesophagus, large intestine
 - b) Mouth, oesophagus, stomach, large intestine, small intestine
 - c) Mouth, stomach, oesophagus, small intestine, large intestine
 - d) Mouth, oesophagus, stomach, small intestine, large intestine
5. If salivary amylase is lacking in the Saliva, which of the following events in the mouth cavity will be affected
 - a) Proteins breaking down into amino acids
 - b) Starch breaking down into sugar
 - c) Fats breaking down into fatty acids and glycerol
 - d) Absorption of vitamins
6. The inner lining of stomach is protected by one of the following from hydrochloric acid. Choose the correct one
 - a) Pepsin

- b) Mucus
 - c) Salivary amylase
 - d) Bile
7. Which part of alimentary canal receives bile from the liver?
- a) Stomach
 - b) Small intestine
 - c) Large intestine
 - d) Oesophagus
8. A few drops of iodine solution were added to rice the solution turns blue black in colour. This indicates that rice water contains
- a) Complex proteins
 - b) Simple protein
 - c) Fats
 - d) Starch
9. In which part of the alimentary canal food is finally digested?
- a) Stomach
 - b) Mouth cavity
 - c) Large intestine
 - d) Small intestine
10. Choose the function of the pancreatic juice from the following
- a) Trypsin digest proteins and lipase carbohydrates
 - b) Trypsin digests emulsified fats and lipase proteins
 - c) Trypsin and lipase digest fats
 - d) Trypsin digests protein and lipase digests emulsified fats
11. When air is blown from mouth into to a test tube containing lime water, the lime water turn milky due to the presence of
- a) Oxygen
 - b) Carbon dioxide**
 - c) Nitrogen
 - d) Water vapour
12. The correct sequence of anaerobic respiration in yeast is
- a) Glucose → cytoplasm → pyruvate → mitochondria → ethanol + carbon dioxide
 - b) Glucose → cytoplasm → pyruvate → cytoplasm → lactic acid
 - c) Glucose → cytoplasm → pyruvate → mitochondria → lactic acid

d) Glucose → cytoplasm → pyruvate → cytoplasm → ethanol + carbon dioxide

13. Which of the following is most appropriate for aerobic respiration?

a) Glucose → mitochondria → pyruvate → cytoplasm → $\text{CO}_2 + \text{H}_2\text{O} + \text{energy}$

b) Glucose → cytoplasm → pyruvate → mitochondria → $\text{CO}_2 + \text{H}_2\text{O} + \text{energy}$

c) Glucose → cytoplasm → pyruvate + energy → mitochondria → $\text{CO}_2 + \text{H}_2\text{O}$

d) Glucose → cytoplasm → pyruvate + energy → mitochondria → $\text{CO}_2 + \text{H}_2\text{O} + \text{energy}$

14. Which of the following statement(s) is (are) true about respiration?

- i. During inhalation, ribs move inward and diaphragm is raised.
 - ii. In the alveoli, exchange of gases takes place, i.e. oxygen from alveolar air diffuses into blood and carbon dioxide from blood into alveolar air.
 - iii. Haemoglobin has greater affinity for Carbon dioxide than oxygen.
 - iv. Alveoli increase surface area for exchange of gases.
- a. i and iv
 - b. ii and iii
 - c. i and iii
 - d. ii and iv

15. 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

ASSERTION - REASON TYPE QUESTION

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- (d) A is false but R is true

1) Assertion(A) : kidneys perform a dual function in our body.

Reason(R): selective reabsorption occurs in the glomerulus.

2) Assertion (A) : mammals and birds have four chambered heart .

Reason(R) : mammals and birds are warm blooded.

3) Assertion(A) : a mammal has double circulation .

Reason(R) : higher energy need due to endothermy.

4) Assertion(A): veins have valves.

Reason (R): the pressure for the flow is far lesser compared to arteries

VERY SHORT ANSWER QUESTIONS (2 MARKS)

- 1. What is the role of acid in our stomach?
- 2. Name the correct substrates for the following:

(a) Trypsin (b) Amylase (c) Pepsin (d) Lipase

3. What is the role of bile juice in the process of digestion
4. Write two different ways in which glucose is oxidized to provide energy. Write the products formed in each case.
5. State the function of alveoli in respiration.
6. Rate of breathing in aquatic organisms is faster than that in terrestrial organisms. Give reason.
7. What do you mean by emulsification of fats?
8. Why is small intestine in herbivores longer than in carnivores?
9. What will happen if mucus is not secreted by the gastric glands?
10. What is the difference between lymph and blood?

SHORT ANSWER QUESTIONS (3 MARKS)

1. List the events that happened during the process of photosynthesis.
2. Write the role performed by following enzymes in digestion process
 - a. Salivary amylase
 - b. Pepsin
 - c. Lipase
3. What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?
4. Name the vessels which carry:
 - A)Oxygenated blood from heart to various body parts.
 - b) Oxygenated blood from lungs to heart.
 - c) Deoxygenated blood from heart to lungs.
5.
 - a) In mammals and birds, why is it necessary to separate oxygenated and deoxygenated blood?
 - b) Using only flow chart, write the path of oxygen from trachea to respiring tissue cell.
 - c) Write the difference between aerobic and anaerobic respiration.
6. Explain the mechanism of transport of water and minerals in a plant.
7.
 - a) Name a vein which carries oxygenated blood.
 - b) Name an artery which carries deoxygenated blood.
 - c) Why is left ventricle of heart thicker than the right ventricle.
8. What is the composition of blood? Write one function each of the components.
9. Explain the ways in which glucose is broken down in the absence of oxygen.
10. List three differences between arteries and veins.

LONG ANSWER QUESTIONS (5 MARKS)

1.
 - a) Name one gland in human body which secretes digestive enzymes as well as hormones.
 - b) Give reasons for the following:-
 - i) The lung alveoli are covered with blood capillaries.
 - ii) The wall of trachea is supported by cartilage rings.
 - iii) How are the alveoli and the villi similar in function even if their locations are different?
2. Draw the diagram of human respiratory system and label on it:

i) larynx, ii) trachea, iii) lungs, iv) bronchi.

Explain the mechanism of breathing in human beings

3. Give reasons for the following:-

i) The muscular wall of ventricle are thicker than the walls of aorta.

ii) Arteries have thick elastic walls.

iii) The colour of Human blood is red

iv) Veins have valves

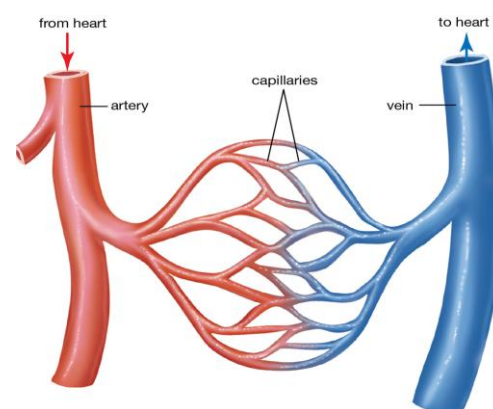
v) Heart is enclosed in a covering called pericardium

4. List the steps of Photosynthesis. Write down the chemical equation involved. What are the sources of raw materials required in photosynthesis?

5. Write down the functions of HCl, mucus, trypsin, bile and pepsin secreted by the glands of the digestive system.

CASE BASED QUESTION (4 MARKS)

Blood consists of a fluid medium called plasma in which the cells are suspended. Plasma transports food, carbon dioxide and nitrogenous wastes in dissolved form. Oxygen is carried by the red blood corpuscles. Many other substances like salts, are also transported by the blood. We thus need a pumping organ to push blood around the body, a network of tubes to reach all the tissues and a system in place to ensure that this network can be repaired if damaged. Blood transport food, Oxygen and waste materials in our bodies. It consists of plasma as a fluid medium. A pumping organ heart is required to push the blood around the body. The blood flows through the chambers of the heart in a specific manner and direction. While flowing throughout the body, blood exerts a pressure against the wall or a vessel.



i) Oxygenated blood from lungs enters left atrium through

(a) Vena cava

(b) Pulmonary artery

(c) Pulmonary vein

(d) Aorta

ii) The rate of blood flow in the capillaries is very low because capillaries are

(a) Very narrow and have high resistance

(b) Much wide and have low resistance

(c) Very narrow and have low resistance

(d) Much wide and have high resistance

iii) Which of the following statements are true about human heart?

(a) It is a hollow muscular organ

(b) It is four chambered having three auricles and one ventricle.

(c) It has different chambers to prevent O₂ rich blood from mixing with the blood containing CO₂

(d) Both A & C

iv) Study the table below and select the row that has correct information.

(a) Blood = Plasma + RBC + WBC + Platelets

(b) Plasma = Blood – RBC

(c) Lymph = Plasma + RBC

(d) Serum = Plasma + RBC + WBC

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CHAPTER 6- CONTROL AND COORDINATION

MCQ

1. Which of the following statements is correct about receptors?
 - a) Gustatory receptors detect taste while olfactory receptors detect smell.
 - b) Both gustatory and olfactory receptors detect smell.
 - c) Auditory receptors detect smell and olfactory receptors detect taste.
 - d) Olfactory receptors detect taste and gustatory receptors smell.
2. Electrical impulse travels in a neurone from
 - a) Dendrite → axon → axonal end → cell body
 - b) Cell body → dendrite → axon → axonal end
 - c) Dendrite → cell body → axon → axonal end
 - d) Axonal end → axon → cell body → dendrite
3. In a synapse, chemical signal is transmitted from
 - a) Dendrite end of one neuron to axonal end of another neuron
 - b) Axon to cell body of the same neuron.
 - c) Cell body to axonal end of the same neuron
 - d) Axonal end of neuron to dendritic end of another neuron.
4. In a neuron, conversion of electrical signal to a chemical signal occurs at/in
 - a) Cell body
 - b) Axonal end
 - c) Dendritic end
 - d) Axon
5. Which is the correct sequence of the components of a reflex arc?
 - a. Receptors → muscles → sensory neuron → motor neuron → spinal cord
 - b. Receptors → motor neurone → spinal cord → sensory neuron → muscle
 - c. Receptors → spinal cord → sensory neuron → motor neuron → muscle
 - d. Receptors → sensory neuron → spinal cord → motor neuron → muscles
6. Which of the following statements are true?
 - i) Sudden action in response to something in the environment is called reflex action.
 - ii) Sensory neurons carry signals from spinal cord to muscles
 - iii) Motor neurons carry signals from receptors to spinal cord
 - iv) The path through which signals are transmitted from a receptor to muscle and gland is called reflex arc
 - a. i and ii
 - b. i and iii
 - c. i and iv
 - d. i, ii, iii
- 7) Which of the following statements are true about the brain
 - i) The main thinking part of brain is highest brain
 - ii) Centres of hearing, smell, memory, sight, are located in forebrain
 - iii) Involuntary actions like salivation, vomiting, blood pressure are controlled by the medulla in the hind brain.

iv) Cerebellum does not control the posture and balance of the body

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

8. Posture and balance of the body is controlled by

- a. Cerebrum
- b. Cerebellum
- c. Medulla
- d. Pons

9. Spinal cord originates from

- a. Cerebrum
- b. Medulla
- c. Pons
- d. Cerebellum

10. The movement of shoot towards light is

- a. Geotropism
- b. Hydrotropism
- c. Chemotropism
- d. Phototropism

11. The main function of abscisic acid in plants is to

- a. Increase the length of cells
- b. Promote cell division
- c. Inhibit growth
- d. Promote growth of stem

12. Which of the following is not associated with growth of plant?

- a. Auxin
- b. Gibberellin
- c. Cytokinins
- d. Absciscicacid

13. Iodine is necessary for the synthesis of which hormone?

- a. Adrenaline
- b. Thyroxine
- c. Auxin
- d. Insulin

14. Choose the incorrect statement about insulin

- a. It is produced from pancreas
- b. It regulate growth and development of the cell
- c. It regulate blood sugar level
- d. Insufficient secretion of insulin will cause diabetes

15. Select the mismatched pair

- a. Adrenaline : pituitary gland
- b. Testosterone : testis
- c. Oestrogen : ovary
- d. Thyroxine : thyroid gland

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1. **Assertion (A)** : Insulin regulates blood sugar level.
Reason (R) : Insufficient secretion of insulin will cause diabetes.
2. **Assertion (A)** : Animals can react to stimuli in different ways.
Reason (R) : All animals have a nervous system and an endocrine system involving hormones.
3. **Assertion (A)**: The effect of auxin hormone on the growth of root is exactly opposite to that on a stem.
Reason (R) : Auxin hormone increases the rate of growth in root and decreases the rate of growth in stem.
4. **Assertion (A)**: A receptor is a specialized group of cells in a sense organ that perceive a particular type of stimulus.
Reason (R) : Different sense organs have different receptors for detecting stimuli.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Identify the parts of neuron where
 - i) information is acquired and where
 - ii) this impulse is converted into a chemical signal for onward transmission
2. With the help of reflex arc trace the sequence of events which occur when we touch any hot object.
3. Which part of the brain –
 - i) Helps in maintaining the posture and balance of the body
 - ii) Carries out the involuntary actions e.g .salivation, vomiting and blood pressure.
4. Name the plant hormone which helps in--
 - i) the growth of stem
 - ii) promoting cell division
5. Why is the use of iodised salt advisable?

SHORT ANSWER QUESTIONS (3 MARKS)

1. What are nastic movements? Give one example.
2. Describe how auxins are related with the bending of shoots towards the source of light?
3. Define hormones. Name the hormone secreted by thyroid. Write its function. Why is the use of iodised salt advised to us?

4. Name the hormones secreted by the following endocrine glands and specify one function of each:
 - a. Thyroid
 - b. Pituitary
 - c. Pancreas.
5. Pertaining to endocrine system, what will you interpret if
 - a) you observe swollen neck in people living in The hills.
 - b) over secretion of growth hormone takes place during childhood.
 - c) Facial hair develops in boys aged 13.
6. What is geotropism? Draw a labelled diagram of a potted plant showing positive geotropism and negative geotropism.
7. Explain giving reason the bending of the shoot tip of a plant towards light source coming from one side of the plant.
8. What are plant hormones? Name the plant hormones responsible for the following:
 - a) Growth of stem
 - b) Promotion of cell division
 - c) Inhibition of growth
 - d) Elongation of cells
9. What is a nerve impulse? State the direction followed by a nerve impulse while travelling in the body of an organism?
10. List in tabular form three distinguishing features between cerebrum and cerebellum.

LONG ANSWER QUESTIONS (5 MARKS)

1. Which animal or plant hormone is associated with the following? Also name the gland from where it is secreted.
 - i) Changes at puberty in males.
 - ii) Changes at puberty in females.
 - iii) Inhibits growth of plants.
 - iv) Promotes cell division in plants.
 - v) Dwarfism.
 - vi) Goitre.
2. a) What is geotropism? Draw a diagram to show positive phototropic and negative phototropic movement in plant. Differentiate between tropic and nastic movement
3. a) Name the three major regions (parts) of the human brain. Which part of the brain maintains posture and equilibrium of the body?
b) How are our brain and spinal cord protected?
4. Identify the glands and mention hormones produced .
 - a. .Gland which prepares our body to function at maximum efficiency during anger or danger.
 - b. Gland that helps in growth of bones and muscles.
 - c. Gland that helps in growth of secondary sexual characters in males.
 - d. Gland associated with the maintaining of menstrual cycle
 - e. Gland associated with the development of secondary sexual characters in males
 - f. Glands associated with the level of glucose in the blood stream
5. a) What is synapse?
b) What is Reflex Action? Draw a flowchart diagram of reflex arc.

CASE BASED QUESTION (4 MARKS)

Case Study 1: Control and coordination are vital processes in living organisms that enable them to respond to their environment and maintain internal balance. In humans, the nervous system and the endocrine system work together to carry out these functions. The nervous system consists of the brain, spinal cord, and nerves, and it transmits signals through electrical impulses. The endocrine system, on the other hand, consists of glands that secrete hormones into the bloodstream, which regulate various bodily functions. The coordination between the nervous system and the endocrine system ensures the proper functioning of different organs and systems in the body. The nervous system allows for rapid responses, while the endocrine system enables long-term regulation. Understanding control and coordination helps us comprehend the mechanisms behind reflex actions, voluntary actions, and the response to external stimuli.

- i) What are control and coordination processes responsible for?
 - a) Maintaining internal balance in living organisms
 - b) Regulating bodily functions
 - c) Transmitting signals through electrical impulses
 - d) All of the above

- ii) What is the role of the nervous system in control and coordination?
 - a) Secreting hormones into the bloodstream
 - b) Transmitting signals through electrical impulses
 - c) Regulating various bodily functions
 - d) Maintaining internal balance

- iii) Which systems work together to carry out control and coordination in humans?
(OR)

What is the role of the endocrine system in control and coordination?

Case Study 2: To carry out a simple function such as eating food there has to be coordination of the eyes, hands, and mouth. The eyes have to focus on the food, the hands have to pick it up and take it to the mouth where it will be chewed. All these actions have to be coordinated in such a manner that they follow a particular sequence and the action is completed. A similar mechanism is also needed for internal functions of the body. This function is carried out by the nervous system. It is composed of

- (a) Specialised cells which can detect, receive and transmit different kinds of stimuli. These are called neurons.
- (b) Nerve fibres which are certain bundles of extended processes of nerve cells.

The individuals also have to adjust to the changing conditions around them and vary their responses. At the same time, the internal conditions of the body should be maintained constant. This is called homeostasis. The internal conditions of the body are maintained at a constant by controlling the physiology of the organisms.

- i) What are called neurons?
- a) Units of nephrons
 - b) Units of nervous system
 - c) Units of respiratory system
 - d) Units of circulatory system
- ii) Nervous system
- a) Responds to stimuli
 - b) Responds to blood from the lungs
 - c) Responds to liver
 - d) Responds to kidneys
- iii) What will the correct sequence in which conduction of information through nerves take place?
- (OR)

What happens when the dendrite tip of a nerve cell receives a signal?

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CHAPTER 7- HOW DO ORGANISMS REPRODUCE

MCQ

1. In the list of organisms given below, those that reproduce by the asexual method are
 - i) Bandana ii) dog iii) yeast iv) amoeba
 - a) ii and iv
 - b) ii, iii, iv
 - c) i and iv
 - d) ii, iii, iv
2. In a flower, the parts that produce male and female gametes are
 - a) Stamen and anther
 - b) Filament and stigma
 - c) Anther and ovary
 - d) Stamen and style
3. Which of the following is the correct sequence of events of sexual reproduction in a flower?
 - a) Pollination, fertilization, seedling ,embryo.
 - b) Seedling, embryo, fertilization, pollination
 - c) Pollination ,fertilization, embryo ,seedling
 - d) Embryo, seedling, pollination, fertilization
4. Offsprings formed by asexual method of reproduction have greater similarity among themselves because
 - i) Asexual reproduction involves only one parent
 - ii) Asexual reproduction does not involve gametes
 - iii) Asexual reproduction occurs before sexual reproduction
 - iv) Asexual reproduction occurs after sexual reproduction
 - a) i and ii
 - b) i and iii
 - c) ii and iv
 - d) i,iii and iv
5. Characters transmitted from parents to offspring are present in
 - a) Cytoplasm
 - b) Ribosome
 - c) Golgi bodies
 - d) Genes
6. Characters that are transmitted from parents to offspring during reproduction show
 - a) Only similarities with parents
 - b) Only variations with parents
 - c) Both similarities and variations with parents
 - d) Neither similarities nor variations
7. A feature of reproduction that is common to amoeba, spirogyra and yeast is that
 - a) The reproduce asexually
 - b) There are all unicellular
 - c) They reproduce only sexually
 - d) They are all multicellular

8. In spirogyra, asexual reproduction takes place by breaking up of filaments into smaller pieces
- Division of a cell into two cells
 - Division of a cell into many cells
 - Formation of young cells from older cells
 - None of these
9. The ability of a cell to divide into several cells during reproduction in plasmodium is called
- Budding
 - Reduction division
 - Binary fission
 - Multiple fission
10. The correct sequence of reproductive stages seen in flowering plants is
- Gametes, zygote embryo, seedling
 - Zygote, gametes, embryo, seedling
 - Seedling, embryo, zygote, gametes
 - Gametes, embryo, zygote, seedling
11. The number of chromosomes in parents and offsprings of a particular species remains constant due to
- Doubling of chromosomes after zygote formation
 - Halving of chromosomes due to gamete formation
 - Doubling of chromosomes after gamete formation
 - Halving optimal rules after gamete formation
12. In rhizopus, tubular thread like structure bearing sporangium at their tips are called
- Elements
 - Hyphae
 - Rhizoids
 - Roots
13. Vegetative propagation refers to formation of new plants from
- Stem, roots and flowers
 - Stem, roots and leaves
 - stem, flowers and fruits
 - Stem, leaves and flowers
14. Factor responsible for the spread of bread mould on slices of bread are
- Large number of spores
 - Availability of moisture and nutrients in bread
 - Presence of tubular branched hyphae
 - Formation of round shaped sporangia
- I and iii
 - ii and iv
 - i and ii
 - iii and iv

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1. **Assertion (A)** : Asexual reproduction is a primitive type of reproduction.
Reason (R) : Asexual reproduction involves only mitotic cell division.
2. **Assertion (A)** : Spores are unicellular bodies.
Reason (R) : The parent body simply breaks up into smaller pieces on maturation.
3. **Assertion (A)** : Clones are offspring of an organism formed by asexual reproduction.
Reason (R) : Clones have exact copies of DNA as their parent.
4. **Assertion (A)** : Colonies of yeast multiply in sugar solution.
Reason (R) : Sugar is made of sucrose which provides energy for sustaining all life activities.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Protozoans reproduce by binary fission as well as multiple fission. Which process is better and why?
2. Name the kind of organisms that reproduce by spore formation. How will an organism be benefitted if it reproduces through spores?
3. Compare the vegetative propagation in *Bryophyllum* and money plant.
4. How fragmentation is different from regeneration
5. A student noticed that an organism by mistake was cut into parts. After some time, both developed into new individuals.
 - (i) Name the mode of reproduction followed by the organism.
 - (ii) Give an example of organism which multiply by this process.
6. A plant that has lost the capacity to produce seed. Name a process using which it can reproduce?
7. Differentiate between binary and multiple fission.
8. Name two plants which are grown by the technique of tissue culture.
9. Which methods will you use for growing jasmine and rose plants? Why?
10. Name the part of *Bryophyllum* where the buds are produced for vegetative propagation. Draw diagram also.

SHORT ANSWER QUESTIONS (3 MARKS)

1. What are the advantages of sexual reproduction over asexual reproduction?
2. Describe double fertilization in plants.

3. Write three methods used for regulation of childbirth.
4. a) Explain the terms i) implantation ii) placenta.
b) What is the average duration of human pregnancy?
5. What are sexually transmitted diseases? Name four such diseases. Which one of them damages the immune system of human body?
6. Explain with the help of labelled diagram the development that takes place in each of the body parts of a *Planaria* where body is cut into three pieces. Name this process and give an example of an organism in which is similar process can be observed.
7. List any four methods of contraception used by humans. How does the use of these methods have a direct effect on the health and prosperity of a family?
8. List two functions each of the following points of human reproductive organs.
 - a. ovaries
 - b. fallopian tube
 - c. uterus
9. Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement.
10. What is vegetative propagation? State two advantages and two disadvantages of this method.

LONG ANSWER QUESTIONS (5 MARKS)

1. What does HIV-AIDS stand for? Is it a STD? Name three more STDs. What are the means of transmission of HIV?
2. a) Name the female & the male reproductive glands which produces gametes.
b) State the hormones produce by the above glands.
c) Where does fertilization occur in case of human female & name the place where fertilized egg gets implanted?
3. Define menstrual cycle. Name the hormones associated with menstrual cycle. What are the cycle of events that occur in the female uterus is
 - a) Fertilisation takes place
 - b) If fertilisation do not take place
4. a) Name two glands that contribute fluid to the semen.
b) State two advantages semen offers to the sperms.
c) Why are testes in males located outside the abdominal cavity in scrotum?
5. Draw a labelled diagram of the longitudinal section of a flower/ male reproductive system/ female reproductive system
 - a) What are the advantages of sexual reproduction over asexual reproduction?
 - b) What is the importance of DNA copying in reproduction?

CASE BASED QUESTION (4 MARKS)

CASESTUDY 1

The male reproductive system consists of portions that produce the germ cells and other portions that deliver the germ cells to the site of fertilization. Testes are located outside the abdominal cavity in the scrotum because sperm formation requires a lower temperature than normal body temperature. It also has a role of secretion of male sex hormone which brings changes in appearance seen in boys at the time of puberty. Vas deferens unites with a tube coming from the urinary bladder. The urethra is a common passage for

sperms and urine. The prostate gland and seminal vesicles add their secretions so that sperms are now in a fluid.

1. Name the sex hormone associated with males.
 - (a) Testosterone
 - (b) Progesterone
 - (c) Oestrogen
 - (d) None of these
2. Which of the following statements is incorrect?
 - (a) Sperms are present in a fluid
 - (b) Fluid provides nutrition to sperms
 - (c) Fluid makes easier transportation of sperms
 - (d) Fluid helps to bind the sperms together
3. Why testes are are located outside the abdominal cavity in scrotum?

(OR)

Mentions the functions of urethra in human males.

CASESTUDY 2

Rohit collected some pond water which was dark green in colour in a test tube. She took out green-coloured mass from it and separated its filaments by using needles. She broke some filaments into small fragments and put them in a Petri dish containing clean water. She observed that after a few days the small fragments gave rise to complete filaments.

1. What do you think the mass of green filament was?
 - (a) It was a mass of Spirogyra filament.
 - (b) It was a colony of Volvox algae.
 - (c) It was large brown algae.
 - (d) It was a mass of fungal filaments
2. Organisms that reproduces in similar ways as Spirogyra is :
 - (a) yeast
 - (b) hydra
 - (c) Planaria
 - (d) Cow
3. Name the type of reproduction that you observe here.

(OR)

How vegetative propagation are is advantageous to plants?

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CHAPTER 8- HEREDITY

MCQ

1. Exchange of genetic material takes place in
 - a) vegetative propagation
 - b) asexual reproduction
 - c) sexual reproduction
 - d) budding
2. Two pink coloured flowers on crossing resulted in one red, two pink and 1 white flower progeny. The nature of the cross will be
 - a) double fertilization
 - b) self pollination
 - c) cross fertilization
 - d) no fertilization
3. A cross between a tall plant (TT) and a short pea plant (tt) resulted in progeny that were all tall plants because
 - a) tallest is the dominant trait
 - b) shortness is the dominant trait
 - c) tallness is the recessive trait
 - d) height of pea plant is not governed by gene T or t.
4. Which of the following statement is incorrect?
 - a) for every hormone there is a gene
 - b) for every protein there is a gene
 - c) for production of every enzyme there is a gene
 - d) for every molecule of fat there is a gene
5. If around, green seeded pea plant (RRyy) is crossed with wrinkled yellow seeded pea plant (rrYY), the seeds produced in F₁ generation are
 - a) round and yellow
 - b) round and green
 - c) wrinkled and green
 - d) wrinkled yellow
6. In human males all the chromosome separated perfectly except one. This unpaired chromosome is/are
 - i) large chromosome
 - ii) small chromosome
 - iii) Y chromosome
 - iv) X chromosome
 - a) i) and ii)
 - b) iii only
 - c) iii) and iv)
 - d) ii) and iv)
7. The maleness of a child is determined by
 - a) the X chromosome in the zygote
 - b) the Y chromosome in the zygote
 - c) the cytoplasm of germ cell which determines the sex
 - d) sex is determined by chance
8. A zygote which has an X chromosome inherited from the father will develop into a
 - a) boy
 - b) girl
 - c) X chromosome does not determine the sex of a child

- d) either boy or girl
9. Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow seeds (rrYY) produce F1 progeny that have round, yellow (RrYy) seeds. When F1 plants are selfed, the F2 progeny will have new combination of characters. Choose the new combination from the following:
- i) round, yellow
 - ii) round, green
 - iii) Wrinkled yellow
 - iv) wrinkled, green
- a) i) and ii)
 - b) i) and iv)
 - c) ii) and iii)
 - d) i) and iii)
10. Which of the following statements is not true with respect to variation?
- a) always runs in a species have equal chance of survival
 - b) change in genetic composition results in variation
 - c) selection of variants by environmental factors forms the basis of evolutionary processes
 - d) variation is minimum in asexual reproduction
11. A trait in an organism is influenced by
- a) paternal DNA only
 - b) maternal DNA only
 - c) both maternal and paternal DNA
 - d) neither by paternal nor by maternal DNA
12. From the list given below, select the character which can be acquired but not inherited
- a) colour of eye
 - b) colour of skin
 - c) size of body
 - d) nature of hair
13. The two versions of a trait which are brought in by the male and female gametes are situated on
- a) copies of the same chromosome
 - b) two different chromosomes
 - c) sex chromosomes
 - d) any chromosome
14. Select the statements that describe characteristics of genes
- i) genes are specific sequence of bases in a DNA molecule
 - ii) a gene does not code for proteins
 - iii) in individuals of a given species, specific gene is located on a particular chromosome
 - iv) which chromosome has only one gene
- a) i) and ii)
 - b) i) and iii)
 - c) i) and iv)
 - d) ii) and iv)

15. In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F₂ is

- a) 1:3
- b) 3:1
- c) 1:1
- d) 2:1

ASSERTION - REASON TYPE QUESTION

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- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1. **Assertion (A):** A geneticist crossed two pea plants and got 50% tall and 50% dwarf in the progeny.

Reason (R) : One plant was heterozygous tall and the other was dwarf.

2. **Assertion (A) :** Variations are seen in offspring produced by sexual reproduction.

Reason (R) : DNA molecule generated by replication is not exactly identical to original DNA.

3. **Assertion (A) :** Mutation is sudden change in the genetic material.

Reason (R) : Variation is useful for the survival of species over time.

4. **Assertion (A):** Mendel selected the pea plant for his experiments.

Reason (R) : Pea plant is cross-pollinating and has unisexual flowers

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Tabulate two distinguishing features between acquired traits and inherited traits with one example of each.
2. How do Mendel's experiments show that traits may be dominant or recessive?
3. How do Mendel's experiments show that traits are inherited independently?
4. How is the equal genetic contribution of male and female parents ensured in the progeny? Explain
5. The chromosome number of the sexually reproducing parents and their offspring is same. Justify the statement.
6. 'Genes controls traits'. Explain this statement with an example. 10. What is DNA copying? State its importance
7. How is the sex of child determined in human beings?

8. A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other. (a) List your observations regarding:
- (i) Colour of stem in their F1 progeny
 - (ii) Percentage of brown stemmed plants in F2 progeny if F1 plants are self-pollinated.
 - (iii) Ratio of GG and Gg in the F2 progeny.
9. With the help of a flow chart explain in brief how the sex of a new born is genetically determined in human beings. Which of the two parents, the mother or the father, is responsible for determination of sex of a child?
10. What is the difference between phenotype and genotype of an organism.

SHORT ANSWER QUESTIONS (3 MARKS)

1. Explain sex determination in human beings through diagram.
2. How did Mendel explain that it is possible that a trait is inherited but not expressed in an organism?
3. With the help of two examples, explain why certain experiences and earned by people during the lifetime are not passed on to the next generations. Can cancer traits be passed on?
4. Distinguish between the acquired traits and inherited traits in tabular form giving one example for each.
5. Mention the total number of chromosomes along with the sex chromosomes that are present in a human female and human male. Explain how in sexually reproducing organisms the number of chromosomes in the progeny remains the same as that of the parents.
6. How did Mendel's experiment show that different traits are inherited independently? Explain.
7. How do variations arise in organisms? Variation is useful for the survival of species. Justify this statement with the help of an example.
8. Crossbred tall (dominant) pea plant with pure bred dwarf (recessive) pea plant, we will get plants of F1 generation. If we now self-cross the pea plants of F1 generation, we obtain plants of F2 generation.
 - i. Why do the plants of a generation look like?
 - ii. State the ratio of tall to dwarf plants in F2 generation.
 - iii. State the type of plants not found in F1 generation but appeared in F2 generation. Write the reason for the same.

9. Mendel, in one of his experiments with pea plants, crossed a variety of pea plant having round seeds with one having wrinkled seeds. State Mendel's observation giving reasons of F₁ and F₂ progeny of this cross. Also list any two contrasting characters, other than round seeds of pea plants that Mendel used in his experiments.

LONG ANSWER QUESTIONS (5 MARKS)

1. Study the given data and answer the questions following the data:

Parental plants cross fertilized and seeds collected	F ₁ (first generation offsprings)	F ₂ (offsprings of self pollination of F ₁)
Male parent always bore red flowers. Female parent always had white flowers	330 seeds sown and observed. All 330 gave red flowers.	Out of 44 seeds 33 seeds gave plants with red flowers & 11 seeds gave plants with white flowers.

- What is the term used for this type of cross?
- What does the data of the column marked F₁ indicate?
- Express the genotype of the F₁ and F₂ progeny.

2. Explain the sex determination in human beings.

CASE BASED QUESTION (4 MARKS)

CASESTUDY 1

Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant with smooth seeds using pollen from plant with wrinkled seeds. The resulting pea pod has all smooth seeds.

- Which of the following conclusions can be drawn?
 - The allele for smooth seeds is dominated over that of wrinkled seeds
 - The plant with smooth seeds is heterozygous.
 - The plant with wrinkled seeds is homozygous.
 - 1 only
 - 1 and 2 only
 - 1 and 3 only
 - 1, 2 and 3
- Which of the following crosses will give smooth and wrinkled seeds in same proportion?
 - RR X rr
 - Rr x rr
 - RRX Rr
 - rrrr
- Crossing of two heterozygous smooth seeded plants (Rr), a total of 1000 plants were obtained in F₁ generation. What will be the respective number of smooth and wrinkled seeds obtained in F₁ generation?

(OR)

What is the genotype ratio in Mendel mono hybridisation in F₂ generation?

CASE STUDY : 2

Seema crossed pure breed pea plants having round-yellow seeds with wrinkled green seeds and found that only A-B type of seeds was produced in the F₁ generation. When F₁ generation pea plants having A-B type of seeds were cross-breed by self-pollination, then in addition to the original round yellow and wrinkled green seeds, two new varieties A-D and C-B types of seeds were also obtained.

1. What are the A-B type of seeds?
 - (a) Round -yellow
 - (b) Round- green
 - (c) Wrinkled- yellow
 - (d) Wrinkled- green
2. A and B are _____ traits.
 - (a) recessive
 - (b) dominant
 - (c) both (a) and (b)
 - (d) None of these
3. Why did Mendel select pea plant for his experiment?

(OR)

Name any two laws established by Mendel.

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CHAPTER 9- LIGHT REFLECTION AND REFRACTION

MCQ

1. Image of an object formed in a plane mirror is
 - a) Laterally inverted
 - b) Virtual
 - c) Erect
 - d) All the above
2. In order to observe full height h of a person in a plane mirror, the minimum height of mirror should be
 - a) h
 - b) $h/2$
 - c) $h/3$
 - d) $2h$
3. Two plane mirrors are inclined to each other at an angle 30° . The number of images of a point object held in between the mirror is
 - a) 6
 - b) 12
 - c) 11
 - d) infinity
4. An object is at a distance of 0.5m in front of a plane mirror. Distance between the object and the image is
 - a) 0.5 metre
 - b) 1 metre
 - c) 0.25 metre
 - d) 2 metres
5. The light reflected from a plane mirror may form a real image
 - a) If the rays incident on the mirror are converging
 - b) If the rays incident on the mirror are diverging
 - c) If the rays are perpendicular to the mirror
 - d) Under no circumstances
6. When a Ray of light incident on a plane mirror at an angle of θ , the reflected ray deviates through an angle
 - a) $\pi/2$
 - b) π
 - c) $\pi - \theta$
 - d) $\pi - 2\theta$
7. In which of the following cases, man will not see image greater than himself?
 - a) concave mirror
 - b) convex mirror
 - c) plane mirror
 - d) none of these
8. An object is placed at the focus of a concave mirror of focal length 20cm. the distance of the image from the pole of the mirror is
 - a) 10 cm
 - b) 20 cm
 - c) 40 cm
 - d) Infinity
9. When a light wave goes from air into water, the quality that remains unchanged is its
 - a) Amplitude
 - b) Speed
 - c) Frequency
 - d) Wavelength

10. The refractive indices of glass and water with respect to air are $\frac{3}{2}$ and $\frac{4}{3}$ respectively. The refractive index of glass with respect to water will be
- $\frac{8}{9}$
 - $\frac{9}{8}$
 - $\frac{7}{6}$
 - None of these
11. A convex lens is dipped in a liquid whose refractive index is equal to the refractive index of the lens. Then its focal length will
- Become zero
 - Become infinite
 - Reduce
 - Increase
12. Two thin lenses of focal length 20cm and 25cm are in contact. The effective power of the combination is
- 4.5 D
 - 18 D
 - 45 D
 - 9 D
13. A convex lens of focal length 40 cm, a concave lens of focal length 40 cm and a concave lens of focal length 15cm are placed in contact. The power of this combination in dioptre is
- +1.5
 - 1.5
 - +6.67
 - 6.67
14. Which of the following can make a parallel beam of light when light from a point source is incident on it?
- Concave mirror as well as convex lens
 - Convex mirror as well as concave lens
 - Two plane mirrors placed at 90 degree to each other
 - concave mirror as well as concave lens
15. A 10 mm long pin is placed vertically in front of a concave mirror. A 5 mm long image of the pin is formed at 30 cm in front of the mirror. The focal length of this mirror is
- 30cm
 - 20cm
 - 40cm
 - 60cm

ASSERTION - REASON TYPE QUESTION

Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions 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 but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true

1) Assertion (A) : Concave mirrors are used as make-up mirrors.

Reason (R) : When the face is held within the focus of a concave mirror, then a diminished image of the face is seen in the concave mirror.

2) Assertion (A) : The formula connecting u , v and f for a spherical mirror is valid in all situations for all spherical mirrors for all positions of the object.

Reason (R) : Laws of reflection are strictly valid for plane surfaces.

3) Assertion (A): The mirrors used in search lights are concave spherical.
Reason (R) : In concave spherical mirror the image formed is always virtual.

4) Assertion (A) : For observing traffic at back, the driver mirror is convex mirror.
Reason (R) : Convex mirror is also called diverging mirror.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. List two possible ways in which a concave mirror can produce a magnified image of an object placed in front of it. State the difference if any between these two images.
2. A concave mirror has a focal length of 20 cm. At what distance from the mirror should a 4 cm tall object be placed so that it forms an image at a distance of 30 cm from the mirror? Also calculate the size of the image formed.
3. A spherical mirror produces an image of magnification of -1 on a screen placed at a distance of 40 cm from the mirror.
 - i. Write type of mirror is this
 - ii. What is the nature of the image formed?
 - iii. How far is the object located from the mirror?
 - iv. Draw the ray diagram to show the image formation in this case.
4. A student wants to obtain an erect image of an object using a concave mirror of 12 cm focal length. What should be the range of distance of the candle flame from the mirror? State the nature and size of the image he is likely to observe. Draw a ray diagram to show the image formation in this case.
5. Mention the types of mirrors used as (i) rear view mirrors, (ii) shaving mirrors. List two reasons to justify your answer in each case.
6. Draw a ray diagram showing the path of rays of light when it enters with oblique incidence from air into water.
7. A student uses a lens of focal length 40 cm and another of -20 cm. Write the nature and power of each lens.

SHORT ANSWER QUESTIONS (3 MARKS)

1. An object 4 cm in height, is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed to obtain a sharp image of the object? Calculate the height of the image.
2. An object is placed at a distance of 30cm in front of a convex mirror of focal length 15 cm. write four characteristics of the image formed by the mirror.
3. Find the position of an object, which when placed in front of a concave mirror of focal length 20cm produces a virtual image, which is twice the size of the object.
4. The linear magnification of a convex mirror of focal length 15 cm is $\frac{1}{3}$. what is the distance of the object from the focus of the mirror?
5. Find the position, nature and size of the image formed by a convex lens of focal length 20cm of an object 4 cm high placed at a distance of 30 cm from it.

6. Student places a candle flame at a distance of about 60 cm from a convex lens of focal length 10 cm and focuses the image of the flame on a screen. After that he gradually moves the flame towards the lens and each time focuses the image on the screen.
 - a. In which direction towards or away from the lens does he move the screen to focus the image?
 - b. How does the size of the image change?
 - c. How does the intensity of the image change as the flame moves towards the lens?
 - d. Approximately for what distance between a plane and the lens the image formed on the screen is inverted and of the same size?
7. A convex lens has focal length of 30cm. Calculate at what distance should the object be placed from the lens so that it forms an image at 60 cm on the other side of the lens? Find the magnification produced by the lens in this case.
8. A convex lens has focal length of 30cm. Calculate at what distance should the object be placed from the lens so that it forms an image at 60 cm on the other side of the lens? Find the magnification produced by the lens in this case.
9. A 5 centimetre tall object is placed perpendicular to the principal axis of a convex lens of focal length 20cm. The distance of the object from the lens is 30cm. Determine the position and size of the image formed.
10. An object is placed at a distance of 15 cm from a convex lens of focal length 20 cm. List four characteristics of the image formed by the lens.

LONG ANSWER QUESTIONS (5 MARKS)

1. A) What is lateral displacement? State two factors on which it depends?
B) Write three applications each of concave and convex lenses.
2. a) The radius of curvature of a spherical mirror is 20 cm. What is its focal length?
b) Why do we prefer a convex mirror as a rear-view mirror in vehicles?
3. Draw the ray diagram for the following cases and state the nature, position and size of the image
 - a) When the object is placed at C of a concave mirror
 - b) When the object is placed at F of a concave mirror
 - c) When the object is placed between F and P of a concave mirror
 - d) When the object is placed between C and F of a concave mirror
 - e) When the object is placed beyond C of a concave mirror
4. Draw the ray diagram for the following cases and state the nature, position and size of the image
 - a) When the object is placed at $2F_1$ of a convex lens
 - b) When the object is placed at F_1 of a convex lens
 - c) When the object is placed between F_1 and O of a convex lens
 - d) When the object is placed between $2F_1$ and F_1 of a convex lens
 - e) When the object is placed beyond $2F_1$ of a convex lens
5. An object of size 7 cm is placed perpendicular to the principal axis at a distance of 27 cm in front of a concave mirror. The focal length of the mirror is 18 cm. Find the
 - a) position, b) size and c) nature of the image produced. Draw a ray diagram in support of this.

CASE BASED QUESTION (4 MARKS)

We know that lenses form different types of images when objects are kept at varying positions. When a ray is incident parallel to the principal axis, then after refraction, it passes through the focus or appears to come from the focus. When a ray goes through the optical center of the lens, it passes without any deviation. If the object is placed between the focus and optical center of the convex lens, erect and magnified image is formed. As the object is brought closer to the convex lens from infinity to focus, the image moves away from the convex lens from focus to infinity. Also the size of the image goes on increasing and the image is always real and inverted. A concave lens always gives a virtual, erect and diminished image irrespective of the position of the object.

1. The location of image formed by a convex lens when the object is placed at infinity is
 - a) at focus
 - b) at $2F$
 - c) at optical center
 - d) between F and $2F$

2. When the object is placed at the focus of concave lens, the image formed is
 - a) real and smaller
 - b) virtual and smaller
 - c) virtual and inverted
 - d) real and erect

3. The size of image formed by a convex lens when the object is placed at the focus of convex lens is
 - a) highly magnified
 - b) point in size
 - c) small
 - d) same as that of object

4. When the object is placed at $2F$ in front of convex lens, the location of image is
 - a) at F
 - b) between F and optical center
 - c) at infinity
 - d) none of the above

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CHAPTER 10- HUMAN EYE AND COLOURFUL WORLD

MCQ

1. A person cannot see distinctly object kept beyond 2 metre. This defect can be corrected by using a lens of power
 - a. +0.5D
 - b. -0.5D
 - c. +0.2D
 - d. -0.2D
2. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his textbook. Which of the following statements is correct?
 - a) The near point of his eyes has receded away.
 - b) The near point of his eyes has come closer to him.
 - c) The far point of his eyes has come closer to him.
 - d) The far point of his eyes as receded away.
3. At noon the sun appears white as
 - a) light is least scattered
 - b) all the colours of white light are scattered away.
 - c) blue colour is scattered the most.
 - d) red colour is scattered the most.
4. Which of the following phenomena of light are involved in the formation of rainbow?
 - a) reflection refraction and dispersion.
 - b) refraction dispersion and total internal reflection.
 - c) refraction dispersion and internal reflection.
 - d) dispersion scattering and total internal reflection.
5. Twinkling of stars is due to atmospheric
 - a) dispersion of light by water droplets.
 - b) reflection of light by different layers of wearing a refractive indices.
 - c) scattering of light by dust particles.
 - d) internal reflection of light by clouds.
6. The clear sky appears blue because
 - a) blue light gets absorbed in atmosphere.
 - b) ultraviolet radiations are absorbed in the atmosphere.
 - c) violet and blue lights gets scattered more than lights of all other colours by the atmosphere.
 - d) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere.
7. 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.
8. The danger signals installed at the top of a tall building are red in colour. this can be easily seen from a distance because among all other colours the rate light
 - a) is better the most by smoke or fog.
 - b) is scattered the least by smoke or fog.

- ### ASSERTION - REASON TYPE QUESTION

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true

- 1. Assertion (A):** A normal human eye can clearly see all the objects beyond certain minimum distance.
Reason (R) : The human eye has capacity of adjusting the focal length of eye lens.
- 2. Assertion (A) :** A rainbow is sometimes seen in the sky in rainy season only when observer's back is towards the Sun.
Reason (R) : Internal reflection in the water droplets cause dispersion and the final rays are in backward direction.
- 3. Assertion (A) :** Myopia is the defect of the eye in which only nearer objects are seen by the eye.
Reason (R) : The eye ball is elongated.
- 4. Assertion (A):** Hypermetropia is the defect of the eye in which only farther objects are seen.
Reason (R) : Hypermetropia is corrected by using converging lens

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. What is Hypermetropia? What are the two causes of this defect of vision?
2. Define the focal length of a lens. How the focal length can be changed in human eye
3. Explain why planets do not twinkle while stars do.
4. Draw a neat diagram to show the refraction of a light ray through a glass prism showing angle of prism and angle of deviation
5. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light?
6. Draw a labelled diagram to explain the formation of a rainbow in the sky.
7. What is 'dispersion of white light'? State its cause. Draw a ray diagram to show the dispersion of white light by a glass prism.
8. The near point of a defective eye is 25 cm from the eye. Calculate focal length of the lens required by her to read a book placed at 20cm.
9. A myopic person is using spectacles of power -1.5D for distant vision. How far can be see distinctly without specs?
10. A person needs a lens of power – 3.5 D for correction of her vision.
 - (i) What kind of defect of vision is she suffering from?
 - (ii) What is the focal length of the corrective lens?
 - (iii) What is the nature of the corrective lens?

SHORT ANSWER QUESTIONS (3 MARKS)

1. What is presbyopia? State its causes. How is it corrected?
2. Draw the path of ray passing through a prism. Label angle of incidence angle of emergence in angle of deviation in the diagram.
3. a) Student uses spectacles of focal length -2.5 metre.

- b) Name the defect of vision he is suffering from.
- c) Which lens is used for the correction of this defect?
- d) List two main causes of this defect.
- e) Compute the power of this lens.
4. Give reasons
 - a. Red colour is selected for danger signals.
 - b. The sky appears dark in space.
 - c. The time difference between actual sunset and apparent sunset is about 2 minutes.
5. What is the cause of dispersion of white light through a glass prism? Draw a ray diagram to show the path of light when two identical glass prisms are arranged together in inverted position with respect to each other and a narrow beam of white light is allowed to fall obliquely on one of the faces of the prisms.
6. What is scattering of light? Use this phenomenon to explain why i) the sun appears reddish at sunrise ii) the clear sky appears blue.
7. State the function of the following parts of human eye:
 - a. Iris
 - b. Cornea
 - c. Ciliary muscles
 - d. Pupil
 - e. Retina
 - f. Crystalline lens
8. Define the following terms:
 - a) Power of accommodation
 - b) Least distance of distinct vision
 - c) Presbyopia
9. What happens when you enter a dark room from bright sunlight? Explain why does this happen and how do our eyes adjust to this change?
10. Draw a ray diagram and explain how a rainbow is formed in the sky.

LONG ANSWER QUESTIONS (5 MARKS)

1. State the reason for the following
 - i) Space appears dark for astronaut
 - ii) Danger signals are red in colour.
 - iii) Describe how rainbow is formed in the sky?
2. a) Name the component of white light that deviates the least and the component that deviates the most while passing through a glass prism. 1
 b) Why do we see sun two minutes before sunrise and two minutes after sunset? Draw and show it with a diagram
3. Draw a diagram of human eye & label i) Retina, ii) Pupil, iii) Iris, iv) Lens.
4. Rohit needs a lens of power -4.5D for correction of his vision.
 - a) What kind of defect in vision is he suffering from?
 - b) What is the focal length and nature of the corrective lens?
 - c) What are the causes of this defect?
5. What is the difference in the vision in myopia and hypermetropia? Give a comparative account on the image formed by these disorders and their cures. Also mention the correction for them.

CASE BASED QUESTION (4 MARKS)

Case study 1:

Atmospheric refraction is the phenomenon of bending of light on passing through the earth's atmosphere. As we move above the surface of the earth, the density of air goes on decreasing. Local conditions like temperature etc. also affect the optical density of the earth's atmosphere. On account of atmospheric refraction, stars seen appear higher than they actually are; advanced sunrise; delayed sunset, the oval appearance of the sun at sunrise and sunset; stars twinkle, planets do not.

1. Due to atmospheric refraction, the apparent length of the day
 - (a) increases
 - (b) decreases
 - (c) remains the same
 - (d) all of these
2. Apparent position of the star appears raised due to
 - (a) atmospheric refraction
 - (b) scattering of light
 - (c) both (a) and (b)
 - (d) none of these
3. Why do stars twinkle?

(OR)

How does the sky appears to an astronaut?

Case Study 2:

The human eye is a complex organ that enables us to perceive the world around us. It consists of various parts that work together to provide vision. The cornea is the transparent outer covering of the eye that helps in focusing light. The iris, the colored part of the eye, controls the amount of light entering the eye by adjusting the size of the pupil. The lens, located behind the iris, further focuses the light onto the retina, which contains light-sensitive cells called rods and cones. These cells convert light into electrical signals, which are then transmitted to the brain via the optic nerve. The brain processes these signals and interprets them as visual images. The eye is capable of adjusting its focal length through a process called accommodation, allowing us to see objects at different distances clearly. The eye is also sensitive to different colors due to the presence of cones that respond to specific wavelengths of light. Understanding the functioning of the human eye and the properties of light helps us comprehend vision, perception, and phenomena such as refraction, dispersion, and the formation of images.

1. What is the function of the lens?
 - a) Controlling the amount of light entering the eye
 - b) Focusing light onto the retina
 - c) Transmitting electrical signals to the brain
 - d) Providing reflection

2. What part of the eye controls the amount of light entering the eye?

- a) Cornea
- b) Iris
- c) Lens
- d) Retina

3. How are visual images transmitted to the brain?

(OR)

What is the process called that allows the eye to adjust its focal length?

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CHAPTER 11- ELECTRICITY

MCQ

1. When a 4 volt battery is connected across an unknown resistor, there is a current of 100 mA in the circuit. The value of the resistance of the resistor is
 - a) 4 ohm
 - b) 40 ohm
 - c) 400 ohm
 - d) 0.4ohm
2. Unit of electric power may also be expressed as:
 - a) Volt- ampere
 - b) Kilowatt hour
 - c) Watt second
 - d) Joule second
3. The resistivity of a conductor increases with:
 - a) Increase in temperature
 - b) Increase in cross sectional area
 - c) Decrease in length
 - d) Decrease in cross sectional area
4. Three copper wires have lengths and cross sectional areas as (l,A) ; $(2l,A/2)$ and $(l/2,2A)$. Resistance is minimum in:
 - a) Wire of cross sectional area $a/2$
 - b) Wire of cross sectional area A
 - c) Wire of cross sectional area $2A$
 - d) Same in all the three cases
5. A wire is drawn such that its radius changes from r to $2r$. The new resistance is
 - a) One time
 - b) 4 times
 - c) 8 times
 - d) $1/16$ times
6. An electric bulb marked 40 watts 200 volt is used in a circuit of supply voltage 100 volt. Its power becomes
 - a) 100 W
 - b) 40 W
 - c) 20W
 - d) 10W
7. When three identical bulbs marked 60 watts 200 volt are connected in series to a 200 volt supply, the power drawn by them will be
 - a) 60W
 - b) 180W
 - c) 10W
 - d) 20W
8. If two identical heaters, each rated 1000 watt 220 volt are connected in parallel to 200 volt, then the total power consumed is
 - a) 200W
 - b) 2500W
 - c) 250W

- d) 2000W
9. Which of the following statements does not represent ohm's law?
- a) Current/potential difference=constant
 - b) Potential difference/current=constant
 - c) Potential difference=current×resistance
 - d) Current=resistance×potential difference
- 10.If a wire is stretched to make its length three times, its resistance will become
- a) Three times
 - b) One third
 - c) Nine times
 - d) One tenth
- 11.In a circuit current becomes half when resistance is
- a) Removed
 - b) Doubled
 - c) Halved
 - d) None of these
- 12.A number of cells when connected in series form
- a) A generator
 - b) An inverter
 - c) A battery
 - d) Battery eliminator
- 13.Three resistances of 2 ohm,4 ohm and 8 ohm are connected in series. Their equivalent resistance is
- a) 10 ohm
 - b) 8/7 ohm
 - c) 14 ohm
 - d) Between 2 ohm and 8 ohm
- 14.A device used to measure current, voltage and resistance is called
- a) Voltmeter
 - b) Ammeter
 - c) AVO meter
 - d) Ohm meter
- 15.Three resistances 2 ohm,4 ohm and 8 ohm are connected in parallel. Their equivalent resistance is
- a) 10 ohm
 - b) 14ohm
 - c) 8/7 ohm
 - d) Between 2 ohm and 8 ohm

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1. Assertion (A) : Longer wires have greater resistance and the smaller wires have lesser resistance.

Reason (R) : Resistance is inversely proportional to the length of the wire.

- 2. Assertion (A) :** Alloys are commonly used in electrical heating devices, like electrical iron, toasters etc.
Reason (R) : Alloys do not oxidise (burn) readily at high temperatures.
- 3. Assertion (A) :** When the resistances are connected end-to-end consecutively, they are said to be in series.
Reason (R) : In case the total resistance is to be increased, then the individual resistances are connected in series.
- 4. Assertion (A) :** When the resistances are connected between the same two points, they are said to be connected in parallel.
Reason (R) : In case the total resistance is to be decreased, then the individual resistances are connected in parallel.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. An electric iron of resistance 20Ω takes a current of 5 A. Calculate the heat developed in 30 s.
2. Why coils of electric toasters and electric irons are made of an-alloy rather than a pure metal?
3. State Ohms law.
4. What are the factors on which resistance of a conductor depends?
5. Why does the cord of an electric heater not glow while the heating element does?
6. Explain the use of an electric fuse. What type of material is used for fuse wire and why?
7. Work of 14 J is done to move 2 C charges between two points on a conducting wire. What is the potential difference between the two points?
8. Establish the relationship between 1 kWh and SI unit of energy (joule).
9. Two identical resistors are first connected in series and then in parallel. Find the ratio of equivalent resistance in these two cases.
10. Choices for the correct combination of elements from Column-I and column-II are given as options (a), (b), (c) and (d) select the correct combination?

Column-I	Column-II
(P) Current	1. ohm
(Q) Potential	2. ampere
(R) Resistance	3. ohm m
(S) Resistivity	4. volt

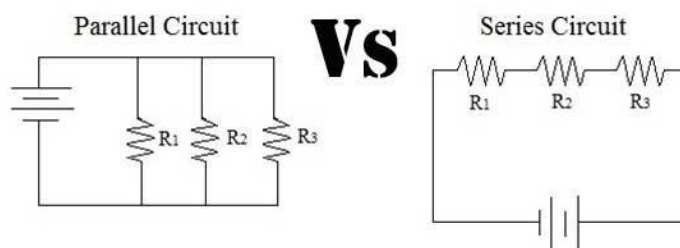
SHORT ANSWER QUESTIONS (3 MARKS)

1. How many 176 ohm resistors in parallel are required to carry 5 ampere in 220 volt line?
2. Show how you would connect three resistors, each of resistance 6 ohm, so that the combination has a resistance of i) 9 Ohm ii) 2 ohm.
3. Several electric bulbs designed to be used on a 220 volt electric supply line, are rated 10 watt. How many lamps can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 ampere?
4. Two lamps, one rated 100 watt 220 volt, and other 60W 220V are connected in parallel to the electric mains supply. What current is drawn from the line if the supply voltage is 220 volt?
5. Write the relation between resistance and electrical resistivity of the material of a conductor of length L and area of cross section A. Derive the SI unit of electrical resistivity.
6. What is electric power? An electrical device of resistance R is connected across a source of voltage V and draws a current I. Derive an expression for power in terms of current and resistance.
7. What is electrical resistivity? Derive its SI unit. In a series electrical circuit comprising a resistor made up of a metallic wire, the ammeter reads 100mA. If the length of the wire is doubled, how will the current in the circuit change? Justify your answer.
8. a) List the factors on which the resistance of a conductor in the shape of a wire depends.
b) Why are metals good conductors of electricity where is glass is a bad conductor of electricity? Give reason.
c) Why are alloys commonly used in heating devices? Give reason.
9. Calculate the total cost of running the following electrical devices in the month of September, if the rate of 1 unit of electricity is rupees 6.
 - a. Electric heater of 1000W for 5 hours daily.
 - b. Electric refrigerator off 400W for 10 hours daily.
10. Give reasons
 - a) Electric bulbs are not filled with air
 - b) Copper wires are employed for electricity transmission
 - c) The filament wire is a thin wire

LONG ANSWER QUESTIONS (5 MARKS)

1. A torch bulb is rated 2.5 V and 750 mA. Calculate
 - a) Its power,
 - b) Its resistance,
 - c) The energy consumed if this bulb is lighted for 4 hours.
2. In a household, an electric bulb of 100 W is used for 10 hours and an electric heater of 1000 W for 2 hours every day. Calculate the cost of using the bulb and the heater for 30 days, if the cost of one unit of electrical energy is two rupees.
3. a) Define power. Write its SI unit.
b) An electric motor takes 5A from a 220V line. Determine the power and the energy consumed in 2h.

- c) Which uses more energy, a 280W TV set in 1 hr, or a 1.2kW toaster in 15 min?
4. Explain the following.
- Why is the tungsten used almost exclusively for filament of electric lamps?
 - Why are the conductors of electric heating devices, such as bread-toasters and electric irons, made of an alloy rather than a pure metal?
 - Why is the series arrangement not used for domestic circuits?
 - How does the resistance of a wire vary with its area of cross-section?
 - Why copper and aluminium wires are usually employed for electricity transmission?
5. Study the following electrical circuits.



In the above parallel and series combination of resistors find out the equivalent resistance in each case if the values of R_1 , R_2 , R_3 are 10Ω , 20Ω and 30Ω respectively. Which one will you use in your domestic circuit? Why?

CASE BASED QUESTION (4 MARKS)

One of the wires in domestic circuit supply, usually with a red insulation cover, is called live wire. With black insulation is called neutral wire. The earth wire, which has insulation of green color, is usually connected to a metal plate deep in the earth near the house appliances that has a metallic body. Overloading contact, in such a situation the current in the circuit abruptly increases. Circuit prevents damage to the appliances and the circuit due to overloading.

- When do we say that an electrical appliance
- Mention the function of earth wire in electrical line
- How is an electric fuse connected in a domestic circuit?
- When overloading and short circuiting are said to occur?

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CHAPTER 12- MAGNETIC EFFECTS OF ELECTRICITY

MCQ

1. The magnetic field inside a long straight solenoid carrying current:
 - a. Is zero
 - b. Decreases as we move towards its end
 - c. Increases as we move towards its end
 - d. Is same at all points
2. A positively charged particle projected towards west is deflected towards north by a magnetic field. The direction of magnetic field is:
 - a) Towards south
 - b) Towards east
 - c) Downward
 - d) Upward
3. Which of the following correctly describes the magnetic field near a long straight wire?
 - a) The field consists of straight lines 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.
4. The phenomenon of electromagnetic induction is:
 - a) The process of charging a body
 - b) the process of generating magnetic field due to a current passing through a coil
 - c) producing induced current in a coil due to relative motion between a magnet and the coil
 - d) The process of rotating a coil of an electric motor
5. The device used for producing electric current is called is a:
 - a) Generator
 - b) Galvanometer
 - c) Ammeter
 - d) Motor
6. The essential difference between an AC generator and DC generator is that
 - a) AC generator has an electromagnet while a DC generator has permanent magnet
 - b) DC generator will generate a higher voltage
 - c) AC generator will generate a higher voltage
 - d) AC generator has slip rings while the decision narrator has a commutator
7. At the time of short circuit, the current in the circuit:
 - a) Reduces substantially
 - b) Does not change
 - c) Increases heavily
 - d) Varies continuously
8. Choose the correct statement from the following regarding magnetic lines of field:
 - a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points.
 - b) Magnetic field lines are closed curves.
 - c) If magnetic field lines are parallel and equidistant, they represent zero field strength.
 - d) relative strength of magnetic field is shown by the degree of closeness of the field lines.
9. For a current in a long straight solenoid, North and South 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 indicate 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 North and South poles exchange positions when the direction of current through the solenoid is reversed.
10. Commercial electric motor do not use:
- a) An electromagnet to rotate the armature
 - b) Effectively large number of turns of conducting wire in the current carrying coil
 - c) A permanent magnet to rotate the armature
 - d) Is soft iron core on which the coil is wound
11. Choose the correct statement:
- a) Fleming's right hand rule is a simple rule to know the direction of induced current
 - b) The right hand thumb rule is used to find the direction of magnetic fields due to current carrying conductors
 - c) The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas alternating current reverses its direction periodically
 - d) In India the AC changes direction after every $1/50$ second
12. The strength of magnetic field inside a long current carrying straight solenoid is:
- a) More at the ends than at the centre
 - b) Minimum in the middle
 - c) Same at all points
 - d) Found to increase from one end to the other
13. To convert an AC generator to DC generator:
- a) Split ring type of commutator must be used
 - b) Slip rings and brushes must be used
 - c) A stronger magnetic field is to be used
 - d) A rectangular wire loop has to be used
14. The most important safety method used for protecting home appliances from short circuiting and overloading is:
- a) Earthing
 - b) Use of fuse
 - c) Use of stabilizers
 - d) Use of electric meter
15. When a charged particle moves perpendicular to a magnetic field, then:
- a) Speed of the particle is changed
 - b) Speed of the particle remains unchanged
 - c) Direction of the particle remains unchanged
 - d) Acceleration of the particle remains unchanged

ASSERTION - REASON TYPE QUESTION

Following 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 but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true

1. **Assertion (A):** On changing the direction of flow of current through a straight conductor, the direction of a magnetic field around the conductor is reversed.
Reason (R) : The direction of magnetic field around a conductor can be given in accordance with left hand thumb rule.
2. **Assertion (A):** The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is inversely proportional to the current flowing through the solenoid.
Reason (R): The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.
3. **Assertion (A):** A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of an electric current in the wire is increased.
Reason (R): Strength of a magnetic field at a point near the conductor increases on increasing the current.
4. **Assertion (A) :** A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the compass needle is displaced away from the wire.
Reason (R): Strength of a magnetic field decreases as one moves away from a current carrying conductor.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. What is meant by magnetic field?
2. Draw magnetic field lines around a bar magnet. Name the device which is used to draw magnetic field lines.
3. When is the force experienced by a current carrying conductor placed in a magnetic field greatest?
4. What is the pattern of field lines inside a solenoid? What do they indicate?
5. What precautions should be taken to avoid the overloading of domestic electric circuit?
6. Why don't two magnetic lines of force intersect each other?
7. Suggest one way to distinguish a wire carrying current from a wire carrying no current.
8. Explain why magnetic field lines are closed curves?
9. Name two safety measures commonly used in electric circuits and appliances.

SHORT ANSWER QUESTIONS (3 MARKS)

2. A coil of insulated copper wire is connected to a galvanometer. What would happen if a strong bar magnet is:
 - a) used into the coil
 - b) Withdrawn from the coil.
 - c) Held stationary inside the coil?

Give justification for each observation.

3. Two circular coils p and q are kept close to each other, of which coil p carries a current. What will you observe in the galvanometer connected across the coil q,
 - a) If the current in the coil is changed?
 - b) If both the coils are moved in the same direction with the same speed?

Give reason to justify your answer in each case

4. Name the electrical device that converts mechanical energy into electrical energy. Draw the labelled diagram and explain the principle involved in this device.
5. I) what is the function of earth wire in electrical instruments?
II) Explain what is short circuiting in an electric supply?
III) What is the usual current rating of the fuse wire in the line to feed?
 - b) Lights and fans b) appliances of 2 kilowatt or more?
6. The following diagram shows two parallel straight conductors carrying same current. Copy the diagram and draw the pattern of the magnetic field lines around them

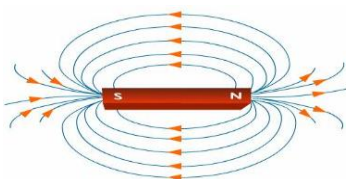
Showing their  directions. What is the magnitude of magnetic field at a point X which is equidistant from the conductors? Give justification for your answer.

LONG ANSWER QUESTIONS (5 MARKS)

1. List two characteristics of the material to be used in fuse wire. Name the material it is made of. A fuse is always connected in series in an electric circuit Justify this statement giving reason.
2. State the rule to determine the direction of a
 - a) magnetic field produced around a straight conductor carrying current.
 - b) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it and
 - c) current induced in coil due to its rotation in a magnetic field.
3. Give scientific reasons:
 - a) Alternative current used in domestic circuit.
 - b) We must not use many electrical appliances simultaneously.
 - c) A fuse with defined rating for an electric circuit should not be replaced by one with a larger rating.
4. Draw the pattern of magnetic field lines of a current carrying solenoid. What does the pattern of field lines inside the solenoid indicate? Write one application of magnetic field of current carrying solenoid.
5. a) What is an electromagnet?
 - b) List any of its two uses.
 - c) What is the purpose of the soft iron core used in making an electromagnet?

CASE BASED QUESTION (4 MARKS)

The region around a magnet where magnetism acts is represented by the magnetic field. The force of magnetism is due to moving charge or some magnetic material. Like stationary charges produce an electric field proportional to the magnitude of charge, moving charges produce magnetic fields proportional to the current. In other words, a current carrying conductor produces a magnetic field around it. The subatomic particles in the conductor, like the electrons moving in atomic orbitals, are responsible for the production of magnetic fields. The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire.



1. The magnetic field associated with a current carrying straight conductor is in anti-clockwise direction. If the conductor was held horizontally along east west direction, what is the direction of current through it?
2. Name and state the rule applied to determine the direction of magnetic field in a straight current carrying conductor.
3. Ramus performs an experiment to study the magnetic effect of current around a current carrying straight conductor with the help of a magnetic compass. He reports that
 - a) The degree of deflection of magnetic compass increases when the compass is moved away from the conductor.
 - b) The degree of deflection of the magnetic compass increases when the current through the conductor is increased.Which of the above observations of the student appears to be wrong and why?
4. What type of field is produced by stationary and moving charges respectively?

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CHAPTER 13- OUR ENVIRONMENT

MCQ

1. Which one of the following is an artificial ecosystem?
 - a) Pond
 - b) Crop field
 - c) Lake
 - d) Forest
2. In a food chain, the third trophic level is always occupied by
 - a. Carnivores
 - b. Herbivores
 - c. Decomposers
 - d. Producers
3. In ecosystem includes
 - a. All living organisms
 - b. Non living objects
 - c. Both living organisms and non living objects
 - d. Sometimes living organisms and sometimes non living objects
4. In the given food chain, suppose the amount of energy at 4th trophic level is 5 kilo joule, what will be the energy available at the producer level?
Grass-----grasshopper-----frog-----snake-----hawk
 - a. 5 kilo joule
 - b. 50 kilo joule
 - c. 500 kilojoule
 - d. 5000 kilo joule
5. Accumulation of Non biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as
 - a. Eutrophication
 - b. Pollution
 - c. Biomagnifications
 - d. Accumulation
6. Depletion of ozone is mainly due to
 - a. Chloro fluoro carbon compounds
 - b. Carbon monoxide
 - c. Methane
 - d. Pesticides
7. Organisms which synthesise carbohydrates from inorganic compounds using radiant energy are called Eid

- a. Decomposers
 - b. Producers
 - c. Herbivores
 - d. Carnivores
8. In an ecosystem, the 10% of energy available for transfer from one trophic level to the next is in the form of
- a. Heat energy
 - b. Light energy
 - c. Chemical energy
 - d. Mechanical energy
9. Organisms of a higher trophic level which feed on several types of organisms belonging to a lower trophic level constituted the
- a) Food web
 - b) Ecological pyramid
 - c) Ecosystem
 - d) Food chain
10. Flow of energy in an ecosystem is always
- a) Unidirectional
 - b) Bidirectional
 - c) Multi directional
 - d) No specific direction
11. Excessive exposure of humans to UV rays results in
- i. Damage to immune system
 - ii. Damage to lungs
 - iii. Skin cancer
 - iv. Peptic ulcer
- a) i) and ii)
 - b) ii) and iv)
 - c) i) and iii)
 - d) iii) and iv)
12. In the following groups of materials, which group (s) contents only Non-biodegradable items?
- i) Wood, paper, leather
 - ii) Polythene, detergent, PVC
 - iii) Plastic, detergent, grass
 - iv) Plastic, bakelite, DDT
- a) iii)
 - b) Iv)
 - c) i) and iii)
 - d) ii) and iv)
13. Which of the following limits the number of trophic levels in a food chain
- a) Decrease in energy at higher trophic levels

- b) Deficient food supply
- c) Polluted air
- d) Water

14. Which of the statement is incorrect?

- a) All green plants and blue green algae are producers.
- b) green plants get their food from organic compounds.
- c) Producers prepare their own food from inorganic compounds.
- d) Plants convert solar energy into chemical energy.

15. Which group of organisms are not constituents of a food chain?

- i) Grass, lion, rabbit, wolf
 - ii) Plankton, man, fish, grasshopper
 - iii) Wolf, grass, snake, tiger
 - iv) Frog, snake, eagle, grass, grasshopper
- a) i) and iii)
 - b) iii) and iv)
 - c) ii) and iii)
 - d) i) and iv)

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1. **Assertion (A):** Polythene bags and plastic containers are non-biodegradable substances.
Reason(R): They can be broken down by microorganisms in natural simple harmless substances.
2. **Assertion (A):** The concentration of harmful chemicals is least in human beings.
Reason(R): Man is at the apex of the food chain.
3. **Assertion (A):** Ozone is formed in upper atmosphere by O₂ in presence of UV radiations.
Reason(R): Ozone depletion will lead to UV rays reaching earth which may cause skin cancer.
4. **Assertion (A):** Aquarium needs regular cleaning
Reason(R): There are no microbes to clean water in aquarium, therefore, it needs to be regularly cleaned.

VERY SHORT ANSWER QUESTIONS (2 MARKS)

1. Why is improper disposal of waste a curse to environment?
2. Write the common food chain of a pond ecosystem.

3. What are the advantages of carrying cloth bags over plastic bags during shopping?
4. Why are crop fields known as artificial ecosystems?
5. Explain "Biological Magnification" with the help of an example.
6. What is ozone? How is it formed?
7. List two reasons to show that the existence of decomposers is essential in an ecosystem.
8. Why a food chain should have limited trophic levels?
9. Which two steps can we take for managing the garbage we produce in our homes?
10. What is the role of decomposers in the ecosystem?

SHORT ANSWER QUESTIONS (3 MARKS)

1. How can you help in reducing the problem of waste disposal? Write any two methods.
2. With the help of an example of a food chain, prove that the flow of energy in the biosphere is unidirectional.
3. What are decomposers? State the role of decomposers in the environment.
4. How is ozone both beneficial and damaging? How can we prevent the damaging effect of ozone?
5. How can we help in reducing the problem of waste disposal? Suggest any three methods.
6. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem.
7. a) Natural water bodies are not regularly cleaned whereas an aquarium needs regular cleaning. Why?
b) What are decomposers? What will be the consequence if the decomposers are completely eradicated from the ecosystem? Give justification.
8. How is ozone formed in the upper atmosphere? State its importance. What is responsible for its depletion? Write one harmful effect of ozone depletion.
9. What is a food chain? Why is flow of energy unidirectional in an ecosystem?

LONG ANSWER QUESTIONS (5 MARKS)

1. a) Why do food chains in an ecosystem do not have more than 4 to 5 trophic levels?
b) How much energy flows from one trophic level to next in a food chain?
2. a) Identify which one of the following would have a hazardous impact if they persist in the environment for a long time.
Newspaper, vegetable peels, pesticides, waste from cattle shed.
b) Phytoplanktons → Zooplanktons → Fish → Fish eating birds.
In the above food chain, which organisms will have
i) maximum available energy?
ii) maximum concentration of pesticides? Name the phenomenon associated with it. Define the phenomenon.

3. "Energy flow in food chains is always unidirectional." Justify this statement. What is a food web?
4. a) What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules ?
b) Classify the following ecosystems into natural and artificial ecosystem.
Forest ecosystem, aquarium, marine ecosystem, cropland ecosystem
5. a) What is an ecosystem? List its two main components. Why do we not clean ponds or lakes but an aquarium needs to be cleaned regularly-Why?
b) What is ozone ? How and where is it formed in the atmosphere ? Explain how does it affect an ecosystem.

CASE BASED QUESTION (4 MARKS) (Case Study 1)

In any given ecosystem, all living organisms are linked in a systematic chain with respect to their mode of manufacturing food/feeding habits. This sequential interlinking of organisms involving the transfer of food energy from producers through a series of organisms with repeated eating and being eaten is called the food chain. A food chain may have 3-4 trophic levels.

1. Which of the following statements regarding the food chain is incorrect?
(a) It is a single straight pathway through which food energy travels in the ecosystem.
(b) It adds adaptability and competitiveness to the organisms.
(c) Presence of isolated food chains adds to the instability of the ecosystem.
(d) Food chain binds up the inorganic nutrients of the ecosystem.
2. Select the correct food chain.
(a) Aquatic plants → Tadpole → Water beetle → Pike → Perch
(b) Grass → Grasshopper → Snake → Frog → Eagle
(c) Grass → Rabbit → Wild cat → Tiger
(d) Zooplankton → Phytoplankton → Small fish → Fish
3. Draw a food chain with three trophic levels.

(OR)

What is food web?

CASE STUDY 2

An ecosystem may be defined as a structural and functional unit of the biosphere comprising living organisms and their non-living environment which interact by means of food chains and biogeochemical cycles resulting in energy flow, biotic diversity, and material cycling to form a stable, self-supporting system.

1. The two basic processes involved in an ecosystem are :
(a) cycling of materials and food chains
(b) energy flow and self-sustainability
(c) carbon cycle and biotic diversity
(d) cycling of materials and flow of energy

2. Which among the following is not an artificial ecosystem?
(a) Orchard
(b) Lake
(c) Aquarium
(d) Cropland
3. What is the role of fungi and bacteria in an ecosystem?
(OR)

What would be one of the likely results be if all decomposers in a particular ecosystem were wiped out?

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