



केंद्रीय विद्यालय संगठन
आगरा संभाग

KENDRIYA VIDYALAYA SANGATHAN
AGRA REGION



विज्ञान
SCIENCE

कक्षा – 10
CLASS- X

(सत्र 2026-27)
(SESSION 2026-27)

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विद्यार्थी सहायक सामग्री

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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – I

CHEMICAL REACTION & EQUATIONS

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A		
1.	Which observation does <i>not</i> indicate a chemical reaction? A) Change in temperature B) Change in colour C) Evaporation of water D) Evolution of gas	1
2.	The reaction $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ is a... A) Displacement B) Combination C) Decomposition D) Double displacement	1
3.	Heating CaCO_3 results in... A) Decomposition B) Neutralisation C) Displacement D) Combination	1
4.	Which of the following is a balanced chemical equation? A) $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{O}_2$ B) $\text{NaNO}_3 \rightarrow \text{NaNO}_2 + \text{O}_2$ C) $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ D) $\text{Al}_2\text{CO}_3 \rightarrow \text{Al}_2\text{O}_3 + \text{CO}_2$	1

5.	Identify the oxidizing agent in the reaction given below $\text{H}_2\text{S} + \text{I}_2 \rightarrow 2\text{HI} + \text{S}$ A) I_2 B) H_2S C) HI D) S	1
6.	Which reaction is different from the others? A) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$ B) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$ C) $\text{KNO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{KHSO}_4 + \text{HNO}_3$ D) $\text{ZnCl}_2 + \text{H}_2\text{S} \rightarrow \text{ZnS} + 2\text{HCl}$	1
7.	Identify the type of reaction $\text{Zn} + 2\text{CH}_3\text{COOH} \rightarrow \text{Zn(CH}_3\text{COO)}_2 + \text{H}_2$ A) Decomposition B) Displacement C) Double displacement D) Combination	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Rusting of iron is a redox reaction. Reason (R): In rusting, iron is oxidised to $\text{Fe}^{2+}/\text{Fe}^{3+}$ and oxygen is reduced in presence of water.	1
9.	Assertion (A): The reaction between AgNO_3 solution and NaCl solution produces a white precipitate of AgCl . Reason (R): This reaction is combination reaction.	1
10.	Balance the equation: $\text{Al} + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2$.	2
11.	What is a precipitation reaction? Explain with one example.	2

12.	Write the balanced equation for heating ferrous sulphate crystals. State the type of reaction.	2
13.	Write the balanced equations for: (a) When hydrogen gas is passed over heated copper oxide (b) Reaction of Na_2SO_4 with BaCl_2 (c) Natural gas burns in air to form carbon dioxide.	3
14.	Explain redox reaction with the help of the example given here $\text{ZnO} + \text{C} \longrightarrow \text{Zn} + \text{CO}$	3
15.	Iron articles such as railings, bridges, or gates when exposed to moist air for a long time develop a reddish-brown flaky substance on the surface. This is called rust. Rusting is a slow oxidation reaction involving both oxygen and water. The presence of electrolytes like salts (in coastal areas) speeds up rusting. Answer the following questions: a) Write the chemical reaction for rusting of iron. b) Why does rusting take place faster in coastal regions? c) Mention two methods to prevent rusting. d) Identify the type of reaction involved in rusting.	4
16.	Define chemical reaction. Explain how the following Observations show chemical change: (i) Change in colour (ii) Evolution of gas (iii) Change in temperature Give one example for each.	5
Section B		
17.	Which of the following is a redox reaction but <i>not</i> a combination reaction? A) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ B) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ C) $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ D) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$	1
18.	$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$. This reaction is... A) Exothermic + Combination B) Endothermic + Decomposition C) Exothermic + Decomposition	1

	D) Endothermic + Combination	
19.	When KI and $\text{Pb}(\text{NO}_3)_2$ are mixed, the correct balanced equation is: A) $\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI} + \text{KNO}_3$ B) $2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI}_2 + 2\text{KNO}_3$ C) $\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI}_2 + \text{KNO}_3$ D) $\text{KI} + \text{PbNO}_3 \rightarrow \text{PbI}_2 + \text{KNO}_3$	1
20.	The emission of brown fumes (NO_2) during heating $\text{Pb}(\text{NO}_3)_2$ is due to... A) Thermal decomposition producing NO_2 B) Oxidation forming lead oxide C) Reduction of nitric acid D) Combination with oxygen	1
21.	Passing CO_2 through limewater turns it milky, then clear—why? A) Calcium carbonate forms, then dissolves in excess CO_2 B) Calcium hydrogen carbonate forms directly C) Limewater reacts to form NaHCO_3 D) Physical change in solution only	1
22.	When magnesium ribbon burns in air, it produces... A) MgO (white) via combination reaction B) MgCO_3 (green) via decomposition C) Mg_2O_2 (black) via displacement D) MgOH_2 (blue) via redox	1
23.	Identify the type of reaction..... $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$? A) Displacement B) Endothermic C) Exothermic D) Neutralisation	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A): Photosynthesis is an endothermic reaction. Reason (R): In this process, light energy is released in the form of heat.	1

25.	Differentiate between exothermic and endothermic reactions with examples.	2
26.	State the observations when: (a) Lead nitrate is heated (b) CO ₂ is passed through lime water (c) A piece of zinc is dropped into HCl.	3
27.	Differentiate between displacement and double displacement reactions with one example each.	3
28.	Decomposition reactions are widely used in industries. For example, heating of calcium carbonate produces lime (CaO) which is used in cement industry. Electrolysis of water produces hydrogen (used as fuel) and oxygen. Silver chloride, when exposed to sunlight, decomposes to silver and chlorine, and this property is used in black-and-white photography. Answer the following questions: a) Write the balanced chemical equation for decomposition of CaCO ₃ . b) Name the type of energy required for decomposition of AgCl. c) Why does silver chloride turn grey in sunlight? d) Give one industrial application of a decomposition reaction.	4
29.	Explain the terms with examples: i) Corrosion. ii) Rancidity. Oils and fats containing food items are flushed to with nitrogen why?	5
Section C		
30.	When yellow silver bromide is kept in sunlight then it turns grey. This is an example of... A) Decomposition reaction B) Combination reaction C) Displacement reaction D) Redox reaction	1
31.	Balanced coefficients for $\text{Al}_2\text{O}_3 + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2\text{O}$ are... A) 1, 6, 2, 3 B) 1, 6, 3, 2 C) 2, 6, 2, 3 D) 2, 6, 3, 2	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given	

	below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
32.	Assertion (A): Decomposition of CaCO_3 into CaO and CO_2 is a thermal decomposition reaction. Reason (R): Heat energy is absorbed during the decomposition of calcium carbonate.	1
33.	A student burns magnesium ribbon in oxygen. Write the observation, chemical equation and type of reaction.	2
34.	A green coloured hydrated metallic salt on heating loses water of crystallisation molecules and gives a gas with suffocating smell. Identify the salt and write the chemical equation for the reaction.	2
35.	"We need to balance a skeletal chemical equation." Give reason to justify the statement.	3
36.	You might have noticed that when copper powder is heated in a China dish, the reddish brown surface of the copper powder gets coated with a black substance. (a) What is this black substance and why is this black substance formed? (b) Write the chemical equation of the reaction that takes place. (c) How can the black coating on the surface be turned reddish brown?	3
37.	During the electrolysis of water (a) Name the gas collected at the cathode and anode respectively. (b). Why is volume of gas collected at one electrode double than that at the other? Name this gas. (c) How will you test this gas?	3
38.	When an iron nail is dipped in copper sulphate solution, the blue colour of the solution fades and a reddish-brown deposit forms on the nail. This happens because iron is more reactive than copper and displaces copper from its salt solution. Such reactions are used in metallurgy and in galvanic cells. Answer the following questions:	4

	a) Write the balanced chemical equation for this reaction. b) What change in colour is observed in the solution? c) Name the type of reaction. d) Why does iron displace copper from copper sulphate solution but not vice versa?	
39.	With suitable examples, explain the role of heat, light, and electricity in decomposition reactions.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – II

ACID BASES AND SALTS

Max. Marks: 80

Time Allowed: 3 hours

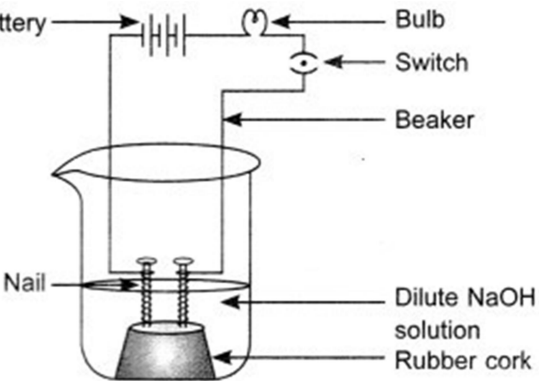
General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A		
1.	Which of the following is a mineral acid? A. Acetic acid B. Citric acid C. Sulphuric acid D. Tartaric acid	1
2.	Which gas is released when dilute HCl reacts with zinc granules? A. Oxygen B. Hydrogen C. Carbon dioxide D. Nitrogen	1
3.	Which of the following substances turns red litmus blue? A. Vinegar B. Lemon juice C. Baking soda solution D. Dilute HCl	1
4.	The acid present in curd is: A. Acetic acid B. Lactic acid C. Formic acid D. Tartaric acid	1
5.	Which salt is used in the manufacture of glass and soap?	1

	A. Baking soda B. Washing soda C. Common salt D. Bleaching powder	
6.	Tooth decay starts when the pH of the mouth is: A. Above 7 B. 7 C. Below 5.5 D. 9	1
7.	Dry HCl gas does not change the colour of litmus paper because: A. It is neutral B. It has no H ⁺ ions in gaseous state C. It has no Cl ⁻ ions D. It is weak acid	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Solutions of acids conduct electricity. Reason (R): Acids in aqueous solution produce ions.	1
9.	Assertion (A): Acids must always be added slowly to water with constant stirring when dissolving them. Reason (R): Dissolving an acid or base in water is a highly exothermic process.	1
10.	Write two differences between acids and bases.	2
11.	A student adds dilute HCl to zinc granules in a test tube. (i) Write the chemical reaction. Name the gas evolved and give a test to identify it.	2
12.	Why does dry HCl gas not change the colour of dry litmus paper, while an aqueous solution of HCl does?	2
13.	What is a universal indicator? How does it help in determining the strength of an acid or base?	3
14.	Explain the preparation of washing soda from baking soda. Write the chemical equations involved.	3

15.	Read the following passage and answer the questions: Toothpaste is basic in nature and helps neutralize the acid produced by bacteria in the mouth. This prevents tooth decay. a) Why is toothpaste basic? b) What is the role of pH in tooth decay? c) What is the ideal pH range for healthy teeth? d) Name one acid responsible for tooth decay.	4
16.	Write the following chemical reactions with suitable examples. - acid with metals - acid with metal oxides - acid with carbonates - bases with metal - Neutralisation reaction	5
Section B		
17.	Plaster of Paris is chemically: A. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ B. $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ C. CaCO_3 D. CaO	1
18.	Which one of the following salts does not contain water of crystallisation? (a) Blue vitriol (b) Baking soda (c) Washing soda (d) Gypsum	1
19.	What happens when a solution of an acid is mixed with a solution of a base in a test tube? (i) Temperature of the solution decreases (ii) Temperature of the solution increases (in) Temperature of the solution remains the same (iv) Salt formation takes place (a) (i) and (iv) (b) (i) and (iii) (c) (ii) only (d) (ii) and (iv)	1
20.	When hydrogen chloride gas is prepared on a humid day, the gas is usually passed	1

	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 Cl^- ions from the evolved gas	
21.	Tomato is a natural source of which acid? (a) Acetic acid (b) Citric acid (c) Tartaric acid (d) Oxalic acid	1
22.	Sodium carbonate is a basic salt because it is a salt of a (a) strong acid and strong base (b) weak acid and weak base (c) strong acid and weak base (d) weak acid and strong base	1
23.	The apparatus given in the adjoining figure was set up to demonstrate electrical conductivity.  Which of the following statement is correct? (i) Bulb will not glow because electrolyte is not acidic. (ii) Bulb will glow because NaOH furnishes ions for conduction. (iii) Bulb will not glow because circuit is incomplete. (iv) Bulb will not glow because it is difficult to conduct electricity in a solution.	1
	The following question consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A.	

	B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A) : Weak acids have low electrical conductivity. Reason (R) : Strong acids and weak acids have equal concentration of hydrogen ions in their solutions.	1
25.	A milkman adds a very small amount of baking soda to fresh milk. Why is it done? What effect does it have on the milk?	2
26.	What is plaster of Paris? Write its chemical formula. How is it prepared? Mention its uses.	3
27.	For making cake, baking powder is taken. If at home someone uses baking soda instead of baking powder in cake, 1. how will it affect the taste of the cake and why? 2. how can baking soda be converted into baking powder? 3. Write chemical name and formula of baking soda.	3
28.	Read the following passage and answer the questions: Many factories release acidic waste, including sulfuric and nitric acids, into nearby rivers and lakes. These acids are highly corrosive and dangerous for aquatic organisms. Acidic water can destroy fish eggs, damage gills, and disrupt entire aquatic ecosystems. a) What effect does acidic waste have on aquatic life? b) How can this waste be neutralized before disposal? c) Name one base used for neutralization. d) What is the environmental importance of maintaining pH balance?	4
29.	(a) Write the chemical formula, chemical name and uses of the following. Write chemical reaction to prepare it also. bleaching powder (b) Write the chemical formula, chemical name and and uses of the following caustic soda	5
Section C		
30.	Alkalis are (a) acids, which are soluble in water (b) acids, which are insoluble in water	1

	(c) bases, which are insoluble in water (d) bases, which are soluble in water	
31.	Brine is an (a) aqueous solution of sodium hydroxide (b) aqueous solution of sodium carbonate (c) aqueous solution of sodium chloride (d) aqueous solution of sodium bicarbonate	1
	The following question consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. A is false but R is true.	
32.	Assertion (A): The aqueous solutions of glucose and alcohol do not show acidic character. Reason (R): Aqueous solutions of glucose and alcohol do not give H ⁺ ions.	1
33.	Name two synthetic indicators and their action with acid and base.	2
34.	Write balanced chemical equations for the following: (a) Sodium carbonate reacts with hydrochloric acid. (b) Calcium hydroxide reacts with carbon dioxide.	2
35.	What is the role of the stomach's pH in digestion? What happens when this pH changes abnormally?	3
36.	What is water of crystallization? Give two examples of salts containing water of crystallization.	3
37.	What is the similarity between Acids and Bases? Write any three.	3
38.	Four solutions were tested with universal indicator. Their pH values were found to be 2, 4, 7 and 9. (a) Which solution is strongly acidic? (b) Which one is neutral? (c) Which solution is weakly basic? (d) Arrange the solutions in increasing order of hydrogen ion	4

39.	(a) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid? (b) Why do HCl, HNO₃, etc., show acidic characters in aqueous solutions while solutions of compounds like alcohol and glucose do not show acidic character?	5
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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – III

METAL AND NON METALS

Max. Marks: 80

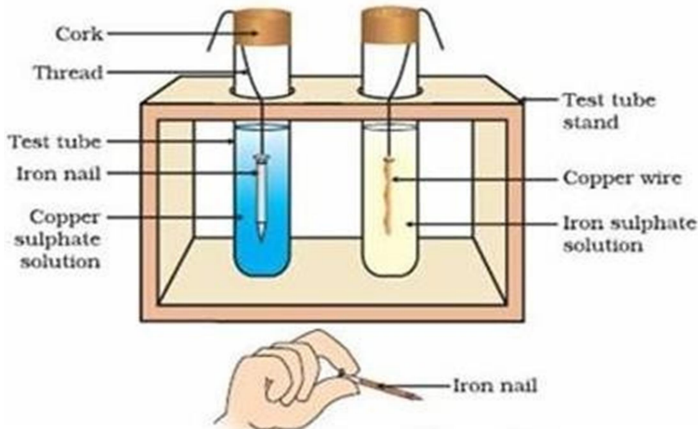
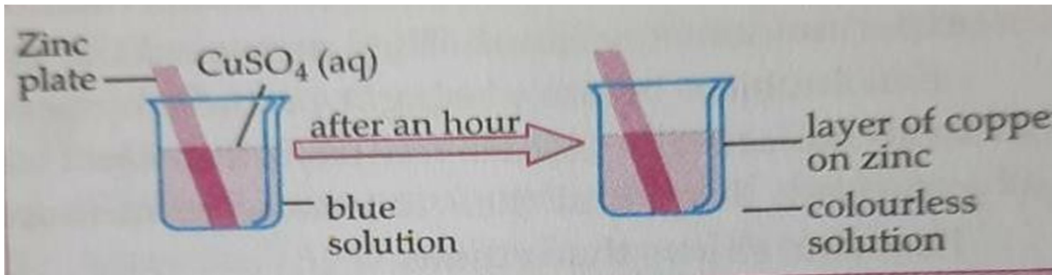
Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

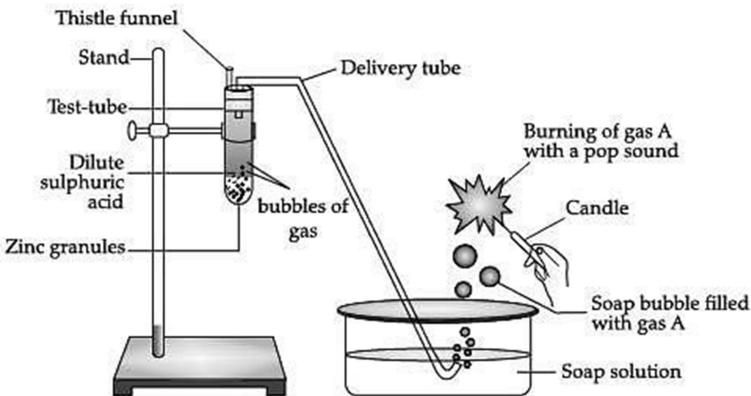
Section A		
1.	Galvanisation is a method of protecting iron from rusting by coating with a thin layer of (a) Galium (b) Aluminium (c) Zinc (d) Silver	1
2.	Silver articles become black on prolonged exposure to air. This is due to the formation of (a) Ag ₃ N (b) Ag ₂ O (c) Ag ₂ S (d) Ag ₂ S and Ag ₃ N	1
3.	An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following (a) Mg (b) Na (c) P (d) Ca	1
4.	Reaction between X and Y forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?	1

	A. Has high melting point B. Has low melting point C. Conducts electricity in molten state D. Occurs as solid	
5.	Which property of solder makes it suitable for welding electrical wires? A. Poor Conducting power B. Low melting point C. Ductility D. High melting point	1
6.	Roasting of zinc ore is correctly represented by which of the following reaction equation A. $2 \text{ZnS} + \text{O}_2 \rightarrow 2 \text{ZnO} + 2 \text{SO}_2$ B. $2 \text{ZnS} + 3 \text{O}_2 \rightarrow 2 \text{ZnO} + 2 \text{SO}_2$ C. $\text{ZnS} + 3 \text{O}_2 \rightarrow 2 \text{ZnO} + 2 \text{SO}_2$ D. $\text{ZnS} + 3 \text{O}_2 \rightarrow 2 \text{ZnO} + \text{SO}_2$	1
7.	Which of the following is the best conductor of heat? (a) Gold (b) Platinum (c) Silver (d) Lead	1
	Question No. 8, 9 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion (b) Assertion and the Reason are correct but the reason is not the correct explanation of assertion. (c) Assertion is true but the Reason is false (d) The statement of the Assertion is false but the Reason is true.	
8.	Assertion: Property of beating metal into sheets is known as malleability Reason: Metals are brittle in nature.	1
9.	Assertion: Zn is used in the galvanization of Fe Reason: Coating of Zinc on iron articles increases their life by protecting iron from rusting.	1

10.	Give Two examples of metals that are good conductor and poor conductor of heat and Electricity.	2
11.	Compound X and Aluminium are used to join the railway tracks. Identify the X and name this reaction. Write down its reaction	2
12.	Write two properties of ionic compounds.	2
13.	 Observe the above activity and answer the following question. What is the name of reaction taking place here? In which test tube no reaction will take place and why?	3
14.	Write chemical equations for the following: - Reaction between Aluminium and oxygen. - Reaction of potassium with cold water. - Reaction of Iron with water.	3
15.	Case based question Reena immersed a zinc plate in an aqueous solution of copper sulphate. She noticed a thick layer of copper on the surface of the zinc plate after an hour.  - State the reason of the formation of the colourless solution. Also mention the chemical formula of the colourless solution. - What should Reena have done to make the reaction faster? - No reaction takes place when a copper plate immersed in an aqueous solution of zinc	4

	sulphate. Explain the reason behind this.	
16.	A metal 'M' is stored under kerosene. It vigorously catches fire, if small piece of this metal is kept open in air. Dissolution of this metal in water releases great amount of energy and the metal catches fire. The solution so formed turns red litmus to blue. A. Name the metal. B. Why is metal 'M' stored under kerosene? C. Write the formula of the compound formed when this metal is exposed to air. Show the formation of this compound by transfer of electron.	5
Section B		
17.	The constituent of haemoglobin is (a) Iron (b) Sodium (c) Copper (d) Magnesium	1
18.	Cinnabar is an ore of (a) Mercury (b) Copper (c) Calcium (d) Lead	1
19.	Which of the following metals are extracted by electrolysis of their molten state (i) Fe (ii) K (iii) Na (iv) Au A. (i) and (ii) B. (i) and (iii) C. (ii) and (iii) D. (iii) and (iv)	1
20.	Which of the following metal loses its shine and gains a green colour coating if it is kept in open air? (a) Cu (b) Fe (c) Ag (d) Al	1
21.	Metals react with dilute acids to give A. Salt and water B. Salt and hydrogen gas	1

	C. Salt and carbon dioxide gas D. Salt, water and carbon dioxide gas	
22.	The correct arrangement of metals Mg, Zn, Fe and Al in decreasing order of their reactivity with dilute acids is: A. $\text{Al} > \text{Mg} > \text{Zn} > \text{Fe}$ B. $\text{Al} > \text{Mg} > \text{Fe} > \text{Zn}$ C. $\text{Mg} > \text{Al} > \text{Zn} > \text{Fe}$ D. $\text{Mg} > \text{Al} > \text{Fe} > \text{Zn}$	1
23.	Which of the following represents an electronegative element (a) 2,8 (b) 2,7 (c) 2,8,2 (d) 2,8,1	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
24.	Assertion: Iron displaces Silver from the silver nitrate solution Reason: Silver is more reactive than Iron.	1
25.	What are Amphoteric Oxides? Give two examples	2
26.	A student has been collecting silver coins and copper coins. One day, she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings. How are these coatings formed?	3
27.	Usually, hydrogen gas is not evolved when metals react with nitric acid. Why? Name two metals which when react with nitric acid and produce hydrogen gas	3
28.	Case based question One of the important method of refining is electrolysis. In electrolysis, electrical energy is used to bring about non-spontaneous redox reaction. This is done by the passing of electric current through liquid containing ions, known as electrolyte. The current in electrolytes is carried by the movement of ions rather than movement of	4

	electrons. The solid conductors inserted into liquid are called electrodes, the one with positive charge is called anode and the one with negative charge is called cathode. 1-Mention the name of two metals whose refining is done by electrolysis. 2-Distinguish between electrolytic reduction and electrolytic refining 3-What is meant by anode mud? 4- Name the electrode where the pure metal gets deposited during electrolytic refining.	
29.	I. What are the process for the extraction of metals which are low in reactivity series? II. What is meant by Roasting? III. Give one example of extracting metals low in reactivity series. IV. In which form does metals of low activity series occur in the earth crust?	5 (1,1, 2,1)
Section C		
30.	Identify gas A in in the given experiment  a) Nitrogen b) Hydrogen c) Oxygen d) Carbon dioxide	1
31.	A non-metal used to preserve food material is: a) Carbon b) Phosphorus c) Sulphur d) Nitrogen	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion	

	B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
32.	Assertion: Electrovalency of Mg is +2 Reason: Number of electrons which atom either lose or gain to form an ionic bond is known as its valency.	1
33.	What is an alloy? Write its importance. Name two alloys	2
34.	How is magnesium chloride formed by the transfer of electrons?	2
35.	An element A burns with golden flame in the air. It reacts with another element B, atomic number 17, to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also, write down the equations for the reactions involved	3
36.	Define the following terms: (i) Mineral (ii) Ore (iii) Gangue	3
37.	When a metal X is treated with cold water, it gives a basic salt Y with the molecular formula XOH (Molecular mass = 40) and liberates a gas Z which easily catches fire. Identify X, Y and Z and also write the reaction involved.	3
38.	Case based question Metals possess distinct physical properties that make them essential in everyday life. They are typically lustrous, giving them a shiny appearance used in jewellery and decoration. Most metals are malleable and ductile. They also have high density and melting points. Additionally, metals are excellent conductors of heat and electricity. Metals are sonorous also. (a) You are provided with coal, wood and iron. Which item should be selected for making school bell and why? (b) Why electric wires are made up of copper? (c) Name one metal that exist in liquid form. Where is this metal used ? (d) Name one metal that can melt at our palm	4

39.	Explain the following (a) Reactivity of Al decreases if it is dipped in HNO_3 (b) Carbon cannot reduce the oxides of Na or Mg (c) NaCl is not a conductor of electricity in solid-state, whereas it does conduct electricity in aqueous solution as well as in the molten state (d) Iron articles are galvanised. (e) Metals like Na, K, Ca and Mg are never found in their free state in nature.	5
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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – IV

CARBON AND ITS COMPOUNDS

Max. Marks: 80

Time Allowed: 3 hours

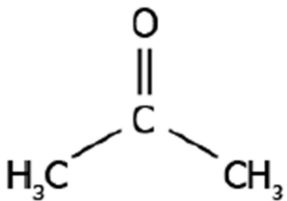
General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A		
1.	Ethanol reacts with sodium and forms two products. These are a. sodium ethanoate and hydrogen b. sodium ethanoate and oxygen c. sodium ethoxide and hydrogen d. sodium ethoxide and oxygen	1
2.	Vinegar is a solution of a. 50% – 60% acetic acid in alcohol b. 5% – 8% acetic acid in alcohol c. 5% – 8% acetic acid in water d. 50 – 60 % of water in alcohol	1
3.	While cooking, if the bottom of the vessel is getting blackened on the outside, it means that: a. The food is not cooked completely b. The fuel is not burning completely c. The fuel is wet d. The fuel is burning completely	1
4.	The organic compounds having functional group -COOH are known as: a. Aldehyde b. Ketone c. Carboxylic acids	1

	d. Alcohol	
5.	Ester is formed by the reaction between: a) An acid and an alcohol b) An acid and a base c) A base and an alcohol d) An acid and an alkene	1
6.	What is denatured alcohol? a) Ethyl alcohol which has been made unfit for drinking purpose by adding small amount of poisonous substance. b) Methyl alcohol which has been made unfit for drinking purpose by adding small amount of poisonous substance c) Alcohol having properties of an acid d) Ethyl alcohol containing 60% of water by weight	1
7.	Which of the following substance produces brisk effervescence with baking soda solution? a) Ethanoic acid b) Table salt c) sugar solution d) Sunflower oil	1
	Question No. 8, 9 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
8.	Assertion- Propanone and Propanal are functional isomers. Reason- These have different functional groups.	1
9.	Assertion- Diamond is extremely hard in nature. Reason – Diamond has layered structure.	1
10.	What is meant by the term homologous series of carbon compounds? Write its characteristics.	2
11.	Write chemical equation of the reactions of ethanoic acid with (i) Sodium hydroxide	2

	(ii) Ethanol (in the presence of an acid); giving the name of the products in each case.	
12.	Draw the structure of the molecule of benzene. Write the molecular formula of ethyne and draw its electron dot structure.	2
13.	Name an alcohol and a carboxylic acid having two carbon atoms in their structures. Write their chemical formula and state how this alcohol can be converted into a carboxylic acid. What happens when these two compounds react in the presence of an acid? Write chemical equations also.	3
14.	What are soaps? Explain the cleansing action of a soap. Why are soaps not considered suitable for washing clothes in a region where water is hard? How is this problem solved?	3
15.	An environmentalist is promoting the use of ethanol-blended petrol to reduce air pollution in urban areas. He explains that ethanol burns cleanly and is less harmful to the environment. a) Why is ethanol considered a cleaner fuel than petrol? b) Write the chemical equation for the combustion of ethanol. c) How does blending ethanol with petrol help in reducing pollution? d) Name another biofuel that can be used as an alternative to fossil fuels.	4
16.	A. compound 'A' with a molecular formula of $C_2H_4O_2$ reacts with a base to give salt and water. Identify 'A', state its nature and the name of the functional group it possesses. Write chemical equation for the reaction involved. B. What is an ester? How is it formed? Write its use.	5
Section B		
17.	The substance not responsible for the hardness of water is (a) Sodium nitrate (b) calcium hydrogen carbonate (c) calcium carbonate (d) magnesium carbonate	1
18.	The by product of soap is (a) isoprene (b) glycerol (c) butene (d) ethylene glycol	1
19.	Which of the following can be used for the denaturation of ethyl alcohol? a. Methyl alcohol	1

	b. Pyridines c. Copper sulphate d. All of above	
20.	saponification is the reaction between NaOH and..... (a) alcohols (b) acid (c) simple esters (d) ketone	1
21.	The following image represents a carbon compound.  Which functional group is present in the compound? a. Alcohol b. Aldehyde c. Carboxylic acid d. Ketone	1
22.	When a vegetable oil is treated with hydrogen in the presence of nickel or Palladium catalyst it forms of hydrogenated fats . This is an example of :- a. Anodizing reaction b. Displacement reaction c. Addition reaction d. combination reaction	1
23.	The soap molecule has a:- a. Hydrophilic head and a hydrophobic tail b. Hydrophobic head and hydrophilic tail c. Hydrophobic head and hydrophobic tail d. Hydrophilic head and hydrophilic tail	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct	

	explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
24.	Assertion- Large number of organic compounds are due to self linking property of carbon known as catenation. Reason- Bond length of C-C bond is quite small and bond dissociation enthalpy is quite high.	1
25.	Write the number of single and double covalent bonds in a molecule of butene (C_4H_8).	2
26.	a) Explain the formation of a molecule of ammonia (NH_3), using electron dot structure. (Atomic number of nitrogen is 7). b) Why does carbon share its valence electrons with other atoms of carbon or with atoms of other elements?	3
27.	A student adds soap solution to hard water and soft water separately and shakes them in test tubes. a) What will be the observation in both cases? b) Why is it difficult to form lather in hard water? What type of salt is formed in the hard water reaction?	3
28.	A student observes that vinegar used in the kitchen has a sour taste and is used as a food preservative. She also notices that it reacts with baking soda to produce bubbles. a) What is the chemical name of vinegar? b) Write the balanced chemical equation for its reaction with baking soda. c) Name the gas released in the reaction and mention one test for it. Why does this reaction help in baking?	4
29.	a. What are soaps chemically? b. How detergents are useful as well as harmful? Explain. c. How soaps are formed in laboratory? d. differentiate saponification and esterification.	5
Section C		
30.	Chlorine reacts with saturated hydrocarbon at room temperature in the :- a) Absence of sunlight b) Presence of sunlight	1

	c) Absence of moisture d) Presence of H ₂ SO ₄	
31.	In a soap micelle the soap molecules are arranged readily with :- a) Ionic end directed towards the centre and hydrocarbon end directed outwards b) Hydrocarbon end directed towards the centre and ionic end directed outwards c) both ionic and hydrocarbon end directed towards the centre d) Both hydrocarbon and ionic end directed outwards	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
32.	Assertion- Distinction between ethyl alcohol and acetic acid can be made by Sodium Hydrogen carbonate test. Reason- Sodium Hydrogen carbonate gives brisk effervescence with acetic acid but not with ethyl alcohol	1
33.	Why is ethanol used as a fuel in many countries? State one advantage of using ethanol as fuel.	2
34.	What are hydrocarbons? Write general formula of alkanes and write names of first two alkanes.	2
35.	a) Why are covalent compounds generally poor conductors of electricity? b) Write the molecular formula and structural formula of the following: a) Ethanoic acid b) Butyne	3
36.	An organic compound A is a liquid at room temperature, has the molecular formula C ₂ H ₆ O, and gives a pleasant smell. It is used in medicines as an antiseptic. a) Identify compound A. b) Write the reaction of A with sodium metal. c) Write one use of this compound	3
37.	a. What are the properties of carbon that make it a unique element? b. What is isomerism? Write one example of it.	3

38.	Vinegar is a popular house hold substance and is used as a preservative for pickles and squashes. Chemically it is about 5 to 8 percent acetic acid or ethanoic acid. It is weak organic acid and it's pH is nearly 4. The acid has typical vinegar smell. On warming with ethyl alcohol, it forms ethyl acetate having fruity smell. - What is glacial acetic acid? - Why ethanoic acid is a weak acid? - Write the chemical equation for its reaction with ethyl alcohol to form Ester. - Why is ethanoic acid known as glacial acetic acid.?	4
39.	A. Write the molecular formula of first two members of homologous series having functional group- Br. B. Given below are the formula of some functional groups. -CHO - CO Write the name of the functional groups. C. What would be observed on adding 5% alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube? D. What are the differences between saturated and unsaturated hydrocarbons?	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – V

LIFE PROCESSES

Max. Marks: 80

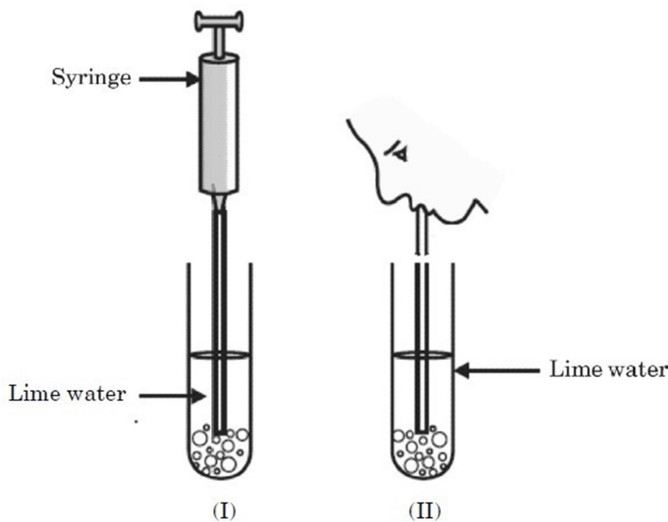
Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

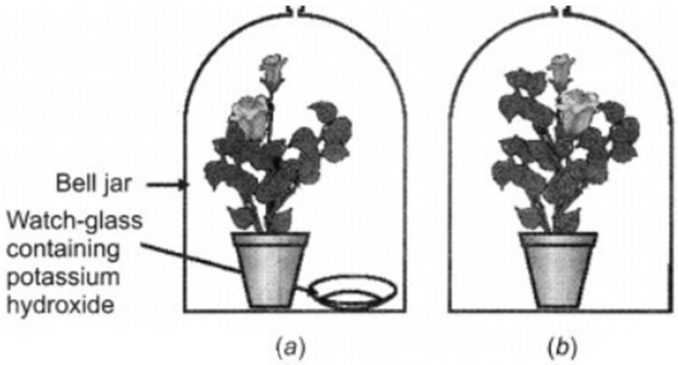
Section A		
1.	The valves in the human heart ensure that: (i) Oxygen-rich blood flows from left atrium to left ventricle only. (ii) Deoxygenated blood flows from left atrium to left ventricle only. (iii) Oxygen-rich blood flows from right atrium to right ventricle only. (iv) Deoxygenated blood flows from right atrium to right ventricle only. (A) (i) and (iii) (B) (ii) and (iv) (C) (i) and (iv) (D) (ii) and (iii)	1
2.	Breakdown of proteins in the stomach takes place by the enzyme : (A) Trypsin (B) Lipase (C) Salivary Amylase (D) Pepsin	1
3.	An organism which breaks down the food material outside the body and then absorbs it is (a) a plant parasite, Cuscuta (b) an animal parasite, Tapeworm (c) a bacteria, Rhizobium (d) a fungi, Rhizopus	1

4.	Consider the following statements about small intestine and select the one which is NOT correct: (a) The length of the small intestine in animals differs as it depends on the type of food they eat. (b) The small intestine is the site of complete digestion of food. (c) The small intestine receives secretions from liver and pancreas. (d) The villi of the small intestine absorb water from the unabsorbed food before it gets removed from the body via the anus.	1
5.	Select the group in which all organisms have the same mode of nutrition. A. Cuscuta, yeast, legumes, leeches and tapeworm B. Cactus, ticks, lice, leeches and cow C. Cuscuta, ticks, lice, leeches and tapeworm D. Cactus, grass, lice, lion and tapeworm	1
6.	The breakdown of glucose has taken the following pathway : Glucose $\xrightarrow{\text{a}}$ Pyruvate + Energy $\xrightarrow{\text{b}}$ Lactic acid + Energy The sites 'a' and 'b' respectively are : (A) Mitochondria and Oxygen deficient muscle cells (B) Cytoplasm and Oxygen rich muscle cells (C) Cytoplasm and Yeast cells (D) Cytoplasm and Oxygen deficient muscle cells	1
7.	Secretion of less saliva in mouth will affect the conversion of : (A) proteins into amino acids (B) fats into fatty acids and glycerol (C) starch into simple sugars (D) sugars into alcohol	1
Question No. 8, 9 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.		
8.	Assertion (A): Transpiration pull helps in the absorption and upward movement of water and dissolved minerals in plants.	1

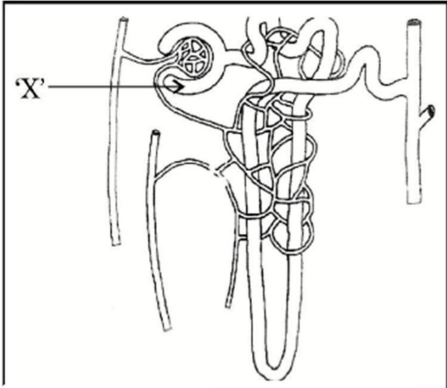
	Reason (R): The effect of root pressure in transport of water is more significant at night.	
9.	Assertion (A): Blood clotting prevents excessive loss of blood. Reason (R): Blood clotting is due to blood plasma and white blood cells present in the blood.	1
10.	Sometimes while running, the athletes suffer from muscle cramps. Why? How is the respiration in this case different from aerobic respiration?	2
11.	Explain in brief two ways by which leaves of a plant help in excretion.	2
12.	How is the small intestine in humans designed to absorb the digested food ? OR Explain how circulation of blood takes place in fishes	2
13.	(a) Write the name and one function of respiratory pigment found in human beings. (b) Why do lungs always contain a residual volume of air? (c) Why is ATP known as energy currency of the living beings?	3
14.	How does water move upward in plants? Explain the process involved.	3
15.	In the experimental set-up shown in diagram (I) atmospheric air is being passed into lime water with a syringe while in diagram (II) air is being exhaled into lime water.  1. In which diagram lime water will turn milky? Give reason to justify your answer. 2. Draw the diagram of an open stomatal pore and label (I) Guard cells, and (II) Chloroplast on it. Mention two functions.	4
16.	Kidneys are vital organs for survival. Several factors like infections, injury or restricted blood flow to kidneys reduce the activity of kidneys. This leads to accumulation of poisonous wastes in the body, which can even lead to death. In case of kidney failure, an artificial kidney can be used. An artificial kidney is a device to	5

	remove waste products from the blood through dialysis. (a) (i) Name the artery that brings oxygenated blood to the kidney. (ii) Name the cluster of thin-walled blood capillaries present in the Bowman's capsule. (b) In human excretory system name the organ which stores urine. Is this organ under hormonal control or nervous control ? (c) In which part of the nephron does selective reabsorption take place ? List the factors which the amount of water reabsorbed depends on.	
Section B		
17.	The opening and closing of stomata is regulated by : (A) CO₂ concentration in stomata (B) Temperature in guard cells (C) O₂ concentration in stomata (D) Amount of water in guard cells	1
18.	One-cell thick blood vessels are known as : (A) Alveoli (B) Capillaries (C) Arteries (D) Veins	1
19.	The gastric glands present in the wall of the stomach release : (A) Mucus and Trypsin (B) Pepsin and Trypsin (C) Mucus and Pepsin (D) Pepsin and Salivary amylase	1
20.	Select TRUE statements about lymph from the following: A. Lymph vessels carry lymph through the body and finally open into larger arteries. B. Lymph contains some amount of plasma, proteins and blood cells. C. Lymph contains some amount of plasma, proteins and red blood cells. D. Lymph vessels carry lymph through the body and finally open into larger veins. The true statements are: (a) A and B (b) B and D (c) A and C (d) C and D	1
21.	Listed below are the steps of nutrition in Amoeba. Select the correct sequence of	1

	these steps: (i) Diffusion of simple nutrients into cytoplasm (ii) Food vacuole formation (iii) Formation of finger like temporary extensions of cell surface (iv) Complex substances broken to simpler ones (v) Undigested material thrown out of the cell surface (A) (iv), (i), (ii), (iii), (v) (B) (iii), (ii), (iv), (i), (v) (C) (ii), (i), (iv), (v), (iii) (D) (iii), (iv), (i), (ii), (v)	
22.	In aerobic respiration, the steps are breakdown of glucose to pyruvate and its further conversion to carbon dioxide. Both processes respectively occur in (A) Vacuole and Cytoplasm (B) Chloroplast and Mitochondria (C) Mitochondria and Cytoplasm (D) Cytoplasm and Mitochondria	1
23.	The basic filtration unit of the excretory system in human beings is: (A) Nephron (B) Urethra (C) Neuron (D) Urinary bladder	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
24.	Assertion (A): Xylem tissue moves water and minerals obtained from the soil by the roots. Reason (R): Xylem tissue is found only in the roots of a plant.	1
25.	In the process of digestion of food in human beings, two protein-digesting enzymes are secreted. Name the enzymes along with the glands that secrete them. OR	2

	Give the name of the enzyme present in the fluid in our mouth cavity. State the gland which produces it. What would happen to the digestion process if this gland stops secreting this enzyme?	
26.	A) Observe the diagram and answer the following questions.  Why do we keep KOH in one of the bell jars? Which jar will show positive test for starch? Give reason	3
27.	With the help of a schematic flow chart, show the breakdown of glucose in a cell to provide energy (i) in the presence of oxygen (ii) in lack of oxygen	3
28.	The maintenance functions of all living organisms must go on even when they are not doing anything particular. Even when we are just sitting in a class or even asleep, this maintenance job has to go on. These maintenance processes require energy to prevent damage and break-down of cells and tissues, which is obtained by the individual organism from the food prepared by the autotrophs, called producers. (a) Name and define the process by which green plants prepare food. (b) Write chemical equation involved in the above process. (c) (i) State in proper sequence the events that occur in synthesis of food by desert plants. OR (c) (ii) Explain giving reasons what happens to the rate at which the green plants will prepare food (I) during cloudy weather, and (II) when stomata get blocked due to dust.	4
29.	(i) "The length of the small intestine in various animals depends on the food they eat." Justify the statement. (ii) Discuss the role of the pancreas and bile juice in the digestion of food in human beings. (iii) State the role of rings of cartilage present in the throat. (iv) Discuss the role of the ribs and diaphragm when air is taken in during the	5

	breathing cycle.	
Section C		
30.	In human alimentary canal, the digestive juice secreted by the gastric glands are (A) Bile, Trypsin, Pepsin (B) Hydrochloric acid, Pepsin, Mucus (C) Lipase, Bile, Mucus (D) Salivary amylase, Pepsin, Bile	1
31.	Which of the following is the correct path of oxygen in the respiratory system. (a) Nasal cavity → Trachea → Bronchi → Alveoli (b) Nasal cavity → Bronchi → Trachea → Alveoli (c) Trachea → Nasal cavity → Bronchi → Alveoli (d) Alveoli → Trachea → Bronchi → Nasal cavity	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
32.	Assertion(A):The opening and closing of the pore is a <u>function</u> of the guard cells. Reason(R): Stomatal pores are the site for exchange of gases by diffusion.	1
33.	List the events in proper sequence that take place during the process of photosynthesis.	2
34.	Besides minimising the loss of blood, why is it essential to plug any leak in a blood vessel? Name the component of blood which helps in this process and state how this component perform this function. OR (i) The transport system in plants is relatively slower than in animals. Give reasons. (ii) State the role of phloem in the transport of materials in plants.	2
35.	Name the blood vessel that brings (i) oxygenated blood (ii) deoxygenated blood, to the human heart. Also name that chamber of the heart which receives deoxygenated blood and state how deoxygenated blood from this chamber is sent to lungs for oxygenation. Why veins do not need thick wall?	3
36.	On the basis of the characteristics of the processes given in the brackets in each case,	3

	differentiate between the following : (a) Products of breakdown of pyruvate in aerobic and anaerobic respiration in human beings (product(s) of the processes) (b) Respiration and photosynthesis in plants (gas released) (c) Respiration in terrestrial animals and fishes (organs involved)	
37.	 (a) Identify 'X' in the figure of human nephron shown below. What role does it play in the process of urine formation? (b) Why some substances are selectively reabsorbed from the initial filtrate of urine, as it flows along the tubular part of nephron?	3
38.	A science teacher wants to prove to her students that sunlight is essential for photosynthesis. She sets up an experiment using two potted plants of the same species and ensures that they are kept in the same environment except for sunlight exposure. One plant's leaf is covered with black paper while the other is fully exposed to sunlight. After a few hours, she tests both leaves for the presence of starch using iodine solution. A. State the objective of this experiment. B. Describe the steps involved in conducting this experiment. C. What observation would you expect and why? D. Write the conclusion of the experiment and explain the role of sunlight in photosynthesis.	4
39.	1. The digestion of food in human alimentary canal is a complex process. State the enzyme/salt present in the Pancreatic Juice and mention their function in the process of digestion. 2. What is sphincter muscle? Where are these located and what are its function?	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – VI

CONTROL AND COORDINATION

Max. Marks: 80

Time Allowed: 3 hours

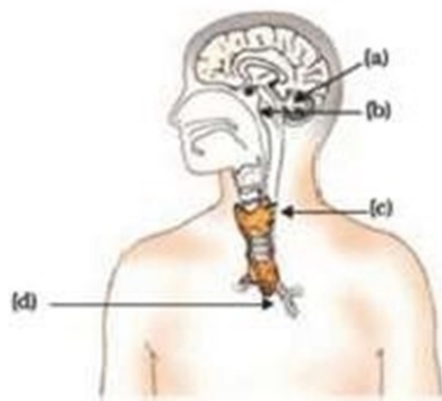
General Instructions:

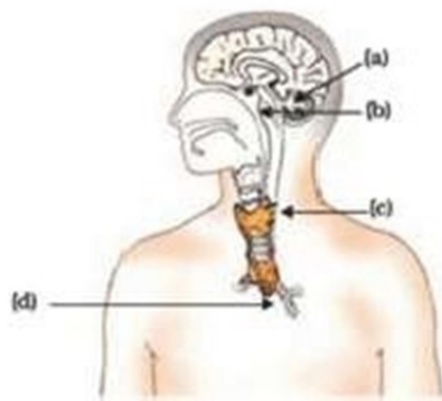
1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A		
1.	The bending of roots towards moisture is an example of: a) Phototropism b) Geotropism c) Hydrotropism d) Chemotropism	1
2.	The part of the brain responsible for regulating involuntary actions such as heartbeat and breathing is: a) Cerebrum b) Cerebellum c) Medulla oblongata d) Pons	1
3.	Which plant hormone promotes the ripening of fruits? a) Auxin b) Gibberellin c) Cytokinin	1

	d) Ethylene	
4.	Adrenaline increases heartbeat and blood supply during: a) Resting b) Emergency situations c) Sleep d) Digestion	1
5.	Which of the following glands controls the activities of other endocrine glands? a) Thyroid b) Pituitary c) Adrenal d) Pancreas	1
6.	A female is suffering from an irregular menstrual cycle. The doctor prescribed her some hormonal tablets. Which option shows that the hormone she lacks in her body is from the endocrine gland? (a) Oestrogen (b) Testosterone (c) Adrenalin (d) Thyroxin	1
7.	When we touch the leaves of the “touch-me-not” plant, they begin to fold up and droop. How does the plant communicate the information of touch? (a) The plant uses electrical signals to transfer information from the external environment to cells. (b) The plant uses electrical-chemical signals to transfer information from cell to cell. (c) The plant uses electrical-chemical signals to transfer information from tissue to specialized cells. (d) The plant uses electrical signals to transfer information from cells to specialized	1

	Tissues.	
	Question No. 8, 9 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
8.	Assertion (A): Reflex actions are controlled by the spinal cord. Reason (R): Reflex actions are voluntary in nature.	1
9.	Assertion (A): Insulin regulates blood sugar level. Reason (R): Insufficient secretion of insulin will cause diabetes.	1
10.	Why are electrical impulses preferred in the nervous system instead of chemical Messages?	2
11.	Attempt either option A or B A. Differentiate between tropic and nastic movements in plants. Any two points of difference OR B. What happens at synapse between two neurons?	2
12.	What is meant by receptors and effectors? Give two examples of each.	2
13.	How do the two movements differ from each other: the movement of leaves of a Sensitive plants and the movement of shoot towards light?	3
14.	A. Which hormone is called birth hormone? B. Label the following glands in the given diagram:	3



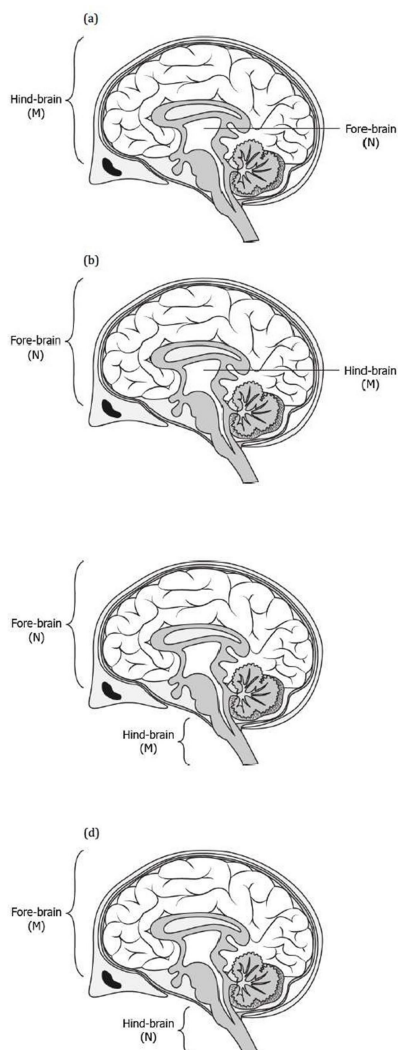
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| |  | |
| <p>15.</p> | <p>There are three plants A, B and C. The flower of plant A open their petals in bright light during the day but close them when it gets dark at night. On the other hand, The flowers of plant B open their petals at night but close them during the day when there is a bright light. The leaves of plant C fold up and droop when touched with fingers or any other solid object.</p> <p>(a) Name the phenomenon shown by the flower of (i) plant A , and (ii) plant B</p> <p>(b) Name one flower each which behaves like the flower of (i) plant A, and (ii) plant B</p> <p>(c) Name the phenomenon exhibited by the leaves of plant C</p> <p>(d) Name a plant whose leaves behaves like those of plant C .</p> | <p>4</p> |
| <p>16.</p> | <p>Attempt either option A or B.</p> <p>A. During an accident, a person suffers injury to the medulla oblongata.</p> <ol style="list-style-type: none"> Which functions will be affected? Why can this injury be life-threatening? How is medulla different from cerebrum in function? State two ways the brain is protected. <p style="text-align: center;">OR</p> <p>B. i) What is phototropism? How does it occurs in plants? Describe an activity to demonstrate it.</p> <p>ii)What do you understand by chemotropism? Provide an example of positive chemotropism.</p> | <p>5</p> |

Section B

17.

Which of the following option illustrates the location of the Centre that controls the feelings associated with hunger (M) and the Centre that allows a person to walk in a straight line (N)?

1



18.

Which of the following options shows the mechanism of the travelling of sense in our body after our nose senses a smell?

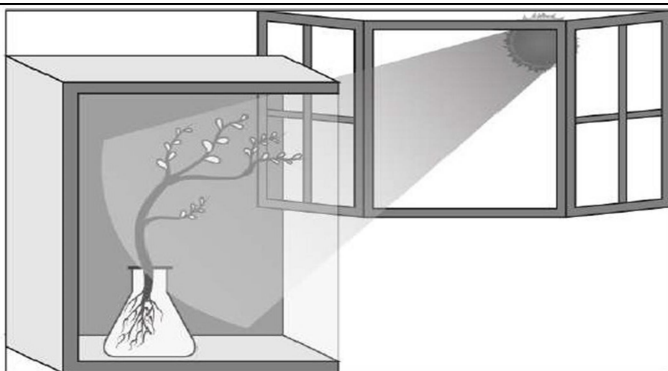
1

- (a) Olfactory receptors → dendritic tip of a nerve cell → axon → nerve ending → release of the signal → dendritic tip of another nerve cell
- (b) Olfactory receptors → dendritic tip of a nerve cell → axon → cell body → release of signal → dendritic tip of other nerve cell
- (c) Gustatory receptors → dendritic tip of a nerve cell → cell body → axon → release of the signal → dendritic tip of another nerve cell

	(d) Gustatory receptors → dendritic tip of a nerve cell → axon → cell body → release of the signal → dendritic tip of another nerve cell	
19.	Which of the following option shows the order of events correctly when a bright light is focused on our eyes? (a) Bright light → receptors in eyes → sensory neuron → spinal cord → motor neurons → eyelid closes (b) Bright light → receptors in eyes → spinal cord → sensory neuron → motor neurons → eyelid closes (c) Bright light → receptors in eyes → sensory neuron → motor neurons → spinal cord → eyelid closes (d) Bright light → receptors in eyes → spinal cord → motor neurons → sensory neuron → eyelid closes	1
20.	What is the function of the pituitary gland? (a) To develop sex organs in males (b) To stimulate growth in all organs (c) To regulate sugar and salt levels in the body (d) To initiate metabolism in the body	1
21.	Which plant hormone promotes dormancy in seeds and buds? a) Auxin (b) Gibberellin (c) Cytokinin (d) Absciscic acid	1
22.	Identify which of the following statements about thyroxine is incorrect? a) Thyroid gland requires iodine to synthesize thyroxine. b) Thyroxine is also called thyroid hormone c) It regulates protein, carbohydrates and fat metabolism in the body	1

	d) Iron is essential for the synthesis of thyroxine.	
23.	The growth of tendrils in pea plants is due to the: (a) Effect of sunlight on the tendril cells facing the sun (b) Effect of gravity on the part of tendril hanging down towards the earth (c) Rapid cell division and elongation in tendril cells that are away from the support (d) Rapid cell division and elongation in tendril cells in contact with the support	1
	Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below: A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion. C. Assertion is true but the Reason is false D. The statement of the Assertion is false but the Reason is true.	
24.	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	1
25.	Explain why feedback mechanism is important in hormone regulation with one example.	2
26.	Attempt either option A or B. A. How does the conduction of messages take place in? (i) Nervous system (ii) Endocrine system OR B. Write one example each of the following tropic movements: (i) Positive phototropism (ii) Negative phototropism (iii) Positive geotropism (iv) Negative geotropism (v) Hydrotropism (vi) Chemotropism	3
27.	Give an account of any three diseases caused by the excess and deficit secretions of various endocrine glands.	3
28.	When we touch a hot plate unknowingly, then this heat is sensed by the receptor P	4

	present in our fingers. The receptors triggers an impulse in neuron Q which transmit it to an organ R which is a part of a Central Nervous System. Here the impulse is passed on to a neuron S which in turn pass it to another neuron T. The neuron T passes the impulse to tissue U in our arm. Then tissue U contracts and pull our hand away from the hot plate. (a) what is the name of (i) receptor P, (ii) neuron Q and (iii) organ R (b) what is (i) neuron S and (ii) neuron T (c) Name tissue U What name is given to the phenomenon in which hand is pulled away quickly from the hot plate?	
29.	Attempt either option A or B. A.) i) How is the movement in sensitive plants different from the movement in our legs? ii) Why does an organism need control and coordination? OR B.) i) What are phytohormones? Name four types of phytohormones. ii) Write any two functions of cytokinin hormone.	5
Section C		
30.	Raghav potted some germinated seeds in a pot. He put the pot in a cardboard box that was opened from one side. He keeps the box in a way that the open side of the box faces sunlight near his window. After 2-3 days, he observes the shoot bends towards the light, as shown in the image.	1



Which type of tropism does he observe?

- (a) Geotropism
- (b) Phototropism
- (c) Chemotropism
- (d) Hydrotropism

- 31.** How will information travel within a neuron?
- (a) Dendrite -> cell body -> axon -> nerve ending
 - (b) Dendrite -> axon -> cell body -> nerve ending
 - (c) Axon -> dendrite -> cell body -> nerve ending
 - (d) Axon -> cell body -> dendrite -> nerve ending

1

Assertion (A) and Reason (R). Answer this questions selecting the appropriate option given below:

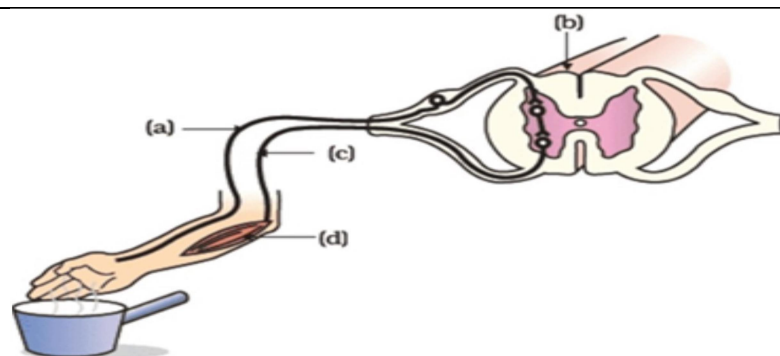
- A. Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion
- B. Assertion and the Reason are correct but the reason is not the correct explanation of assertion.
- C. Assertion is true but the Reason is false
- D. The statement of the Assertion is false but the Reason is true.

- 32.** Assertion (A): The use of iodized salt prevents risk of goitre.
Reason (R): Iodized salt provides iodine needed by thyroid gland to make sufficient thyroxin for our body.

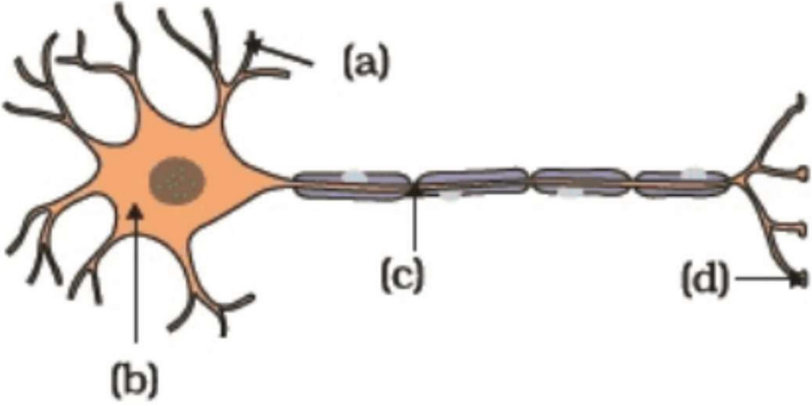
1

- 33.** Label the parts of the given diagram:

2



34.	Define peripheral nervous system. What are its components?	2
35.	Differentiate between voluntary, involuntary actions with one example of each.	3
36.	Given below are some disorders noticed in some patients. It could be due to malfunctioning of which part of brain:- i) Loss of sensation of feeling full. ii) Lower ability to salivate. iii) Difficulty in maintaining the posture and balance in the body.	3
37.	What is reflex action? Any two examples. Explain reflex arc and its path.	3
38.	A gland W is located just below the stomach in the human body. The gland W secretes a hormone X. The deficiency of hormone X in the body causes a disease Y in which the blood sugar level of a person rises too much. The person having high sugar level is Z (a) Name gland W and hormone X (b) what is the function of hormone X (c) Name disease Y and person Z (d) What advice would you like to give the person who's suffering from disease Y due to faulty life?	4

39.	i) Why does the flow of signals in a synapse from axonal end of one neuron to endritic end of another neuron take place but not in the reverse direction? ii) Label the parts of a neuron in the below given figure and state one function of a and d. 	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – VII

HOW DO ORGANISMS REPRODUCE

Max. Marks: 80

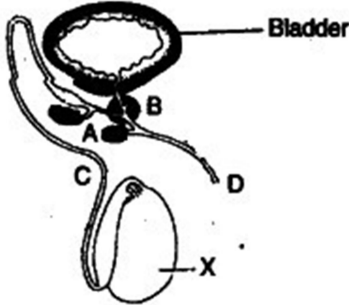
Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

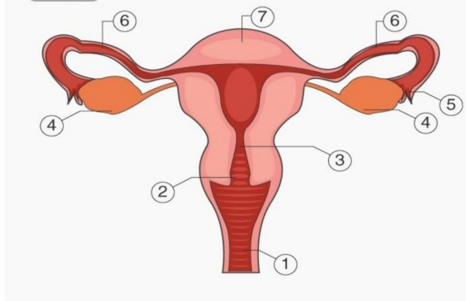
Section A		
1.	Which among the following is NOT a method of asexual reproduction? a) Binary fission b) Budding c) Spore formation d) Fertilization	1
2.	Which of the following organisms reproduces by multiple fission ? a) Amoeba b) Hydra c) Plasmodium d) Yeast	1
3.	What happens when a Planaria is cut into two pieces? a) Only one part regenerates b) Both parts regenerate c) Neither part regenerates d) It dies immediately	1
4.	Which statement is not correct about placenta ? a) It supplies oxygen and nutrients to embryo b) It removes waste products of embryo c) It connects embryo with mother's body d) provides the site for fusion of gametes.	1

5.	Tubectomy is a surgical method of birth control performed in: a) Males, by cutting vas deferens b) Females, by cutting fallopian tubes c) Males, by removing testes d) Females, by removing ovaries	1
6.	Which of the following is an advantage of sexual reproduction over asexual reproduction? a) Produces more offspring quickly b) Produces genetically identical offspring c) Introduces variation in population d) Does not require gametes	1
7.	A zygote is formed when: a) Ovum divides by mitosis b) Ovum is fertilized by sperm c) Egg is released from ovary d) Embryo is formed in uterus	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Offspring produced by sexual reproduction show variation. Reason (R): Offspring inherit all genes from each parent.	1
9.	Assertion (A): Asexual reproduction is a primitive type of reproduction. Reason (R): It involves only mitotic cell division.	1
10.	Define tissue culture with one advantage.	2
11.	Mention two advantages of vegetative propagation used in agriculture and horticulture. OR Mention two industrial application of yeast multiplication.	2
12.	What is the difference between fragmentation and regeneration with one example.	2

13.	A farmer wants to grow banana and papaya in his field. Which mode of reproduction is used in both cases? Write any two differences between the two modes of reproduction.	3
14.	Why is variation important? Explain with reference to survival of species in changing environment. Give an example.	3
15.	A biology teacher explains to students that Hydra reproduces by budding, while Plasmodium causes malaria and reproduces by multiple fission. Q. Answer the following: (i) State one difference between budding and multiple fission. (ii) Write one similarity in both. (iii) Which reproduction is faster and why? OR A married couple was advised to go for medical examination after four years of marriage because they were unable to have children. The report showed that the male partner had a problem in sperm production. (a) Name the male reproductive part responsible for sperm production. (b) Name the hormone secreted by this part. (c) Write two functions of the sperm.	4
16.	In the diagram of human male reproductive system given below: (a) Label parts A and B. (b) Name the hormone produced by organ 'X'. What is the role of this hormone in human male ? (c) Mention the name of substances that are transported by tubes (i) C and (ii) D  For visually impaired students (a) Name the glands which add fluid medium to the sperms to makes their transport easier and also provides nutrition to the sperms. (b) Name the hormone produced by testis. What is the role of this hormone in	5

	human (c) Mention the name of substances that are transported by tubes (i) vas deferens and (ii) ureter	male?
Section B		
17.	Which of the following is an STDs (sexually transmitted disease)? a) AIDS b) Syphilis c) Gonorrhoea d) All of the above	1
18.	Name two organisms capable of regeneration: a) Hydra and Planaria b) Amoeba and Plasmodium c) Yeast and Hydra d) Bryophyllum and Planaria	1
19.	A gardener propagated rose plants by stem cutting. The type of reproduction used was: a) Sexual reproduction b) Asexual reproduction c) Fertilization d) Cross-pollination	1
20.	Which of the following develops into fruit after fertilization? a) Ovary b) Ovule c) Stigma d) Style	1
21.	The process by which Amoeba reproduces is: a) Budding b) Spore formation c) Binary fission d) Multiple fission	1
22.	In Bryophyllum, vegetative propagation occurs through: a) Stem b) Root c) Leaf d) Flower	1

23.	Which of the following develops into a seed after fertilization? a) Ovary b) Ovule c) Stigma d) Style	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A): Fragmentation is a method of asexual reproduction. Reason (R): Breaking of parent body into fragments, each becoming a new individual	1
25.	What are STDs? Write two methods of their prevention.	2
26.	What is regeneration? Explain with an example. State why a complex multicellular organism cannot reproduce by regeneration. OR (a) Name two surgical methods of contraception. (b) How do contraceptive pills prevent pregnancy?	3
27.	What is the importance of DNA copying in reproduction? State how sexual reproduction gives rise to more variation than asexual reproduction.	3
28.	Contraceptive methods are used to regulate reproduction and prevent STDs. They may be barrier, chemical, intrauterine, or surgical. Q. Answer the following: (i) Give one example each of barrier and surgical method. (ii) How do oral pills prevent pregnancy? (iii) Why are contraceptives important for a healthy society? OR A gardener observed that Bryophyllum leaves had small plantlets on their margins. When these leaves fell on moist soil, new plants developed. (i) Name the mode of reproduction shown here. (ii) How does it differ from reproduction in Rhizopus? (iii) State one advantage of this method.	4

29.	Label the parts given in this diagram and write the function of part 4 and 6.  For visually impaired (a) Name the part of female reproductive system where the eggs are produced. (b) Name the part of female reproductive system where fertilisation normally takes place. (c) State one function of each of the above two parts. (d) What is placenta? Write its two functions.	5
Section C		
30.	Which one is a contraceptive method? a) Condom b) Copper-T c) Oral pills d) All of the above	1
31.	The method of reproduction in Spirogyra is: a) Budding b) Fragmentation c) Spore formation d) Binary fission	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	

32.	Assertion (A): Fertilization in humans occurs in the uterus. Reason (R): The uterus provides a suitable environment for the development of the fertilized egg	1
33.	Explain the differences between unisexual and bisexual flower with examples. Write one disadvantage each in sexual and asexual reproduction in plants.	2
34.	Differentiate between pollination and fertilisation in flowering plants. (Any two points). OR What happens if an egg is not fertilised in a female?	2
35.	Draw a labelled diagram of the female reproductive system in humans. Mark: (i) Oviduct (ii) Ovary (iii) Uterus For visually impaired Give reasons (i) During reproduction inheritance of different proteins will lead to altered body designs. (ii) Fertilisation cannot take place in flower if pollination does not occur.	3
36.	Explain the process of fertilisation in flowering plants. How is zygote formed and what does it develop into?	3
37.	Write three advantages of sexual reproduction over asexual reproduction.	3
38.	A gardener uses stem cutting of rose for propagation while a farmer grows maize through seeds. (a) Identify the type of reproduction in both cases. (b) Write two differences between them. (c) Which one shows variation and why? OR In tissue culture, new plants are grown by removing tissue or separating cells from the growing tip of a plant. The cells are then placed in an artificial medium where they divide rapidly to form a small group of cells or callus. The callus is transferred to another medium containing hormones for growth and differentiation. The plantlets are then placed in the soil so that they can grow into mature plants. Using tissue culture, many plants can be grown from one parent in disease-free conditions. This technique is commonly used for ornamental plants. (a) From which part of the plant are tissues usually taken for tissue culture?	4

	(b) What is the mass of undifferentiated cells formed during tissue culture called? (c) Name one advantage of tissue culture. (d) For which type of plants is this technique commonly used?	
39.	Differentiate between binary fission, multiple fission, budding, fragmentation, and regeneration with suitable examples. OR Explain vegetative reproduction and its types? Write two advantages of this type of reproduction.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – VIII

HEREDITY

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

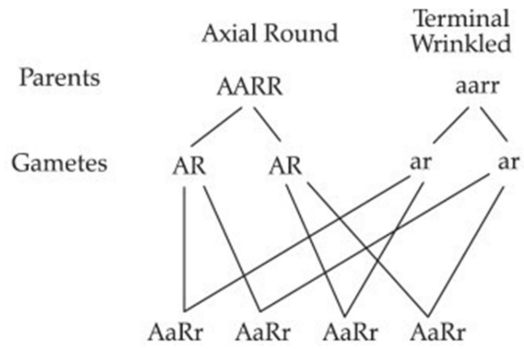
Section A		
1.	The trait which is expressed in the F_1 generation of a monohybrid cross is called: (a) Recessive (b) Dominant (c) Hybrid (d) Co-dominant	1
2.	A pea plant with genotype Tt will show which phenotype? (a) Tall (b) Short (c) Medium height (d) Sterile	1
3.	Which ratio is obtained in the F_2 generation of a monohybrid cross? (a) 3:1 (phenotypic) (b) 9:3:3:1 (genotypic) (c) 1:1 (phenotypic) (d) 2:1 (genotypic)	1
4.	The number of pairs of chromosomes present in human beings is: (a) 23 (b) 46 (c) 22 (d) 24	1

5.	The sex of a child in human beings is determined by: (a) Egg of the mother (b) Sperm of the father (c) Both egg and sperm (d) Hormones	1
6.	The probability of a male child in human beings is: (a) 25% (b) 50% (c) 75% (d) 100%	1
7.	Which of the following is an acquired trait? (a) Eye colour (b) Skin colour (c) Ability to play a musical instrument (d) Blood group	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Traits are controlled by genes. Reason (R): Genes are segments of RNA present on chromosomes.	1
9.	Assertion (A): The sex of a child in human beings will be determined by the type of chromosome he/she inherits from the father. Reason (R): A child who inherits the 'X' chromosome from his father would be a girl (XX), while a child who inherits a 'Y' chromosome from the father would be a boy (XY)	1
10.	In a pea plant, the trait of flowers bearing violet colour (PP) is dominant over white colour (pp). Explain the inheritance pattern of F1 and F2 generations with the help of a cross following the rules of inheritance of traits. State the visible characters of	2

	F1 and F2 progenies.	
11.	Differentiate between dominant and recessive traits with one example each.	2
12.	Name the plant chosen by Mendel for his experiments. Mention two reasons why.	2
13.	What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained.	3
14.	In human beings, the allele for free earlobes (E) is dominant over the allele for attached earlobes (e). (a) If a heterozygous man marries a woman with attached earlobes, write the possible genotypes of their children. (b) What will be the percentage of children with free earlobes? (c) Which law of inheritance is demonstrated here?	3
15.	Mendel worked out the rules of heredity by working on garden pea using a number of visible contrasting characters. He conducted several experiments by making a cross with one or two pairs of contrasting characters of pea plant. On the basis of his observations, he gave some interpretations which helped to study the mechanism of inheritance. Read the above passage carefully and give the answer of the following questions: (a) When Mendel crossed pea plants with pure tall and pure short characteristics to produce F1 progeny, which two observations were made by him in F1 plants? (b) (i) In a cross with two pairs of contrasting characters. RRYy × rryy (Round Yellow) (Wrinkled Green) Mendel observed 4 types of combinations in F2 generation. By which method did he obtain F2 generation? Write the ratio of the parental combinations obtained and what conclusions were drawn from this experiment. OR (ii) Justify the statement: "It is possible that a trait is inherited but may not be expressed."	4
16.	a) If a trait A exists in 10% of a population of an asexually reproducing species and trait B exists in 60% of the same population, which trait is likely to have arisen earlier? b) Write the full form of DNA. Name the part of cell where it is located. Explain its role in the process of reproduction of the cell.	5

Section B		
17.	Which scientist is known as the "Father of Genetics"? (a) Charles Darwin (b) Gregor Johann Mendel (c) Jean Lamarck (d) Hugo de Vries	1
18.	In peas, a pure tall plant (TT) is crossed with a short plant (tt). The ratio of pure tall plants to short plants in F ₂ is (a) 1 : 3 (b) 3 : 1 (c) 1 : 1 (d) 2 : 1	1
19.	In humans, which chromosome combination results in a girl child? (a) XX (b) XY (c) YY (d) XO	1
20.	Which of the following characters was NOT studied by Mendel in pea plants? (a) Seed shape (b) Stem height (c) Leaf type (d) Flower colour	1
21.	In Mendel's experiment, when two heterozygous tall plants (Tt × Tt) are crossed, what percentage of offspring are expected to be dwarf? (a) 0% (b) 25% (c) 50% (d) 75%	1
22.	Which of the following represents a heterozygous condition? (a) TT (b) Tt (c) tt (d) Both TT and tt	1
23.	Which of the following is NOT an inherited trait? (a) Tongue rolling	1

	(b) Colour blindness (c) Knowledge of English language (d) Blood group	
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A): Acquired trait cannot be passed on from one generation to next generation. Reason (R): Inaccuracy during DNA copying of acquired traits is minimum.	1
25.	A tall plant (Tt) is crossed with a dwarf plant (tt). Write the possible genotypes and phenotypes of offspring with their ratio.	2
26.	'Different species use different strategies to determine sex of a newborn individual. It can be environmental cues or genetically determined.' Explain the statement by giving example for each strategy.	3
27.	In humans, there is a 50% probability of the birth of a boy and 50 % probability that a girl will be born. Justify the statement on the basis of the mechanism of sex-determination in human beings.	3
28.	Rohan performed an experiment to study the inheritance pattern of genes. He crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F1 generation. (i) What will be the set of genes present in the F1 generation? (ii) Give reason why only tall plants are observed in F1 progeny. (iii) When F1 plants were self-pollinated, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F2 generation. OR (iii) When F1 plants were cross - pollinated with plants having tt genes, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F2 generation.	4

29.	Given below is a schematic diagram showing Mendel's experiment on garden pea plants having axial flowers with round seeds (AARR) and terminal flowers with wrinkled seeds (aarr). Study the same and answer the questions that follow:  (i) Give the phenotype of F1 progeny. (ii) Give the phenotype of F2 progeny produced upon by the self-pollination of F1 progeny. (iii) Give the phenotypic ratio of F2 progeny. (iv) Name and explain the law introduced by Mendel on the basis of the above observation	5
Section C		
30.	The law of independent assortment was proposed by Mendel on the basis of: (a) Monohybrid cross (b) Dihybrid cross (c) Back cross (d) Test cross	1
31.	Which statement about sex determination is correct? (a) All children resemble the mother (b) Father's gamete decides the sex of the child (c) Mother's egg decides the sex of the child (d) Sex depends on food eaten during pregnancy	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false.	

	D. A is false but R is true.	
32.	Assertion (A): Acquired traits such as learning music cannot be inherited. Reason (R): Changes due to acquired traits occur in non-reproductive cells.	1
33.	How does the progeny formed from asexual reproduction differ from those formed by sexual reproduction?	2
34.	Why is variation important in reproduction?	2
35.	How is the sex of the child determined in human beings?	3
36.	In pea plants, Round seed shape (R) is dominant over Wrinkled (r), and Yellow seed colour (Y) is dominant over Green (y). A pea plant with Round Yellow seeds (RrYy) is self-pollinated. (a) Draw a Punnett square to show the F ₂ generation. (b) Write the phenotypic ratio of the progeny. (c) Name the law of inheritance shown in this experiment.	3
37.	"The traits which skip generations may reappear in the next generation." (a) Explain this with the help of Mendel's monohybrid cross. (b) Which trait is recessive in Mendel's pea plant experiment? (c) Why are recessive traits not expressed in F ₁ generation?	3
38.	In pea plants, tall stem (T) is dominant over dwarf stem (t) , and red flower (R) is dominant over white flower (r) . A plant with genotype TTRR is crossed with a plant ttrr . The F ₁ plants are self-pollinated. (a) What will be the set of genes present in the F ₁ generation? (b) Why do the F ₁ plants all show tall stem and red flower? (c) If selfing of F ₁ produces 1600 plants , how many will be: (i) tall red, (ii) tall white, (iii) dwarf red, (iv) dwarf white? Write the phenotypic ratio. OR When F ₁ plants are test-crossed with ttrr (total 1600 offspring), how many of each phenotype will be produced?	4

39.	(a) Why are offspring produced by sexual reproduction likely to show more variations than those produced by asexual reproduction? (b) How do these variations help a species to survive in a changing environment? (c) Name one trait in humans which is inherited but may be modified by the environment.	(2,2, 1)
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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – IX

LIGHT REFLECTION AND REFRACTION

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

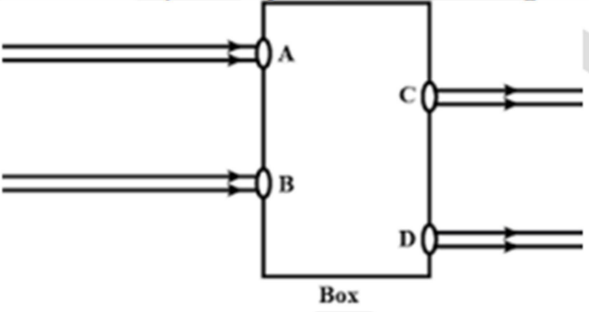
1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

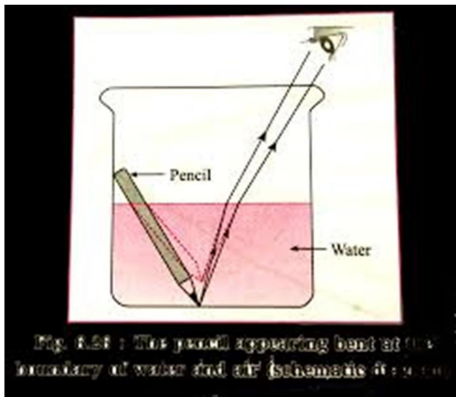
Section A		
1.	The image formed by a plane mirror is: (a) Real, inverted, same size (b) Virtual, erect, laterally inverted (c) Real, erect, diminished (d) Virtual, inverted, magnified	1
2.	A concave mirror of focal length 20 cm forms an image of an object placed 40 cm in front of it. The position of the image will be: (a) 20 cm in front (b) 40 cm in front (c) 20 cm behind (d) 40 cm behind	1
3.	When light travels from air into glass, it: (a) Speeds up (b) Slows down (c) No change (d) Reflected only	1
4.	A lens of power +2D has focal length: (a) +50 cm (b) +100 cm (c) -50 cm	1

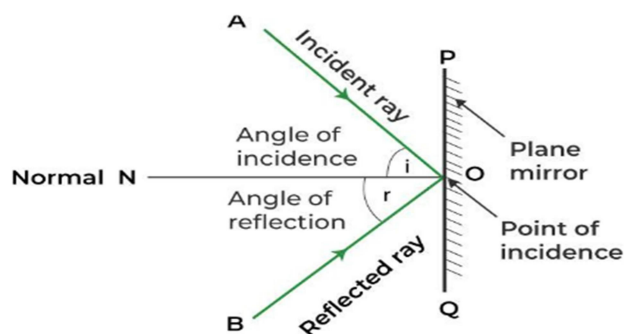
	(d) -100 cm	
5.	The mirror used in vehicles as rear-view mirror is: (a) Concave (b) Convex (c) Plane (d) Cylindrical	1
6.	Refractive index of water is 1.33. Speed of light in water is: (a) 3×10^8 (b) 2.25×10^8 (c) 1.33×10^8 (d) 4×10^8	1
7.	When a ray of light travels from a denser medium to a rarer medium, it a. deviates towards the normal. b. does not deviate. c. deviates away from normal. d. gets reflected.	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): A ray passing through the centre of curvature of a concave mirror after reflection is reflected along the same path. Reason (R): The incident rays fall on the mirror along the normal to the reflecting surface.	1
9.	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.	1
10.	Why do we prefer a convex mirror as a rear-view mirror in vehicles?	2
11.	A concave mirror has a 20 cm focal length. At what distance from the mirror should a 4 cm tall object be placed so that it forms a real and inverted image at a	2

	distance of 30 cm from the mirror? Also, calculate the size of the image formed.	
12.	A concave mirror of focal length 10 cm can produce a magnified real as well as a virtual image of an object placed in front of it. Draw ray diagrams to justify this statement.	2
13.	Define the absolute refractive index of the medium. A ray of light enters from vacuum to glass of absolute refractive index 1.5. Find the speed of light in glass. The speed of light in vacuum is 3×10^8 m/s.	3
14.	What is power of a lens? Write its SI unit. What is relation between focal length and power of lens?	3
15.	One of the most common uses of a convex mirror is the passenger side mirror on your car. Convex mirrors are also often found in the hallway of various buildings, hospitals etc. We can see erect and diminished images of objects. These mirrors are used to save us from many accidents. (4)   A. As the object is moved away from the focus of the convex mirror, what will be the effect on the size of the image? Choose the correct one from the following options (1) - Size of the image increases - Size of the image decreases - Size of the image remains same - Size of the image decreases if the image shifts from focus towards the pole B. Explain why convex mirrors are used in shopping malls for security purposes? C. What happened with image area cover range if we replace the convex mirror with plane mirror? D. What are the advantages and disadvantages of using a convex mirror for seeing traffic at rear?	4
16.	It is desired to obtain an erect image of an object, using concave mirror of focal	1,2,2

	length of 12 cm. (i) What should be the range of distance of a , object placed in front of the mirror? (ii) Will the image be smaller or larger than the object? Draw ray diagram to show the formation of image in this case. (iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror? Draw ray diagram for this situation also to justify your answer. Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams.	
Section B		
17.	A concave lens always forms image which is: (a) Real, erect, magnified (b) Virtual, erect, diminished (c) Real, inverted, diminished (d) Virtual, inverted, magnified	1
18.	The power of lens is reciprocal of: (a) Radius (b) Focal length (c) Image distance (d) Object distance	1
19.	An image of an object produced on a screen which is about 36 cm using a convex lens. The image produced is about 3 times the size of the object. What is the size of the object? (a) 12 cm (b) 33 cm (c) 39 cm (d) 108 cm	1
20.	In order to obtain a magnification of, -0.6 (minus 0.6) with a concave mirror, the object must be placed: (a) At the focus (b) Between pole and focus (c) Between focus and centre of curvature (d) Beyond the centre of curvature	1
21.	Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the figure. Which of the following could be inside the box?	1

	 (a) A rectangular glass slab (b) A convex lens (c) A concave lens (d) A prism	
22.	The unit of power of a lens is: (a) m (b) m^2 (c) Diopetre (d) cm	1
23.	Magnification produced by a plane mirror is: (a) +1 (b) -1 (c) +2 (d) -2	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	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 valid both on plane as well as spherical surfaces.	1
25.	An object 4 cm in height is placed 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror screen should it be placed to obtain a sharp image of the object? Calculate the height of the image.	2

26.	If power of a lens is 4D, what would be its focal length in Cartesian system? What will be its nature?	3
27.	An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm (a) Use lens formula to find the distance of image from the lens. (b) List three characteristics of image formed by the lens (nature and position and size). (c) Draw ray diagram to justify your answer.	3
28.	A pencil partially dipped in a glass of water appears bent or broken at the surface of the water. This effect is observed when looking from the top.  (a) Name the phenomenon responsible for this observation. (b) Why does the pencil appear to be bent? (c) What happens to the speed of light as it passes from water to air? (d) Will the pencil appear more or less bent if placed in kerosene instead of water?	4
29.	A mirror with a flat or planar reflective surface is called a plane mirror. The reflected angle is always equal to the incident angle for all the light rays that strike the plane mirror. The angle that occupies within the incident ray & the normal is called the angle of incidence. The normal is said to be an imaginary line that is perpendicular to the surface.	5



(a) Under what condition in an arrangement of two plane mirrors, incident ray and reflected ray will always be parallel to each other, whatever may be angle of incidence. Show the same with the help of diagram.

(b) Name the type of mirror used in the following situations

(i) Headlights of a car.

(ii) Side/rear-view mirror of a vehicle.

(iii) Solar furnace.

Section C

30.	An object is approaching a plane mirror at 5 cm/s. A stationary observer sees the image. At what speed will the image appear to approach the stationary observer? (a) 20 cm/s (b) 10 cm/s (c) 15 cm/s (d) 5 cm/s	1
31.	The radius of curvature of a mirror is 20cm the focal length is (a) 20cm (b) 10cm (c) 40cm (d) 5cm	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A.	

	C. A is true but R is false. D. A is false but R is true.																						
32.	Assertion(A): A person cannot see his image in a concave mirror, unless he is standing beyond the center of curvature of the mirror. Reason (R): In a concave mirror, the image formed is real provided the object is situated beyond its focus.	1																					
33.	A light ray passes from glass to air. Will it bend toward or away from the normal? Why?	2																					
34.	Calculate the refractive index of a medium in which the speed of light is 2.25×10^8 m/s.	2																					
35.	Determine the speed of light in diamond if the refractive index of diamond with respect to vacuum is 2.42. Speed of light in a vacuum is 3×10^8 m/s.	3																					
36.	State two laws of refraction of light. If the angle of incidence is 30° and the angle of refraction is 45°, find the refractive index of the medium ($\sin 30^\circ = \frac{1}{2}$, $\sin 45^\circ = \frac{1}{\sqrt{2}}$).	3																					
37.	Identify the device used as a spherical mirror or lens in following cases, when the image formed is virtual and erect in each case. (a) Object is placed between device and its focus, image formed is enlarged and behind it. (b) Object is placed between the focus and device, image formed is enlarged and on the same side as that of the object. (c) Object is placed between infinity and device, image formed is diminished and between focus and optical centre on the same side as that of the object.	3																					
38.	A student of class X placed the object in front of a convex lens at different distance from it and recorded the image distance as per the given data in the following table. <table border="1"> <thead> <tr> <th>SLNO.</th><th>Object distance 'U' in cm</th><th>Image distance' V'in cm</th></tr> </thead> <tbody> <tr> <td>1</td><td>-60</td><td>+12</td></tr> <tr> <td>2</td><td>-30</td><td>+15</td></tr> <tr> <td>3</td><td>-20</td><td>+20</td></tr> <tr> <td>4</td><td>-15</td><td>+30</td></tr> <tr> <td>5</td><td>-12</td><td>+60</td></tr> <tr> <td>6</td><td>-9</td><td>+90</td></tr> </tbody> </table>	SLNO.	Object distance 'U' in cm	Image distance' V'in cm	1	-60	+12	2	-30	+15	3	-20	+20	4	-15	+30	5	-12	+60	6	-9	+90	4
SLNO.	Object distance 'U' in cm	Image distance' V'in cm																					
1	-60	+12																					
2	-30	+15																					
3	-20	+20																					
4	-15	+30																					
5	-12	+60																					
6	-9	+90																					

	Read the above paragraph and answer the following questions. (a) Find the focal length of the convex lens. (b) At which of the position of the object from the lens, image formed by the above convex lens will be real, inverted and magnified. (c) Can a convex lens can be used a magnifying glass? State the reason. (d) Draw the ray diagram for the formation of virtual image by the convex lens.	
39.	A group of friends is at a lake during a hot summer day. One friend, Maya, notices that the water in the shallows of the lake looks much shallower than it actually is. She points this out, and another friend, Rohan, uses this observation to explain the concept of refraction and optical density to the others. (i)What phenomenon is responsible for the pool of water appearing shallower than its actual depth? Explain why this happens in terms of light bending and changes in speed. (ii)Using a simplified ray diagram, show how a ray of light from the bottom of the lake bends as it travels from water into air. (Assume the ray is not perpendicular to the surface). (iii)If the refractive index of water is 1.33 and the refractive index of air is approximately 1, what does this tell us about the speed of light in water compared to its speed in air? (iv)The optical density of a medium is directly related to its refractive index. Explain why a medium with a higher refractive index is considered optically denser.	(2,1, 1,1)

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – X

HUMAN EYE AND COLOURFUL WORLD

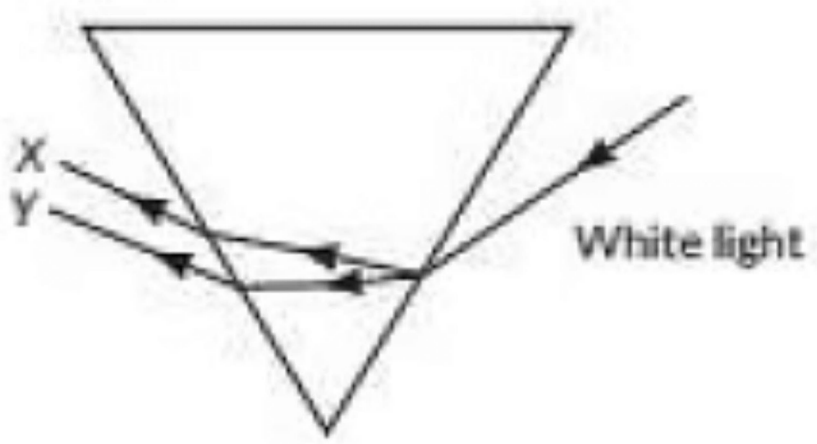
Max. Marks: 80

Time Allowed: 3 hours

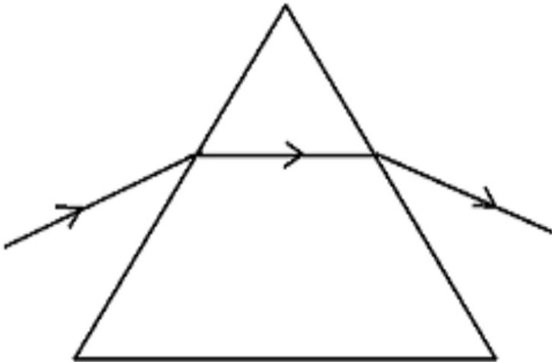
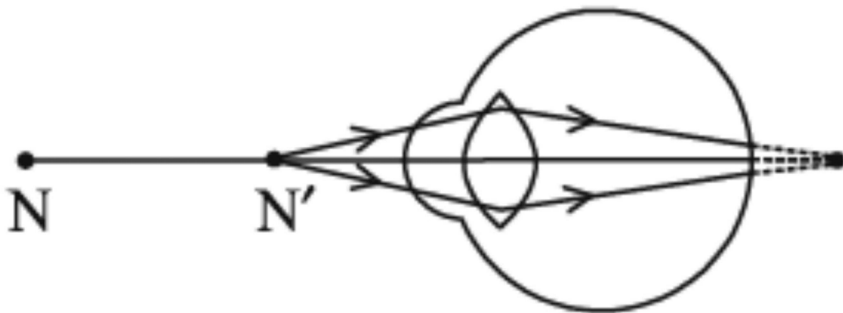
General Instructions:

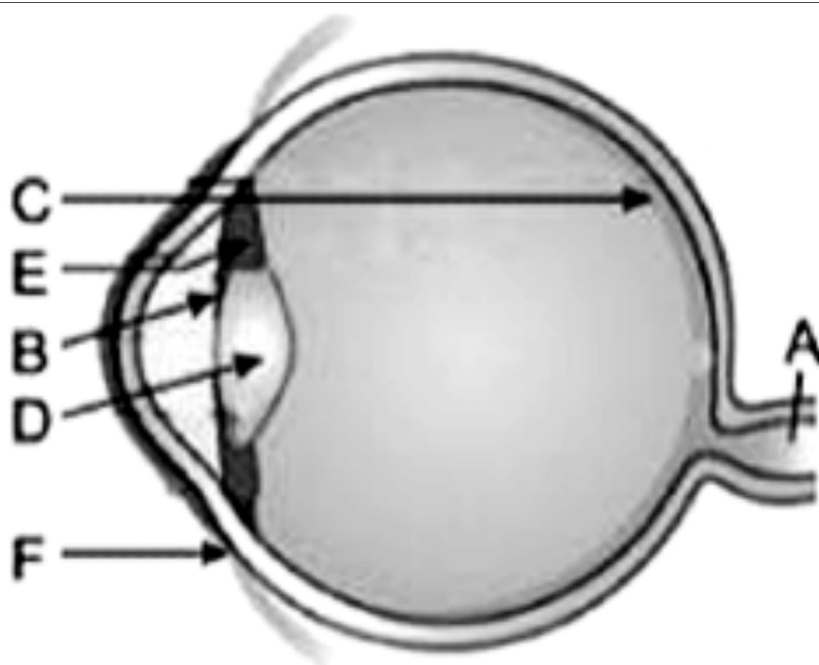
1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A		
1.	The lens system of human eye forms an image on a light sensitive screen, which is called as: (2024) (a) Cornea (b) Ciliary muscles (c) Optic nerves (d) Retina	1
2.	Consider the following statements in the context of human eye: (2024) (A) The diameter of the eye ball is about 2.3 cm. (B) Iris is a dark muscular diaphragm that controls the size of the pupil. (C) Most of the refraction for the light rays entering the eye occurs at the crystalline lens. (D) While focusing on the objects at different distances the distance between the crystalline lens and the retina is adjusted by ciliary muscles. The correct statements are — (a) (A) and (B) (b) (A), (B) and (C) (c) (B), (C) and (D) (d) (A), (C) and (D)	1
3.	When a beam of white light passes through a region having very fine dust particles,	1

	the colour of light mainly scattered in that region is: (2024) (a) Red (b) Orange (c) Blue (d) Yellow	
4.	In the diagram given below. X and Y are the end colours of the spectrum of white light. The colour of 'Y' represents the (2022)  (a) Colour of sky as seen from earth during the day (b) Colour of the sky as seen from the moon (c) Colour used to paint the danger signals (d) Colour of sun at the time of noon.	1
5.	A student cannot see objects clearly beyond 2 meters. The defect in his eyes and the lens required to correct it are: a) Hypermetropia, convex lens b) Myopia, concave lens c) Hypermetropia, concave lens d) Myopia, convex lens	1
6.	A man uses spectacles with convex lenses, but after the age of 60 he finds difficulty in reading as well as seeing distant objects. The reason is: a) Myopia only b) Hypermetropia only c) Presbyopia d) Cataract	1
7.	The doctor advised a student to use a concave lens of 1.5 D power. The focal length of the lens is:	1

	a) +100 cm b) -66.7 cm c) -150 cm d) +50 cm	
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Myopic eye cannot see distant objects distinctly. Reason (R): For the correction of myopia converging lenses of appropriate power are prescribed by eye-surgeons.	1
9.	Assertion (A): Red light signals are used to stop the vehicles on the road. Reason (R): Red coloured light is scattered the most so as to be visible from a large distance.	1
10.	Name and explain the phenomenon of light due to which the path of a beam of light becomes visible when it enters a smoke filled room through a small hole. Also state the dependence of colour of the light we receive on the size of the particle of the medium through which the beam of light passes. (CBSE 2024)	2
11.	A student traces the path of a ray of light through a glass prism as shown in the diagram, but leaves it incomplete and unlabelled. Redraw and complete the diagram. Also label angle- i, angle - e, angle - r and angle - D.	2

		
12.	Curvature of eye lens of human eye can be modified by ciliary muscles to some extent so that its focal length is changed as per requirement. How will the curvature and focal length of eye lens change when: (A) a distant object is to be seen, and, (B) a nearby object is to be seen clearly? Write the reason why a normal eye is not able to see clearly, the objects placed closer than 25 cm, without any strain on the eye.	2
13.	Study the diagram given below and answer the questions that follow: (2024)  (i) Name the defect of vision represented in the diagram. Give reason for your answer. (ii) List two causes of this defect. (iii) With the help of a diagram show how this defect of vision is corrected.	3
14.	(i) A person with myopia has a far point of 50 cm. Calculate the focal length of the concave lens required to correct this defect. (ii) A person with hypermetropia has a near point at 150 cm. To read clearly at 25 cm (normal near point), what should be the focal length of the convex lens used?	3
15.	Read the source below and answer the questions that follow:	4



The Structure of Human Eye

Different organs of human eye are labelled as A to F.

- i. Name the parts A, B, C, D and E. (1 mark)
- ii. What is the nature of image formed on the retina of the eye? (1 mark)
- iii. When light rays enter the eye, most of the refraction occurs at the: (1 mark)
 - (a) part D
 - (b) part B
 - (c) outer surface of part F
 - (d) part E
- iv. Define power of accommodation. (1 mark)

OR

- iv. What is aqueous humour and vitreous humour? (1 mark)

16.	What is myopia? List two causes for the development of this defect. How can this defect be corrected using a lens? Draw ray diagrams to show the image formation in case of (i) defective eye and (ii) corrected eye.	1,2,2
Section B		
17.	The sky appears blue to us because: a) Blue light is absorbed the most by the atmosphere	1

	b) Blue light is scattered the most by the atmosphere c) Blue light is refracted the most by the atmosphere d) Blue light has the least wavelength	
18.	A student standing at the roadside observes that the sky appears red at sunset. Which of the following explains this best? a) Red light is absorbed least by atmospheric particles b) Red light is scattered least and passes through the atmosphere c) Red light is reflected more by the atmosphere d) Red light has the highest energy	1
19.	A rainbow is formed when sunlight passes through raindrops. Which phenomena are responsible for this? a) Reflection only b) Dispersion and scattering c) Dispersion, refraction and total internal reflection d) Scattering and diffraction	1
20.	Twinkling of stars is due to atmospheric refraction. But planets do not twinkle because: a) Planets are much bigger than stars b) Planets are much closer and appear as extended sources c) Planets do not emit light of their own d) Planets have no apparent motion in the sky	1
21.	If the least distance of distinct vision of a person increases to 100 cm, then he is suffering from: a) Myopia b) Hypermetropia c) Astigmatism d) Presbyopia	1
22.	A student is observing a white board in his classroom. He feels difficulty in reading the text written on it, but can read his notebook clearly. His problem can be solved by using: a) Convex lens spectacles b) Concave lens spectacles c) Cylindrical lens spectacles d) Bifocal spectacles	1
23.	A person is advised to use spectacles with power +2.0 D. This means he is	1

	suffering from: a) Myopia and needs concave lens b) Hypermetropia and needs convex lens c) Presbyopia and needs bifocal lens d) Astigmatism and needs cylindrical lens	
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A): A convex lens is used to correct hypermetropia. Reason (R): A convex lens converges light rays before they enter the eye.	1
25.	Due to gradual weakening of ciliary muscles and diminishing flexibility of the eye lens a certain defect of vision arises. Write the name of this defect. Name the type of lens required by such persons to improve the vision. Explain the structure and function of such a lens. (CBSE 2017)	2
26.	(a) Define the term power of accommodation of human eye. Write the name of the part of eye which plays a major role in the process of accommodation and explain what happens when human eye focuses (i) nearby objects and (ii) distant objects. OR (b) Draw a ray diagram to show the formation of a rainbow in the sky. On this diagram mark A — where dispersion of light occurs, B — where internal reflection of light occurs and C — where refraction of light occurs. List two necessary conditions to observe a rainbow. (2024)	3
27.	Give reasons for the following. (A) Danger signals installed at airports and at the top of tall buildings are of red colour. (B) The sky appears dark to the passengers flying at very high altitudes. (C) The path of a beam of light passing through a colloidal solution is visible. (CBSE 2023)	3
28.	Read the source below and answer the questions that follow: We know that when light goes from one medium to another medium having	4

different optical densities, then refraction of light rays (or bending of light rays) takes place. Now, in the atmosphere, we have air everywhere. But all the air in the atmosphere is not at the same temperature. Some of the air layers of the atmosphere are cold whereas other air layers of the atmosphere are comparatively warm (or hotter). Now the cooler air layers of the atmosphere behave as optically denser medium for light rays whereas the warmer air layers (or hotter air layers) of the atmosphere behave as optically rarer medium. for the light rays. So, in the same atmosphere we have air layers having different optical densities. And when light rays pass through the atmosphere having air layers of different optical densities, then refraction of light takes place. The refraction of light caused by the Earth's atmosphere (having air layers of varying optical densities) is called atmospheric refraction.

i. With respect to atmospheric refraction which of the following point distinguish between cold air and hot air? (1 mark)

- (a) Cold air is denser than hot air
- (b) Hot air is lighter than cold air
- (c) Cold air has higher refractive index than hot air.
- (d) All of the above

ii. What is the reason behind twinkling of Stars? (1 mark)

- (a) Dispersion of star light
- (b) Reflection of star light
- (c) Refraction of star light
- (d) All of the above

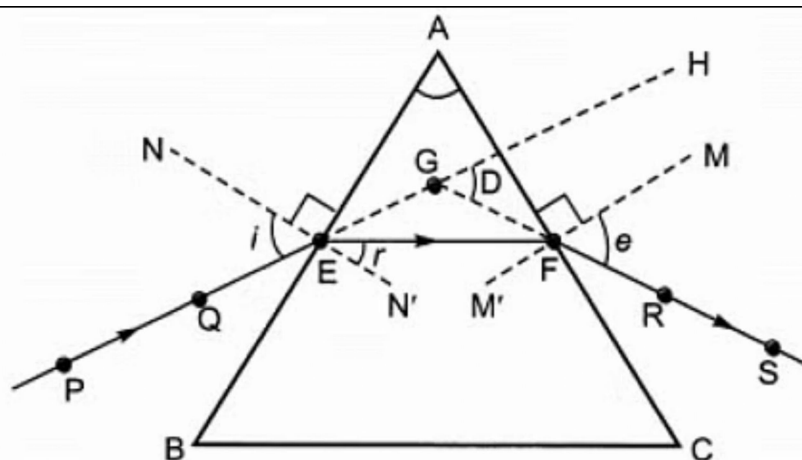
iii. Why Sun appears flattened during sunrise and sunset? (1 mark)

- (a) Because Sun is closer to Earth
- (b) Because Earth is rotating
- (c) Because Earth is revolving
- (d) Because of atmospheric refraction

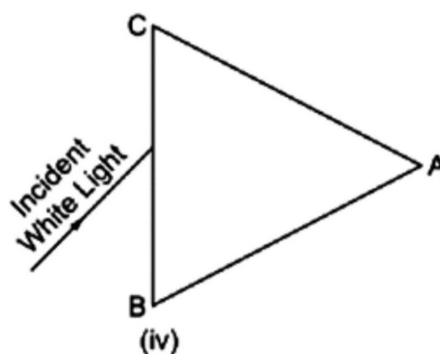
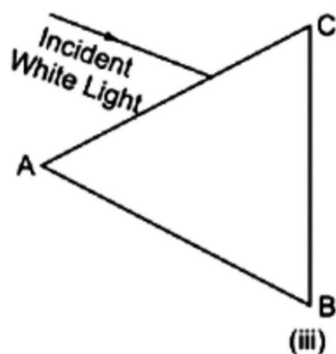
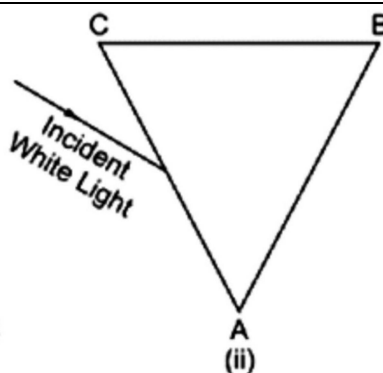
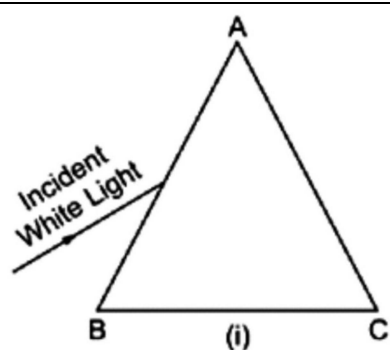
iv. How much time from sunrise to sunset is lengthened because of atmospheric

	refraction? (1 mark) (a) 4 hours (b) 2 minutes (c) 4 minutes (d) 2 hours OR iv. When light rays from Stars enter into Earth's atmosphere, it travels from: (1 mark) (a) denser to rarer medium (b) rarer to denser medium (c) rarer medium to vacuum (d) denser medium to vacuum	
29.	(a) What is the dispersion of white light? State its cause. (b) "Rainbow is an example of dispersion of sunlight" Justify this statement by explaining, with the help of a labelled diagram, the formation of a rainbow in the sky. List two essential conditions for observing a rainbow. (Foreign 2016)	5
Section C		
30.	A student sees a rainbow after rainfall. The correct sequence of colours from top to bottom is: a) VIBGYOR b) RYGBIV c) ROYGBIV d) BIVGYOR	1
31.	A star sometimes appears to change its position slightly when observed from Earth. This phenomenon is due to: a) Scattering of light b) Dispersion of light c) Atmospheric refraction d) Diffraction of light	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given	

	below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
32.	Assertion (A): Planets do not twinkle like stars. Reason (R): Planets are very far away point sources of light.	1
33.	Ravi was unable to see clearly the words written on the blackboard from the last bench. His teacher advised him to get his eyes checked. (a) Which defect of vision does Ravi suffer from? (b) State the cause of this defect. (c) Name the type of lens used to correct this defect.	2
34.	While returning home from school, Anjali noticed that the sky near the horizon appeared reddish during sunset. (a) Why does the sky appear reddish at sunset? (b) Which colour is scattered the least? (c) What does this phenomenon prove about the nature of light?	2
35.	It is observed that the power of an eye to see nearby objects as well as far off objects diminishes with age. (A) Give reason for the above statement. (B) Name the defect that is likely to arise in the eyes in such a condition. (C) Draw a labelled ray diagram to show the type of corrective lens used for restoring the vision of such an eye. (CBSE 2023)	3
36.	Explain the refraction of light through a triangular glass prism using a labelled ray diagram. Hence define the angle of deviation	3



37.	What is atmospheric refraction? Use this phenomenon to explain the following natural events. (a) Twinkling of stars (b) Advanced sunrise and delayed sunset. Draw diagrams to illustrate your answers. (2016)	3
38.	Read the source below and answer the questions that follow: The triangular glass prism is a transparent object made of glass having two triangular ends and three rectangular sides. The opposite faces of a triangular glass prism are not parallel to one another. When a ray of light passes through a prism, it bends towards the base of prism. But when white light consisting of seven colours falls on a glass prism, each colour in it is refracted by a different angle, with the result that seven colours are spread out to form a spectrum. The red colour is deviated the least and the violet colour is deviated the maximum.	4



a. (i)

b. (ii)

c. (iii)

d. (iv)

i. Angle of deviation in a prism is the angle between (1 mark)

- (a) incident and reflected ray
- (b) reflected and emergent ray
- (c) incident and emergent ray
- (d) incident and refracted ray

ii. Which of the following phenomenon of light are involved in the formation of a 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

iii. Which of the following coloured light has the least speed in glass prism?

- (a) Violet
- (b) Yellow
- (c) Red
- (d) Green

iv. The colour of light which undergoes least bending on passing through the glass

39.	A person is unable to see objects distinctly placed within 75 cm from his eyes. (a) Name the defect of vision the person is suffering from. (b) List it's two possible causes. (c) Calculate the power of the lens needed to correct this defect. Assume that the near point for the normal eye is 25cm.	1,2,2
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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPER (2026-27) CLASS X

SUBJECT SCIENCE (086)

CHAPTER – XI

ELECTRICITY

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

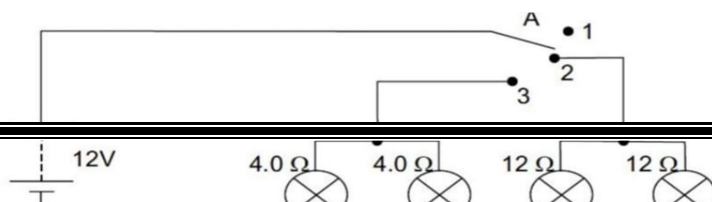
Section A		
1.	In a series circuit, the current is: A. Different through each resistor B. Same through each resistor C. Zero D. Depends on voltage	1
2.	When resistors are connected in parallel, the total resistance is: A. greater than the largest resistance B. equal to the largest resistance C. less than the smallest resistance D. sum of all resistances	1
3.	Which of the following appliances works on the heating effect of current? A. Electric motor B. Electric fan C. Electric bulb D. Generator	1
4.	In an electric circuit, if the current through a $10\ \Omega$ resistor is 0.2 A, the potential difference across it will be: A. 2 V B. 20 V C. 0.02 V	1

	D. 5 V	
5.	Electric fuse works on the principle of: A. Magnetic effect of current B. Chemical effect of current C. Heating effect of current D. Electromagnetic induction	1
6.	Which of the following graphs correctly represents Ohm's Law? A. V vs I (straight line through origin) B. V vs I (curved line) C. I vs R (straight line) D. V vs 1/I (straight line)	1
7.	Which of the following appliances works on heating effect of current? A. Electric bell B. Electric motor C. Electric heater D. Transformer	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
8.	Assertion (A): Current remains same in a series circuit. Reason (R): Same charge flows through each component per unit time.	1
9.	Assertion (A): In household wiring, all devices are connected in parallel. Reason (R): Parallel combination ensures equal potential difference across all appliances.	1
10.	Three resistors $2\ \Omega$, $3\ \Omega$, and $6\ \Omega$ are connected such that $2\ \Omega$ and $3\ \Omega$ are in parallel and their combination is in series with $6\ \Omega$. Find the total resistance of the circuit and the current when connected to a 12 V battery.	2
11.	Calculate the resistance of a metal wire of length 2m and area of cross section 1.55	2

	$\times 106 \text{ m}^2$, if the resistivity of the metal be $2.8 \times 10^{-8} \Omega \text{m}$. OR Why are alloys commonly used in electrical heating devices?	
12.	What is electric fuse? Where it is connected in a circuit?	2
13.	a. Why is it safer to use MCBs instead of traditional wire fuses ? b. How does a three pin plug ensure the safety of electrical appliances? c. A house receives 220V supply. If 10A of current flows through the circuit, calculate the total power used.	3
14.	Three resistors of 5Ω , 10Ω and 15Ω are connected in series and the combination is connected to battery of 30 V. Ammeter and Voltmeter are connected in the circuit. a. Draw a circuit diagram to connect all the devices in proper correct order. b. What is the current flowing and potential difference across 10Ω resistance?	3
15.	A house is fitted with electrical appliances like an electric iron of 1 kW, a refrigerator of 400 W, and a television of 200 W. All these appliances are used daily for 5 hours. The cost of electricity is ₹6 per unit. Read the case study and answer the following questions: - Calculate the total energy consumed by all the appliances in one day (in kWh) - Find the total cost of electricity consumed in one day. - If the household wants to reduce electricity bills, mention two ways they can save energy. Why is electricity transmitted at high voltage over long distances?	4
16.	Explain the following - Why is tungsten used almost exclusively for the filament of electric lamps? - Why are the conductors of electrical heating devices, like bread-toasters and electric irons, mostly made of an alloy rather than a pure metal? - Why is the series arrangement not used in domestic circuits? - How does the resistance of a wire vary with its area of cross-section? - Why are copper and aluminum wires usually employed for electricity	5

	transmission?	
Section B		
17.	Which of the following statements is true for a parallel connection of resistors? A. Current is same in each resistor B. Voltage is same across each resistor C. Equivalent resistance is greater than the largest resistance D. Power is same in each resistor	1
18.	The resistance of a wire of length L and area A is given by: A. $R = \rho A/L$ B. $R = L/\rho A$ C. $R = \rho L/A$ D. $R = A/Pl$	1
19.	The heating effect of current is used in: A. Electric fan B. Electric iron C. Generator D. Electric motor	1
20.	A 60 W bulb consumes 60 W when connected to: A. Any supply B. 220 V supply C. 110 V supply D. 12 V supply	1
21.	Which of the following statements is true for a parallel connection of resistors? A. Current is same in each resistor B. Voltage is same across each resistor C. Equivalent resistance is greater than the largest resistance D. Power is same in each resistor	1
22.	The electric power consumed by a device is given by: A. $P = VI$ B. $P = I^2R$ C. $P = V^2/R$ D. All of these	1
23.	The commercial unit of electric energy is: A. Joule B. Kilowatt-hour	1

	C. Watt D. Ampere-hour	
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
24.	Assertion (A): The resistance of a conductor is directly proportional to its length. Reason (R): Resistance depends on resistivity of material only.	1
25.	a. State and explain Ohm's law. b. Define resistance and give its SI unit.	2
26.	An electric iron of 500W is used for 2hours daily, Calculate: a. The energy consumed in one day (in kWh) b. The cost of electricity for one month (30days) if the rate is ₹6 per unit.	3
27.	A current of 10 A flows through a conductor for two minutes. (i) Calculate the amount of charge passed through any area of cross section of the conductor. (ii) If the charge of an electron is 1.6×10^{-19} C, then calculate the total number of electrons flowing. OR Calculate the resistance of a metal wire of length 2m and area of cross section $1.55 \times 10^{-6} \text{ m}^2$, if the resistivity of the metal be $2.8 \times 10^{-8} \Omega\text{m}$.	3
28.	A student connects a bulb to a battery using copper wires. After some time, the bulb's filament breaks and the bulb stops glowing. Questions: - What type of material is used in the filament of the bulb? - Why is copper used for connecting wires? - Write the relation between potential difference, current, and resistance. - If a bulb of resistance 10Ω is connected to a 2 V battery, find the current flowing.	4
29.	Archana and Krishna demonstrated a circuit that operates the two headlights and the two sidelights of a car, in their school exhibition.	5



Based on their demonstrated circuit, answer the following questions:

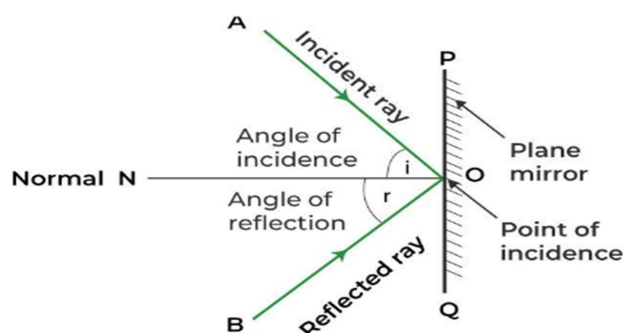
- (a) State what happens when switch A is connected to
 - (i) Position 2 (ii) Position 3
- (b) Find the potential difference across each lamp when lit.
- (c) Calculate the current:
 - (i) In each $12\ \Omega$ lamp when lit.
 - (ii) In each $4\ \Omega$ lamp when lit.

OR

Show, with calculations, which type of lamp, $4.0\ \Omega$ or $12\ \Omega$, has the higher power.

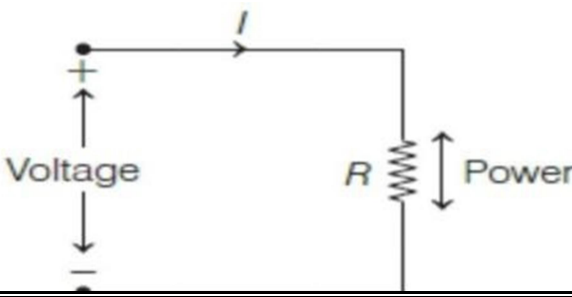
FOR VISUALLY IMPAIRED STUDENTS

- (i) A piece of wire of resistance R is cut into five equal parts. These parts are then arranged in parallel. If the equivalent resistance of this combination is R' , then the ratio R/R' is
- (ii) Two pieces of conducting wire of the same material and of equal lengths and the equal diameters are first connected in series and then changed to parallel in a circuit across the same potential difference. The ratio of heat produced in both series and parallel combinations would be?



- (a) Under what condition in an arrangement of two plane mirrors, incident ray and reflected ray will always be parallel to each other, whatever may be angle of incidence. Show the same with the help of diagram.
- (b) Name the type of mirror used in the following situations

	(i) Headlights of a car. (ii) Side/rear-view mirror of a vehicle. (iii) Solar furnace.	
Section C		
30.	The graph between potential difference and current for a metallic conductor is: A. Straight line passing through origin B. Parabola C. Hyperbola D. Circle	1
31.	A current of 2 A flows through a conductor for 2 minutes. The total charge passed is: A. 120 C B. 60 C C. 30 C D. 240 C	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
32.	Assertion (A): Electric power is inversely proportional to resistance when potential difference is constant. Reason (R): $P = V^2/R$.	1
33.	In our houses we receive AC electric power of 220 V. In electric iron or heater cables having three wires (red, black, green): (a) What are these three wires called? (b) What is the role of green wire in case of leakage?	2
34.	(a) Priya has a copper wire and an aluminium wire of same length and same area. Can the electrical resistance of two wires be the same? Justify your answer. (b) Why are the coils of electric iron and electric toasters are made of an alloy	2

	rather than a pure metal?	
35.	Write three advantages of connecting the electrical appliances in parallel with the mains than in series.	3
36.	Nichrome wire of length 'L' and radius 'R' has resistance of $10\ \Omega$. How would the resistance of the wire change when: (i) Only length of the wire is doubled? (ii) Only diameter of the wire is doubled? Justify your answer. (b) Why element of electrical heating devices is made up of alloys?	3
37.	An electric kettle is rated at (100 W – 220 V). (a) What is the resistance of its element when in use? (b) What is the safe value of current that can pass through its element	3
38.	Case Study:- A student, Rohan, is conducting an experiment to investigate the relationship between the length of a wire and its resistance. He uses a nichrome wire of different lengths and measures the resistance using a multimeter. Rohan observes that as the length of the wire increases, the resistance also increases. (a) If Rohan doubles the length of the wire, what will happen to the resistance? Assume the wire has a uniform cross-sectional area. (b) What would happen to the resistance if Rohan uses a wire of the same length but with a larger cross-sectional area? (c) Rohan wants to reduce the resistance of the wire. Suggest two ways he can do so. (d) If Rohan uses a copper wire instead of nichrome wire, how will it affect the resistance? Explain your answer.	4
39.	Read the following and answer the questions from (i) to (v) given below: The electrical energy consumed by an electrical appliance is given by the product of its power rating and the time for which it is used. The SI unit of electrical energy is Joule (as shown in figure). 	(2,1, 1,1)

Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved.

(i) The SI unit of electric energy per unit time is

- (a) joule (b) joule-second (c) watt (d) watt-second

(ii) Kilowatt-hour is equal to

- (a) $3.6 \times 10^4 \text{ J}$ (b) $3.6 \times 10^6 \text{ J}$ (c) $36 \times 10^6 \text{ J}$ (d) $36 \times 10^4 \text{ J}$

(iii) The energy dissipated by the heater is E. When the time of operating the heater is doubled, the energy dissipated is

- (a) doubled (b) half (c) remains same (d) four times

(iv) The power of a lamp is 60 W. The energy consumed in 1 minute is

- (a) 360 J (b) 36 J (c) 3600 J (d) 3.6 J

FOR VISUALLY IMPAIRED STUDENTS

- (i) How will you verify Ohms law?
- (ii) An electric kettle is rated 230 V; 1000 W. Calculate the resistance of its heating element when in operation.
- (iii) Three resistors of $2 \text{ }\Omega$, $3 \text{ }\Omega$ and $6 \text{ }\Omega$ are connected in (i) series, and (ii) parallel. Draw the arrangements of the resistors and find the equivalent resistance of each arrangement.

KENDRIYA VIDYALAYA SANGTHAN AGRA REGION

SCIENCE – Code no. 086

PRACTICE QUESTION PAPER

CH -12 MAGNETIC EFFECTS OF ELECTRIC CURRENT

CLASS – X (2026-27)

Max. Marks: 80

Time Allowed: 3 hours

General Instructions:

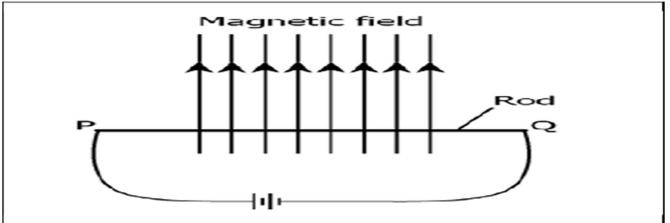
This question paper consists of 39 questions in 3 sections. All questions are compulsory.

Section A

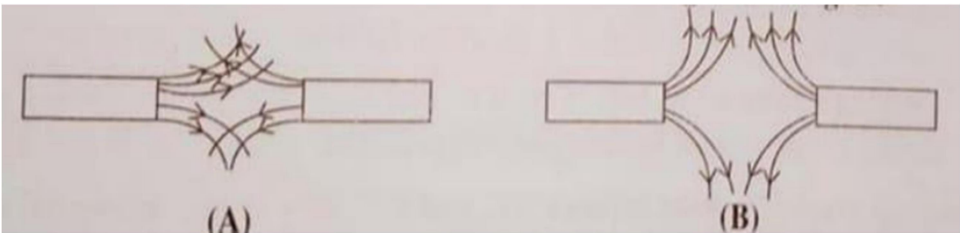
1.	The direction of the magnetic field lines around a straight current-carrying conductor is given by: a) Fleming's Left-Hand Rule b) Fleming's Right-Hand Rule c) Right-Hand Thumb Rule d) Left-Hand Thumb Rule	1
2.	The magnetic field inside a long, straight solenoid carrying current is: a) Zero b) Uniform and parallel to the axis of the solenoid c) Non-uniform d) Maximum at the ends and minimum at the centre	1
3.	A soft iron core is inserted into a solenoid. The magnetic field strength a) Increases b) Decreases c) Remains the same d) Becomes zero	1
4.	The magnetic field at the centre of a current-carrying circular loop is: a) Parallel to the plane of the loop b) Perpendicular to the plane of the loop c) Zero d) Along the radius of the loop	1
5.	The force experienced by a current-carrying conductor in a magnetic field is maximum when the angle between the conductor and the magnetic field is: a) 0° b) 45°	1

	c) 90° d) 180°	
6.	The frequency of A.C. (Alternating Current) in India is: a) 50 Hz b) 60 Hz c) 100 Hz d) 220 Hz	1
7.	Which of the following statements about magnetic field lines is incorrect? a) They are closed curves. b) They emerge from the North Pole and merge at the South Pole c) They never intersect each other. d) They are more crowded where the magnetic field is weaker.	1
	The following two questions consist of two statements – Assertion (A) and Reason (R) . Answer these questions by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) D. A is false but R is true.	
8.	Assertion (A) : Magnetic field lines do not intersect each other. Reason (R) : At the point of intersection, the compass needle would point in two directions, which is not possible	1
9.	Assertion (A) : A fuse in a circuit prevents damage to the appliances and the circuit due to overloading. Reason (R) : Overloading occurs when too many appliances connected to a single socket draw a current greater than the circuit's safety limit.	1
10.	What is the principle behind the working of a galvanometer?	2
11.	A student draws magnetic field lines of a bar magnet. They notice that the field lines are more crowded near the poles. What does this observation indicate about the magnetic field?	2
12.	A long straight conductor carries current. How does the magnetic field produced by it depend on the distance from the conductor?	2
13.	State Fleming's Left-Hand Rule. For which device is this rule applied?	3
14.	Draw a diagram showing the magnetic field lines around a straight current-carrying conductor. How can the strength of this magnetic field be increased?	3
15.	Case Study 1: The Solenoid A solenoid is a coil of many circular turns of insulated	4

	copper wire closely wound in the shape of a cylinder. The magnetic field produced by a current-carrying solenoid is similar to that of a bar magnet. Inside the solenoid, the field lines are parallel straight lines, indicating a uniform magnetic field. Outside the solenoid, the field is non-uniform and much weaker. The strength of this magnetic field can be increased by (i) increasing the number of turns in the coil, (ii) increasing the current flowing through it, and (iii) inserting a soft iron core inside the solenoid. Based on the above information, answer the following questions: a) What is a solenoid? b) How is the magnetic field inside a solenoid similar to that of a bar magnet? c) How can the strength of the magnetic field of a solenoid be increased? Give two ways. OR c) A student claims that the magnetic field outside a solenoid is also uniform. Is this claim correct? Justify your answer.	
16.	In Oersted experiment, he placed a straight current-carrying wire over a magnetic compass needle. On passing current, the needle deflected from its usual north-south direction, proving that electric current produces a magnetic effect. a) What was the main conclusion drawn from Oersted's experiment? b) If the direction of current in the wire is reversed, what happens to the direction of deflection of the compass needle? c) Name the rule used to determine the direction of the magnetic field produced around a current-carrying conductor. d) List any two devices or applications which work on the principle of the magnetic effect of current. e) A student connects a wire to a battery and places it over a magnetic compass. He observes no deflection. Give one possible reason for this.	5
	Section B	
17.	The protective device in the domestic circuit which prevents the flow of excessive current is called: a) Live wire b) Neutral wire c) Earth wire d) Fuse wire	1
18.	A magnetic compass is placed near a straight conductor carrying a current. The compass needle deflects. This deflection can be increased by:	1

	a) Increasing the current in the conductor b) Decreasing the current in the conductor c) Reversing the direction of current d) Changing the direction of the wire	
19.	A current flows through a horizontal power line in the East to West direction. The direction of the magnetic field at a point directly above the power line is: a) North to South b) South to North c) East to West d) West to East	1
20.	The front face of a circular loop of a wire is the North Pole, the direction of current in this face of the loop will be: a) Clockwise b) Anticlockwise c) Towards North d) Towards South	1
21.	A metal rod PQ is placed in the magnetic field. The ends of the rod are connected to a battery using wires. Where will the rod move?  a) Upward b) Downwards c) Into the field d) Out of the field	1
22.	The strength of the magnetic field of a current-carrying solenoid depends on: a) The radius of the solenoid b) The material of the wire c) The nature of the core material d) The colour of the insulation	1
23.	The magnetic field produced by a solenoid is not like that of a bar magnet if: a) The current is alternating b) The coil is wound tightly c) A soft iron core is inserted d) The current is too low	1

	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
24.	Assertion (A) : When a current is switched on through a wire, a magnetic compass placed near it gets deflected. Reason (R): A current-carrying wire produces a magnetic field.	1
25.	Explain why there are two separate circuits, one for high power rating appliances and other for low power rating appliances.	2
26.	An electron enters a uniform magnetic field at a right angle to the direction of the field. What is the direction of the force experienced by the electron? Justify your answer using a relevant rule.	3
27.	Differentiate between a permanent magnet and an electromagnet (three points).	3
28.	Case Study 2: Domestic Electric Circuit In a domestic electric circuit, three wires are used: a live wire (usually red), a neutral wire (usually black), and an earth wire (usually green). The live wire is at a high potential of 220 V, while the neutral wire is at 0 V. The earth wire is a safety measure connected to the metal casing of an appliance. In case the live wire accidentally touches the metal casing, the earth wire provides a low-resistance path for the current to flow to the ground. This causes a large current to flow, which blows the fuse and disconnects the appliance, preventing electric shock. Overloading occurs when too many appliances are connected to a single socket, drawing a current that exceeds the safe limit of the circuit. Based on the above information, answer the following questions: a) What is the composition of fuse wire with respect to its melting point and resistance. b) What happens when the live wire and neutral wire touch each other directly? c) Why is it dangerous to touch a live wire? Explain the role of the earth wire in protecting the user. OR c)What is MCB? How does it differ from fuse?	4

29.	a) Magnetic field lines are shown in Fig A and Fig B. Select the figure that represents the correct pattern of correct lines. Give reason for your answer.  (A) (B) b) Name the poles of the magnets facing each other. c) Draw complete magnetic field lines around a bar magnet	5
Section C		
30.	Overloading in a domestic electric circuit occurs when: a) The current is too low b) The live wire and neutral wire come into direct contact c) The live wire and earth wire come into direct contact d) Too many appliances are connected to a single socket	1
31.	What is the colour of the live wire in a standard domestic circuit? a) Black b) Red c) Green d) Blue	1
	The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
32.	Assertion (A) : The strength of the magnetic field increases with the increase in number of turns in a solenoid. Reason (R) : Each turn of the solenoid contributes to the magnetic field produced	1
33.	The core of an electromagnet is made of soft iron and not steel. Give two reasons.	2
34.	Why is a fuse connected in series with the live wire and not the neutral wire?	2
35.	A student is experimenting with a solenoid. She observes that the magnetic field strength decreases when she increases the distance from the center of the solenoid along its axis. Is her observation correct? Justify your answer.	3
36.	What is the difference between Alternating Current (AC) and Direct Current (DC)?	3

	State one advantage of AC over DC.	
37.	Define overloading and short-circuiting in a domestic circuit. How does a fuse protect the circuit from these two conditions?	3
38.	Case Study 3: Force on a Current-Carrying Conductor in a Magnetic Field A student sets up an experiment to demonstrate the force on a current-carrying conductor in a magnetic field. He places a straight copper wire between the poles of a strong horseshoe magnet such that the wire is perpendicular to the magnetic field. The wire is connected to a battery through a key and rheostat. When the key is closed, the wire is observed to move upward. Read the passage carefully and answer the following: a) State the rule which explains the direction of force on the conductor. b) What will happen if the direction of current is reversed in the conductor? c) What will happen if the magnetic field is reversed, but current is kept in the same direction? d) Write one practical application of this principle in daily life.	4
39.	a) A student observes that a bar magnet attracts iron filings differently than a solenoid carrying current. How it relates to the nature of magnetic fields in both cases. b) Explain the reason for this difference.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

PRACTICE PAPERS (2026-27) CLASS-X

SUBJECT SCIENCE (086)

CHAPTER -13 OUR ENVIRONMENT

MM-80

TIME ALLOWED- 3 hour

General Instructions:

- 1. This question paper consists of 39 questions in 3 sections. Section A, Section B and Section C.**
- 2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.**

	SECTION -A	
1.	Which of the following human activities has resulted in an increase of nonbiodegradable substances? A. Organic farming B. Increase in tree plantation C. Use of plastic as packaging material D. Composting of kitchen waste	1
2.	Which are the correct statements related to ozone? (i) Ozone layer helps in increasing the UV radiations reaching earth. (ii) Ozone is a deadly poison. (iii) Ozone layer shields the earth from UV radiations. (iv) Ozone layer prevents UV rays which cause skin cancer. (v) Ozone is formed with the help of Chlorofluorocarbons. A. (i), (ii), (iii) B. (ii), (iii), (iv) C. (iii), (iv), (v) D. (i), (iv), (v)	1
3.	Identify the incorrect statement 'The energy available to the producers is maximum' because: A. It is the first trophic level which absorbs 1% of light energy directly from the source. B. It utilizes the most of the chemical energy for its own respiration,	1

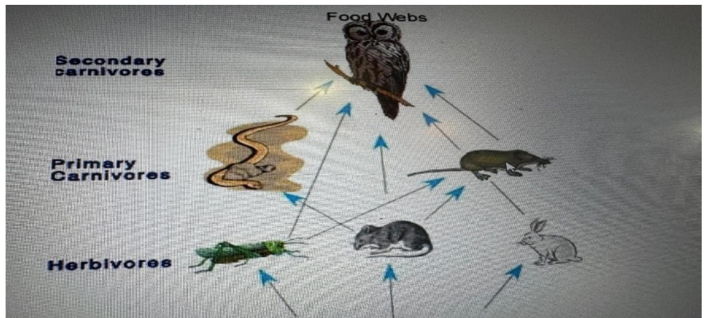
	growth, reproduction, movement etc. C. It utilizes 10% of light energy and transfers the rest to the next trophic level. D. It transfers only 10% of light energy to the next trophic level.	
4.	Which of the following is not a role of decomposers in the ecosystem? A. Natural replenishment of soil. B. Enrichment of oxygen in atmosphere. C. Waste decomposition. D. Break-down of dead remains.	1
5.	In 1987, an agreement was formulated by the United Nations Environment Programme (UNEP) to freeze the production of “X” to prevent depletion of “Y”. “X” and “Y” respectively referred here are: A) Ozone; CFCs B) CFCs; rays UV C) CFCs; Ozone D) UV rays; Diatomic oxygen	1
6.	Which of the following features relates to biodegradable substances? A) Broken down by biological processes B) Remain inert C) Persist in environment for long time D) May harm the ecosystem	1
7.	Which group of waste materials can be classified as non-biodegradable? A) Plant waste, used tea bags B) Polyethene bags, plastic toys C) Used tea bags, paper straw D) old clothes, broken footwear	1
8.	Assertion Reason type questions- The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	1

	Assertion (A): Vulture will always have the least amount of pesticides in a food chain. Reason (R): Vulture occupies the last trophic level and it gets only 10% of energy of the previous trophic level.	
9.	Assertion(A): Food chain is responsible for the entry of harmful chemicals in our bodies. Reason(R): The length and complexity of food chains vary greatly.	1
10.	We do not clean ponds or lakes, but an aquarium needs to be cleaned. Why?	2
11	<u>Students to attempt either option A or B</u> A. About 100 acres of forest land was declared as Natural reserve park. The following organisms were predominant in the Natural reserve park: rabbit, frog, grass, fish, fox, water insects, zebra, peacock, snake, trees, bird, owl, insects, tiger, vulture, duck. Create a food web comprising two separate food chains with different producers by using the above data. OR B. Define the following terms- (i) Biomagnification (ii) Ten percent law of flow of energy.	2
12	 Look at the picture and tell what impact will the process shown in the image have on Humans if they occupy the last trophic level? Explain. <u>For visually impaired students</u>	2

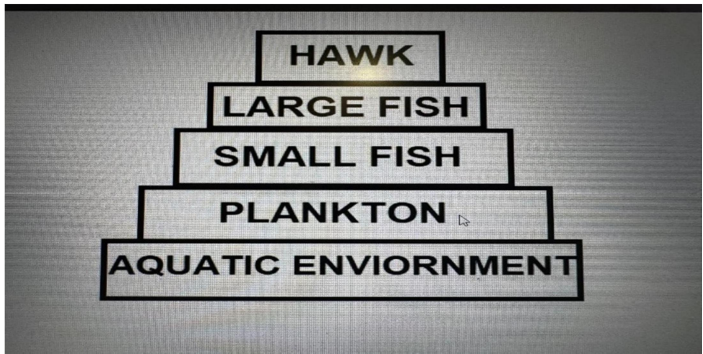
	Human beings occupy the last trophic level in a food chain, what are its harmful effects?	
13	Gas A, found in the upper layers of the atmosphere, is a deadly poison but is essential for all living beings. The amount of this gas started declining sharply in the 1980s. a. Identify Gas A. How is it formed at higher levels of the atmosphere? b. Why is it essential for all living beings? State the cause for the depletion of this gas.	3
14	a. Create a terrestrial food chain depicting four trophic levels. b. Why do we not find food chains of more than four or five trophic levels in nature?	3
15	In a grassland ecosystem, grass is eaten by grasshoppers, which are eaten by frogs. Frogs are eaten by snakes, and snakes are eaten by eagles. The amount of energy available decreases at each trophic level because a large amount is lost as heat during respiration. Questions: a) Write the food chain represented in this case. b) Name the producer in this food chain. c) If 10,000 J of energy is available at the producer level, how much energy will be transferred to the snake (4th trophic level), assuming 10% law of energy transfer?	4
16	a. How much energy of Sun is used by plants for photosynthesis? b. The following organisms form a food chain. Insect, Hawk, Grass, Snake, Frog Which of these will have highest concentration of non-biodegradable chemicals? Name the phenomenon. c. "Human beings occupy the top level in any food chain." What are the consequences of this on our body?	5
	SECTION -B	
17	Which of the following are environment-friendly practices? a) Carrying a cloth bag to put purchases while shopping.	1

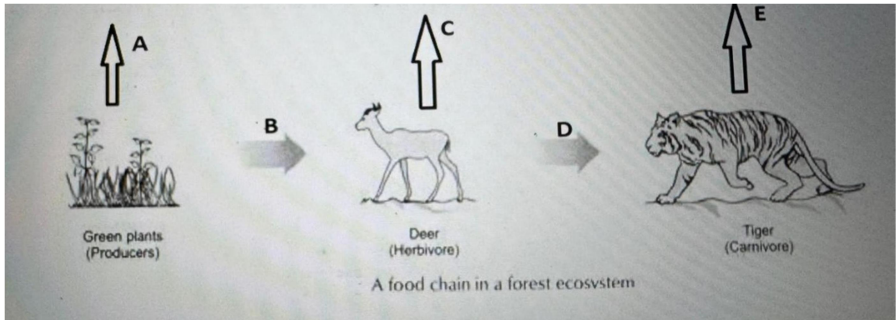
	b) Switching off unnecessary lights and fans c) Walking to school instead of getting your mother to drop you on her scooter d) All of the above	
18	The manufacturing of Chlorofluorocarbons free refrigerators is mandatory throughout the world. How does this help prevent ozone depletion? a) This will help convert oxygen molecules into ozone b) This will help convert the CFCs into ozone molecules c) This will reduce the production of CFCs from oxygen molecules d) This will reduce the release of CFCs that reacts with ozone molecules	1
19	Ozone forms by the combination of free oxygen atoms and oxygen molecules. How do free oxygen atoms form at higher levels of the atmosphere? a) By splitting molecular oxygen into free oxygen atoms in the presence of low-energy UV radiations b) By splitting molecular oxygen into free oxygen atoms in the presence of high-energy UV radiations c) By the combination of two molecular oxygen in the presence of high energy UV radiations d) By the combination of two free oxygen atoms in the presence of lower energy UV radiations	1
20	What is the order of the waste management hierarchy, from most to least favoured? a) Prevention-Recycle-Reuse-Disposal b) Prevention-Reuse-Disposal-Recycle	1

	c) Prevention-Disposal-Reuse-Recycle d) Prevention-Reuse-Recycle-Disposal	
21	Which of the following limits the number of trophic levels in a food chain? a) Water b) Polluted air and water c) Deficient food supply d) Decrease in energy at higher trophic levels	1
22	In a food chain, the third trophic level is always occupied by a) Carnivores b) Herbivores c) Producers d) Decomposer	1
23.	The biotic components of an ecosystem consist of a) Plants, animals and water b) Algae, fungi and soil c) Producers, consumers & decomposers d) Air, water, soil	1
24.	Assertion Reason type question- The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	1

	Assertion (A): If the lions are removed from a food chain it will not affect the food chain, however if the plants are removed from a food chain it will disturb the ecosystem. Reason (R): Plants are producers who can make food using sunlight, while lions are consumers.	
25	Study the food chain given below and answer the questions that follow: plant $\longrightarrow$ caterpillar $\longrightarrow$ chameleon $\longrightarrow$ snake $\longrightarrow$ mongoose a) If the amount of energy available at the third trophic level is 100 joules, then how much energy will be available at the producer level? Justify your answer. b) Is it possible to have 2 more trophic levels in this food chain just before the fourth trophic level? Justify your answer.	2
26.	Plastic cups were used to serve tea in trains in early days- these could be returned to the vendors, cleaned and reused. Later, Kulhads were used instead of plastic cups. Now, paper cups are used for serving tea. What are the reasons for the shift from Plastic to Kulhads and then finally to paper cups?	3
27.	Why is damage to the ozone layer a cause for concern? What are its causes and what steps are being taken to limit this damage?	3
28.	Read the following and answer the questions. Food chains are very important for the survival of most species.  i) If 10,000 J solar energy falls on green plants in a terrestrial ecosystem, what percentage of solar energy will be converted into food energy? a) 10,000 J b) 100 J c) 1000 J d) It will depend on the type of the terrestrial plant. (ii) If Ravi is consuming curd/yogurt for lunch, which trophic level in a food chain he should be considered as occupying?	4

	a) First trophic level b) Second trophic level c) Third trophic level d) Fourth trophic level (iii) Matter and energy are two fundamental inputs of an ecosystem. Movement of a) Energy is bidirectional and matter is repeatedly circulating. b) Energy is repeatedly circulation and matter is unidirectional. c) Energy is unidirectional and matter is repeatedly circulating. d) Energy is multidirectional and matter is bidirectional. (iv) Which of the following limits the number of trophic levels in a food chain? a) Decrease in energy at higher trophic levels b) Less availability of food c) Polluted air d) Water <u>For visually impaired students</u> a) Various food chains in the Ecosystem are interlinked to form a food web. Illustrate by giving an example. b) Bacteria and Fungi act as cleaning agents of the environment. Comment	
29.	The flow of energy between various components of the environment has been extensively studied. List five findings.	5
	SECTION -C	
30.	In the following groups of materials, which group (s) contains 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)	1

	(d) (ii) and (iv)	
31.	A biomass pyramid shows us the relationship between - Flora and Fauna - Organic matter and Ecosystem - Biomass and Trophic level - Biomass and food chains	1
32.	Assertion Reason type question- The following two questions consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: - Both A and R are true, and R is the correct explanation of A. - Both A and R are true, and R is not the correct explanation of A. - A is true but R is false. - A is false but R is true. Assertion(A): Biodegradable substances result in the formation of compost and natural replenishment. Reason(R): It is due to breakdown of complex inorganic substances into simple organic substances	1
33.	DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer.  <u>For visually impaired students</u> DDT was sprayed in a lake to regulate breeding of mosquitoes. Consider the following food chain in the lake: Aquatic environment → Plankton → Small fish → Large fish → Hawk How would spraying DDT in the lake affect the organisms at	2

	different trophic levels in this food chain? Justify your answer with reference to the concept of biological magnification.	
34.	In the following food chain, vertical arrows indicate the energy lost to the environment and horizontal arrows indicate energy transferred to the next trophic level. Which one of the three vertical arrows (A, C and E) and which one of the two horizontal arrows (B and D) will represent more energy transfer? Give reason for your answer.  <u>For visually impaired students</u> In a forest food chain: Green plants → Deer → Tiger At each step, some energy is lost to the environment and some is transferred to the next trophic level. 1. At which level (plants, deer, or tiger) is the maximum energy lost to the environment? 2. Between plants to deer and deer to tiger, at which step is the energy transfer greater? 3. Give reasons for your answers.	2
35.	A. What is meant by term Trophic level? B. Suggest one word for each of the following statements/ definitions (i) The physical and biological world where we live in (ii) Each level of food chain where transfer of energy takes place (iii) The physical factors like temperature, rainfall, wind and soil of an ecosystem (iv) Organisms which depend on the producers either directly or indirectly for food	3

36.	How will you create an artificial aquatic ecosystem, which is self-sustainable?	3
37.	What will happen a) if all the tigers are removed from the food chain? b) If all the deer are removed from the food chain? c) There are no decomposers on Earth at all?	3
38.	Read the following passage and answer the following questions- Waste generated by households, factories and agriculture can be biodegradable or non-biodegradable. Biodegradable waste like vegetable peels, paper, and cow dung is broken down naturally by microorganisms. Non-biodegradable waste such as plastic, glass and synthetic chemicals do not decompose easily and their accumulation causes pollution. Improper disposal of non-biodegradable waste harms the soil, air, water and affects all organisms in food chain. (i) The passage mentions that the accumulation of non-biodegradable waste causes pollution. Explain how it affects soil and water. (ii) Suggest two measures based on the passage to reduce pollution caused by non-biodegradable waste.	4
39.	A town near a river has recently faced problems due to excessive use of plastics and chemical fertilizers. Plastic waste is being dumped into the river, while fertilizers from nearby farms are washed into it during rains. 1. Explain how this situation will affect the aquatic ecosystem in terms of: a) Decomposers and oxygen levels in water b) Food chains and food webs 2. Suggest two eco-friendly measures the town can adopt to reduce such environmental problems.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

MARKING SCHEME (2026-27) CLASS X

SCIENCE – SUB CODE-086

CHAPTER – 01 CHEMICAL REACTION & EQUATIONS

Max. Marks: 80

Time Allowed: 3 hours

Section A		
1.	C	1
2.	B	1
3.	A	1
4.	C	1
5.	A	1
6.	B	1
7.	B	1
8.	A	1
9.	C	1
10.	Balanced: $2\text{Al} + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2$	2
11.	In Precipitation reaction insoluble solid salt is formed; example: $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 \downarrow + 2\text{NaCl}$	2
12.	$2\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$ (Thermal decomposition)	2
13.	(a) $\text{CuO (s)} + \text{H}_2\text{(g)} \xrightarrow{\text{heat}} \text{Cu (s)} + \text{H}_2\text{O (g)}$.	1
	(b) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 \downarrow + 2\text{NaCl}$ (Double displacement, precipitation)	1
	(c) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	1
14.	ZnO reduces to Zn (reduction) C oxidises to CO (oxidation) ZnO is oxidizing agent C is reducing agent	3

15.	a) Chemical Reaction: $4\text{Fe} + 6\text{H}_2\text{O} + 3\text{O}_2 \rightarrow 4\text{Fe}(\text{OH})_3 \rightarrow \text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O} \text{ (rust)}$ b) Rusting is faster in coastal regions because moist air contains salts (electrolytes) that increase conductivity and accelerate rusting. c) Methods to prevent rusting: - Applying paint or oil/grease - Galvanisation (coating with zinc) - Alloying (e.g., stainless steel) d) Type of reaction: Oxidation reaction (also a redox and corrosion process).	1 1 1 1
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16.	A chemical reaction is a change in which one or more substance or reactant react to form new substance with entirely different properties. (i) Change in Colour (a) Explanation: A new substance with a different colour is formed during the reaction. (b) Example: When iron reacts with copper sulphate solution, the solution's blue colour fades, and a reddish-brown deposit of copper forms. (c) Reaction: $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$ (d) (ii) Evolution of Gas (e) Explanation: A gas is produced as a product of the reaction, showing a new substance is formed. (f) Example: Zinc reacts with dilute hydrochloric acid to release hydrogen gas. (g) Reaction: $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2\uparrow$ (iii) Change in temperature (h) Explanation: A chemical reaction may result in the change of temperature of reactants (i) Temperature rises so the beaker in which reaction takes place becomes warm. (i) Reaction $\text{Zn(s)} + \text{H}_2\text{SO}_4\text{(aq)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{H}_2\text{(g)} \uparrow$	1/2 1.5 1.5 1.5
Section B		
17.	D	1
18.	A	1
19.	B	1
20.	A	1
21.	A	1
22.	A	1

23.	C	1
24.	C	1
25.	Exothermic = heat released (burning fuel); Endothermic = heat absorbed (photosynthesis)	2
26.	(a) Brown fumes NO ₂ , yellow PbO residue (b) Milky CaCO ₃ forms , after sometimes colour disappears (c) H ₂ gas, effervescence ,mixture becomes warm	1 1 1
27.	Displacement: In displacement reactions, a more reactive element displaces a less reactive element from its compound. A + BC → AC + B (e.g. Zn + CuSO ₄ → ZnSO ₄ + Cu). Double displacement: ions are exchanged between two reactants forming new compounds AB + CD → AD + CB (e.g. Na ₂ SO ₄ + BaCl ₂ → BaSO ₄ + NaCl)	3
28.	a) Balanced chemical equation: CaCO ₃ →(heat) CaO + CO ₂ b) Energy required: Light energy (for decomposition of AgCl). c) Silver chloride turns grey in sunlight because it decomposes into silver (Ag, grey) and chlorine gas (Cl ₂): 2AgCl →(sunlight) 2Ag + Cl ₂ d) Industrial application: Decomposition of limestone (CaCO ₃) to produce lime (CaO) in the cement industry.	1 1 1 1
29.	(i) Corrosion is the gradual destruction of metals by which it is converted into its unwanted form when react with substances in the environment, such as moisture, air, or acids. Example: Rusting of iron – when iron reacts with oxygen and water, it forms a reddish-brown substance called rust . Chemical equation: 4Fe + 3O ₂ + 6H ₂ O → 4Fe(OH) ₃ → Fe ₂ O ₃ ·xH ₂ O (rust) ii) Rancidity	1.5 1.5

	Rancidity is the spoilage of oils and fats in food due to oxidation, leading to bad smell and taste. Example: Fried snacks or chips that are left open for a long time become stale and smell bad due to rancidity. (b) Oils and fats containing food items are flushed with nitrogen gas to prevent rancidity. Nitrogen is an inert gas that does not react with fats or oils. It displaces oxygen inside the food packet, which slows down oxidation and helps keep the food fresh longer.	2
	Section C	
30.	A	1
31.	A	1
32.	A	1
33.	Bright white flame, white powder MgO, $\text{Mg(s)} + \text{O}_2\text{(g)} \rightarrow 2\text{MgO(s)}$ Combination reaction	2
34.	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O} \xrightarrow{\text{heated}} \text{FeSO}_4 + 7\text{H}_2\text{O}$ $2\text{FeSO}_4 \xrightarrow{\text{heated}} \text{Fe}_2\text{SO}_3 + \text{SO}_2 + \text{SO}_3$	2
35.	Skeletal chemical equation are unbalanced. We need to balance chemical equation because of law of conservation of mass. It states that 'matter can neither be created nor be destroyed'.	3
36.	This black substance is CuO. Formed due to oxidation of copper. $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$ Black coating can be turn reddish brown by reducing it with carbon or hydrogen.	1 1 1

37.	(a) Cathode- Hydrogen, Anode-Oxygen (b) the gas which is collected in double amount is hydrogen as it is present in the ratio of 2:1 with oxygen c) by bringing burning splinter near the gas it burns and pop-up sound is produced.	1 1 1
38.	a) Balanced chemical equation: $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$ b) Change in colour: Blue colour of CuSO_4 solution fades, reddish-brown copper deposit forms. c) Type of reaction: Displacement reaction (also redox). d) Reason: Iron is more reactive than copper, so it displaces copper from its salt solution. Copper, being less reactive, cannot displace iron.	1 1 1 1
39.	When a substance decomposes on heating, the reaction is called thermal decomposition. Calcium carbonate (CaCO_3) decomposes into quicklime (CaO) and carbon dioxide (CO_2) on heating. Chemical Equation: $\text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2\uparrow$ Photolytic Decomposition (Using Light) When a compound decomposes in the presence of sunlight, it is called photolytic decomposition. Silver chloride (AgCl) decomposes into silver (Ag) and chlorine gas (Cl_2) when exposed to sunlight. Chemical Equation: $2\text{AgCl} \xrightarrow{\text{sunlight}} 2\text{Ag} + \text{Cl}_2\uparrow$ Electrolytic Decomposition (Using Electricity)	2 2 1

	When electric current is passed through a compound to break it down, it is called electrolytic decomposition. Water (H₂O) decomposes into hydrogen (H₂) and oxygen (O₂) gases when electricity is passed through it. Chemical Equation: $2\text{H}_2\text{O} \rightarrow (\text{electricity}) 2\text{H}_2 + \text{O}_2\uparrow$	
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KENDRIYA VIDYALAYA SANGATHAN AGRA REGION
MARKING SCHEME (2026-27) CLASS X
SCIENCE – SUB CODE-086
CHAPTER – 02 ACID BASES AND SALTS

Max. Marks: 80

Time Allowed: 3 hours

Section – A (1 Marks)		
1.	C – Sulphuric acid	1
2.	B – Hydrogen	1
3.	C – Baking soda solution	1
4.	B – Lactic acid	1
5.	B – Washing soda	1
6.	C – Below 5.5	1
7.	B – It has no H ⁺ ions in gaseous state	1
8.	A (Both true and R correct explanation)	1
9.	A (Both true and R correct explanation)	1
10	Acids Turns blue litmus red. Release H ⁺ ions in aqueous solution. Bases Turns red litmus blue. Release OH ⁻ ions in Aqueous Solution	2
11	(i) $\text{Zn} + \text{HCL} \rightarrow \text{ZnCL}_2 + \text{H}_2\uparrow$ (ii) H ₂ gas, test: Gas burns with pop sound	2
12	Dry HCl has no H ⁺ ions; in aqueous medium it ionizes and produce H ⁺ ions	2
13	Universal indicator: A mixture of indicators showing a range of colors for different pH levels. It helps determine strength of acid/base by color change. acids and bases give different colour on it according to their strength	3
14.	Sodium carbonate (washing soda) is manufactured by the thermal decomposition of sodium hydrogen carbonate (baking soda) $\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$ $\text{Na}_2\text{CO}_3 + 10 \text{H}_2\text{O} \rightarrow \text{Na}_2\text{CO}_3.10\text{H}_2\text{O}$	3

15	a) Toothpaste is basic to neutralize mouth acids. b) Low pH erodes enamel. c) Ideal pH: ~7.2–7.6 d) Lactic acid.	4
16.	(i.) Acid With metals: $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ (ii) Acid With metal oxides: $\text{HCl} + \text{CuO} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$ (iii) Acid With carbonates: $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$ (iv) Base with metal $2\text{NaOH} + \text{Zn} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$ (v) Neutralisation: $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$	5
	Section B	
17.	B – $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$	1
18	(b) Baking soda	1
19	(d) (ii) and (iv)	1
20	(c) absorb moisture from the gas	1
21	(d) Oxalic acid	1
22	(d) weak acid and strong base	1
23	(ii) Bulb will glow because NaOH furnishes ions for conduction.	1
24	C	1
25	To prevent souring of milk since baking soda is a mild base , It increases shelf life of milk	2
26	White colour powder ,	3

	(Calcium Sulphate Hemihydrate, $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \rightarrow \square \text{CaSO}_4 \cdot 12\text{H}_2\text{O} + 32\text{H}_2\text{O}$ Uses: Making casts, molds, and sculptures.	
27	(i) The cake will taste bitter (ii) by adding appropriate edible acid (iii) Sodium hydrogen carbonate, NaHCO_3	3
28	a) Acidic waste lowers water pH, harming aquatic life. b) Neutralize with base before disposal. c) Lime ($\text{Ca}(\text{OH})_2$) d.) Maintains ecological balance and prevents pollution.	4
29	a) Bleaching Powder (Calcium Oxychloride, CaOCl_2) $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ for bleaching cotton and linen in the textile industry, as an oxidising agent b) Sodium hydroxide Chemical formula – NaOH for manufacturing of paper, soap, detergents	3 2
	Section C	
30	(d) bases, which are soluble in water	1
31	(c) aqueous solution of sodium chloride	1
32	A	1
33	Phenolphthalein is a colourless liquid. It remains colourless with acid but turns into pink with a base. Methyl orange turns into the red with acid and turns into yellow with base.	2
34	$\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$ $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$	2
35	Stomach pH: Normally ~ 1.5 – 3.5 due to HCl produced in stomach If pH rises (less acidic) then digestion is affected; if it drops too low, causes ulcers.	3
36	Water of crystallization: Fixed number of water molecules in a salt. Examples: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (blue vitriol) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ (washing soda)	3
37	Both produce ions in water Both acids and bases act as electrolytes, so are good conductors of electricity. change the colour of the litmus paper	3

38	(a) pH 2 (b) pH 7 (c) pH 9 Order: $9 < 7 < 4 < 2$	4
39	a) heat is evolved gradually when a concentrated acid is added to water and the large amount of water easily absorb the heat If, however, water is added to concentrated acid to dilute it, a large amount of heat is evolved at once and may cause injury. b) glucose and alcohol do not show acidic character because the hydrogen in them does not separate out as hydrogen ions $[H^+ (aq)]$ on dissolving in water.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

MARKING SCHEME (2026-27) CLASS X

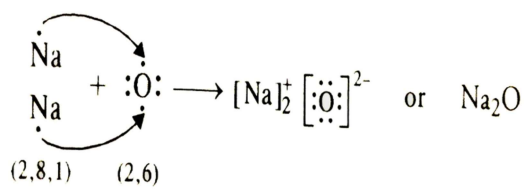
SCIENCE – SUB CODE-086

CHAPTER – 03 METALS AND NON-METALS

Max. Marks: 80

Time Allowed: 3 hours

Q.No	SECTION-A	Marks
1.	C	1
2.	C	1
3.	B	1
4.	B	1
5.	B	1
6.	B	1
7.	C	1
8.	C	1
9.	A	1
10.	Good conductor- Iron and copper ; poor conductor- lead and mercury	2
11.	Compound X must be iron (III) oxide, Fe ₂ O ₃ . The reaction is known as 'thermite reaction'. $\text{Fe}_2\text{O}_3(s) + 2\text{Al}(s) \longrightarrow 2\text{Fe}(l) + \text{Al}_2\text{O}_3(s)$	2
12.	1. Ionic compounds are solids and are hard 2. Ionic compounds have high melting and boiling points.	2
13	1. Displacement Reaction in test tube containing copper sulphate solution 2. The reaction is not taking place in the test tube containing iron sulphate solution because Cu is less reactive than Fe.	3
14.	i. $4\text{Al}(s) + 3\text{O}_2(g) \rightarrow 2\text{Al}_2\text{O}_3(s)$ ii. $2\text{K}(s) + 2\text{H}_2\text{O}(l) \rightarrow 2\text{KOH}(aq) + \text{H}_2(g) + \text{Heat Energy}$ $3\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$	3
15.	1- Zinc metal displaces copper from copper sulphate solution, ZnSO ₄ 2- By adding dilute sulphuric acid 3- Copper is less reactive than zinc, hence copper is unable to displace zinc	4
16	1- Na 2- Sodium metal is highly reactive element and it can catch fire on	5

	exposure to moisture. 3- Na₂O 	
SECTION B		
17	(a) Iron	1
18	(a) Mercury	1
19	C. (ii) and (iii)	1
20	(a) Cu	1
21	B. Salt and hydrogen gas	1
22	C. Mg > Al > Zn > Fe	1
23	(b) 2,7	1
24	C	1
25	Oxides of metals which can react with both acids and bases to produce salt and water. Such oxides are known as Amphoteric Oxides . Examples Al₂O₃ and ZnO	2
26	The name of the phenomenon is corrosion. The chemical name of black coating is silver sulphide (Ag₂S) formed due to attack of H₂S gas present in the atmosphere on silver that of green coating is basic copper carbonate formed due to attack of moist air (CO₂, O₂ and H₂O vapours) on copper.	3
27	Hydrogen gas is not evolved when metals react with nitric acid (HNO₃) because it is a strong oxidising agent and it oxidises the H₂ produced to water and is itself reduced to oxides of nitrogen. Mg and Mn react with very dilute HNO₃ and hydrogen gas is evolved	3
28	1- Na and K 2- Electrolytic reduction is done in case of the metals high in the activity series and electrolytic refining is done for purifying metals. 3- During the purification of metal by the process of electrolytic refining the insoluble impurities deposited at anode is called anode mud. 4. Pure metal is deposited at cathode	4
29	I. Oxides of these metals are reduced to metal by simply heating. II. The sulphide ores are converted into oxides by heating strongly in the	5

	presence of excess air. This is called as Roasting. III. IV. $2\text{Cu}_2\text{O} + 3\text{O}_2 + \text{heat} \longrightarrow 2\text{Cu}_2\text{O}(\text{s}) + 2\text{SO}_2(\text{g})$ On further heating: $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} + \text{heat} \longrightarrow 6\text{Cu}(\text{s}) + \text{SO}_2(\text{g})$. IV. They occur in a free state. Example- Gold	
30	b) Hydrogen	1
31	d) Nitrogen	1
32	A	1
33	An alloy is a homogeneous mixture of a metal with other metals or non metal. Alloying is used to prevent corrosion Brass, Bronze	2
34	Mg $\text{Mg}^{2+} + 2\text{e}^-$ EC = 2,8,2 2,8 Cl $+ 1\text{e}^-$ Cl $-$ EC = 2,8,7 2,8,8	2
35	Element A is sodium metal (Na) as it burns with a golden flame. Element B with atomic number 17 is chlorine (Cl). Sodium and chlorine combine to form sodium chloride, NaCl(compound C). We can write the reaction as $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$. An aqueous solution of NaCl on electrolysis gives the compound D, sodium hydroxide(NaOH). We can write the reaction as $2\text{NaCl}(\text{aq}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{NaOH}(\text{aq}) + \text{Cl}_2(\text{g}) + \text{H}_2(\text{g})$	3
36	i) Mineral----- The naturally occurring chemical substance which ,contains metals (ii) Ore -----The minerals from which metals can be extracted economically on large scale (iii) Gangue ----- The big impurities present in ore/minerals are called gangue.	3
37	X is Na because the molecular mass of NaOH is 40. $\text{Na}(23) + \text{O}(16) \rightarrow \text{NaOH}(40)$ Hence, • X is Sodium. • Y is Sodium hydroxide. • Z is hydrogen, which catches fire when it reacts with water.	3

	$2 \text{ Na} + 2 \text{ H}_2\text{O} \rightarrow 2 \text{ NaOH} + \text{H}_2.$	
38	(a) Iron should be selected. It is because metals are sonorous, i.e. They produce sound when struck with a hard substance. (b) It is because copper is good conductor of electricity. (c) Mercury, used in thermometers (d) Gallium	4
39	(a) a layer of aluminium oxide is formed on the metal.. This prevents further reaction of aluminium. (b) Sodium and magnesium tend to react with oxygen rather than carbon (c) due to presence of ions in molten state (d) Iron articles are galvanised to prevent them from rusting because (e) Metals such as Na, K, Ca and Mg are highly reactive metals, and hence they are not found in their free state.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

MARKING SCHEME (2026-27) CLASS X

SCIENCE – SUB CODE-086

CHAPTER – 04 CARBON AND ITS COMPOUNDS

Max. Marks: 80

Time Allowed: 3 hours

Section -A

1. Sodium ethoxide and hydrogen
2. 5% – 8% acetic acid in water
3. b) The fuel is not burning completely
4. c) Carboxylic acids
5. a) An acid and an alcohol
6. a) Ethyl alcohol which has been made unfit for drinking purpose by adding small amount of poisonous substance
7. a) Ethanoic acid
- 8.(a) Both Assertion and Reason are correct and Reason is correct explanation of Assertion.
9. (c) Assertion is correct but Reason is incorrect
10. A homologous series is a group of organic compounds with similar functional group and chemical properties, differing by a CH₂ group.
 1. All the members of a homologous series have the same general molecular formula.
 2. The methods of preparation and chemical properties of any member of the series are similar.
 3. The physical properties such as melting point, boiling point in a homologous series change gradually as we go down the series
- 11.(i) $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{CH}_3\text{COONa}$ (sodium ethanoate) + H₂O
(ii) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightarrow \text{CH}_3\text{COOC}_2\text{H}_5$ (ethyl ethanoate) + H₂O
12. Benzene:

soap molecules form structures called micelles, where hydrocarbon end of the molecules is towards the oil droplet while the ionic-end faces outside towards water. When we use water to rinse the cloth then all the micelles are removed along with dirt.

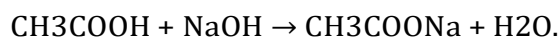
In Hard water soap form scum

Solution: using Detergents

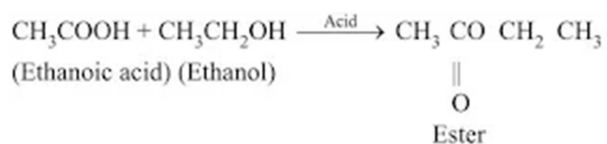
15.

- a) Ethanol: Cleaner fuel due to cleaner combustion
- b) $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$
- c) ethanol burns cleanly and is less harmful to the environment.
- d) Another biofuel: Biodiesel

16. (a) (CH_3COOH) . weak acid. carboxylic acid group $(-COOH)$.



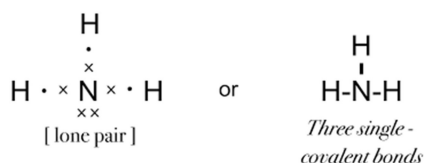
(b) sweet-smelling substance known as Esters



used in making perfumes and flavouring agents.

Section -B

- 17. a) Sodium nitrate
- 18. b) glycerol
- 19. d) All of above
- 20. (c) simple esters
- 21. (d) Ketone
- 22. c) Addition reaction
- 23. a) Hydrophilic head and a hydrophobic tail
- 24. Both Assertion and Reason are correct and Reason is correct explanation of Assertion.
- 25. 10 single bonds and 1 double bond
- 26. a) Nitrogen shares 3 electrons with 3 hydrogen atoms to form ammonia (NH_3) .



b) Carbon shares valence electrons to form covalent bonds and achieve a stable electronic configuration.

27. Soap in hard and soft water

- Soft water: Rich lather forms easily
- Hard water: Little or no lather forms, scum precipitates

Reason: Hard water contains Ca^{2+} and Mg^{2+} ions that react with soap to form insoluble scum.

Salt formed: Calcium or magnesium salts of fatty acids (e.g., $(\text{RCOO})_2\text{Ca}$)

28. Chemical name: Acetic acid (CH_3COOH)

Reaction: $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CH}_3\text{COONa} + \text{CO}_2 + \text{H}_2\text{O}$

Gas released: Carbon dioxide (CO_2)

Test: Limewater test (CO_2 turns limewater milky)

Role in baking: CO_2 bubbles help dough rise.

29 a) Soaps are sodium or potassium salts of long-chain fatty acids (RCOONa or RCOOK)

b) Detergents are useful for cleaning but can be harmful due to their potential to pollute water and harm aquatic life.

c) Soaps are formed by reacting triglycerides (fats/oils) with alkali (NaOH or KOH) through saponification.

d) Saponification: Formation of soap from triglycerides and alkali

Esterification: Formation of ester from carboxylic acid and alcohol.

Section -C

30. b) Presence of sunlight

31.b) Hydrocarbon end directed towards the centre and ionic end directed outwards

32. Both Assertion and Reason are correct and Reason is correct explanation of Assertion.

33. Ethanol is used as a fuel due to its renewable nature and cleaner combustion. Advantage: Reduces greenhouse gas emissions.

34. The compounds containing carbon and hydrogen elements only, are called Hydrocarbons.

Alkane General formula is C_nH_{2n+2} .

Methane (CH_4), Ethane (C_2H_6)

35.a) Covalent compounds are poor conductors due to lack of free ions.

b) Ethanoic acid: CH_3COOH , Butyne: C_4H_6

36.a) Ethanol (C_2H_5OH)

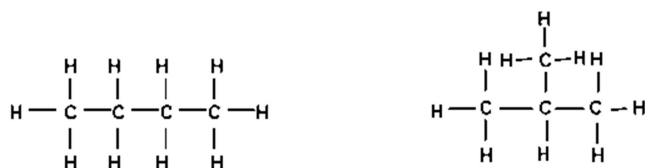
b) $2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2$

c) Antiseptic or solvent

37. a) Carbon's unique properties include catenation and tetravalency. Due to these it forms large number of compounds.

b). The existence of two or more compounds having the same molecular formula but different structural formulae is called Isomerism.

Example - Structural Isomers of Butane



38. a) Glacial acetic acid: Pure, anhydrous ethanoic acid.

b) Weak acid due to partial dissociation in water.

c) $CH_3COOH + C_2H_5OH \rightarrow CH_3COOC_2H_5 + H_2O$

d) Glacial acetic acid forms ice-like crystals when cooled

39. a) CH_3Br (methyl bromide), C_2H_5Br (ethyl bromide)

b) $-CHO$: Aldehyde, $-CO-$: Ketone

c) $KMnO_4$ oxidizes ethanol to ethanoic acid, changing color from purple to brown/colorless.

d) Saturated hydrocarbons: Single bonds, Unsaturated hydrocarbons: Double or triple bonds.

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

MARKING SCHEME (2026-27) CLASS X

SCIENCE – SUB CODE-086

CH 5- LIFE PROCESSES

Max. Marks: 80

Time Allowed: 3 hours

SECTION A

1. (C) (i) and (iv) 1
2. (D) Pepsin 1
3. (d) a fungi, Rhizopus 1
4. (d) The villi of the small intestine absorb water from the unabsorbed food before it gets removed from the body via the anus.
1
5. (C) Cuscuta, ticks, lice, leeches and tapeworm 1
6. (D) Cytoplasm and Oxygen deficient muscle cells 1
7. (C) starch into simple sugars 1
8. (B): Both A and R are true, but R is not the correct explanation of A. 1
9. (C) Assertion (A) is true, but Reason (R) is false. 1

10. Muscle cramps during running are caused by the accumulation of lactic acid in the muscles due to anaerobic respiration, which occurs when there is insufficient oxygen supply. Anaerobic respiration produces lactic acid, whereas aerobic respiration uses oxygen and produces carbon dioxide and water.

2

11. Leaves of a plant help in excretion in two main ways 2
Transpiration, through which water vapour and dissolved waste products are released via stomata.
By shedding leaves containing accumulated solid or metabolic waste (any plants store waste materials in the vacuoles of mesophyll cells and epidermal cells.)

12. Small intestine has numerous finger like projection called as villi which increase the surface area of absorption. 2

Or

Fish have a single circulation where their two-chambered heart (one atrium, one ventricle) pumps deoxygenated blood to the gills for oxygenation. This oxygenated blood then travels directly to the body's organs, and the deoxygenated blood returns to the heart to complete the circulation.

13. a. Name: Hemoglobin, Function: Transports oxygen from lungs to body tissues. 3
- b. Lungs contain residual air to prevent alveoli from collapsing and to allow continuous gas exchange.
- c. ATP is called the energy currency because it stores and provides energy for all cellular activities.

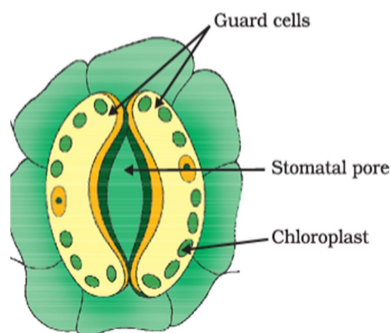
14. Water is absorbed by root hairs from the soil. 3
It moves up through the xylem vessels in the stem and reaches the leaves.
Water evaporates from the stomata in leaves (transpiration).
This creates a pressure (transpiration pull) that pulls water upward from roots to leaves.

15. . (i) Atmospheric air contains about 0.03% carbon dioxide, so it takes longer for lime water to turn milky in diagram(I).

4

Exhaled air contains a higher concentration of carbon dioxide (about 4-5%), so lime water turns milky faster in diagram (II).

(ii)



Two functions of stomata: Gas exchange: Allows entry of CO_2 and release of O_2 during photosynthesis.

Transpiration: Helps in the loss of water vapor, aiding in water transport and cooling

16. (a) i) Renal artery brings oxygenated blood to the kidney.

5

(ii) The cluster of thin-walled blood capillaries present in the Bowman's capsule is called the glomerulus.

(b) The organ which stores urine is the urinary bladder. It is under nervous control.

(c) Selective reabsorption takes place in the proximal convoluted tubule of the nephron.

The amount of water reabsorbed depends on: The body's need for water (hydration level), Concentration of salts in the blood

SECTION B

17. (D) Amount of water in guard cells

1

18. (B) Capillaries

1

19. (C) Mucus and Pepsin

1

20. (b) B and D

1

21. (B) (iii), (ii), (iv), (i), (v)

1

22. (D) Cytoplasm and Mitochondria

1

23. (A) nephron

1

24. (C) Assertion (A) is true, but Reason (R) is false.

1

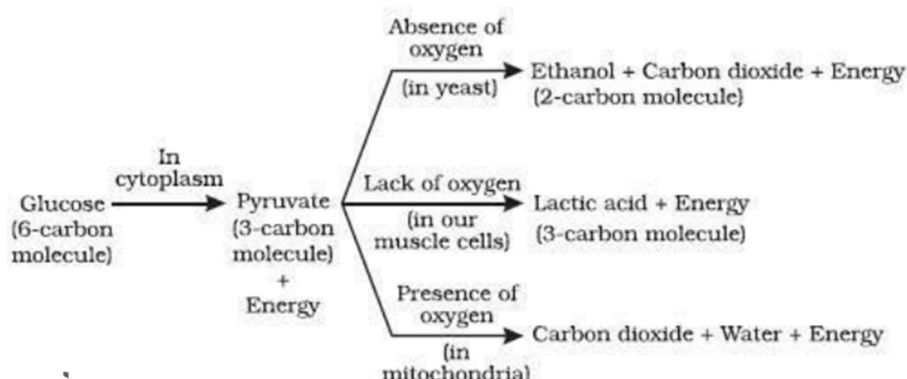
25. Two protein-digesting enzymes secreted during digestion in humans are pepsin and trypsin. 2
Pepsin is secreted by the gastric glands in the stomach, while trypsin is secreted by the pancreas.

Or

The enzyme salivary amylase is present in our mouth, produced by the [salivary glands](#). If the salivary glands stop secreting amylase, the initial breakdown of carbohydrates in the mouth will not occur.

26. i) KOH absorb CO_2 , making the environment CO_2 -free to test its necessity in photosynthesis. 3

ii) The jar without KOH will show starch test (blue-black) because CO_2 is present, allowing photosynthesis.



28. (a) **Photosynthesis** – The process by which green plants prepare food using sunlight, carbon dioxide, and water.

4

(b) **Equation:** $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

(c) (i) Sequence of events in synthesis of food by desert plants:

Sunlight is absorbed by chlorophyll in the leaves or stem.

Water is absorbed from the soil through roots.

Carbon dioxide enters through stomata.

Using light energy, carbon dioxide and water are converted into glucose.

Oxygen is released as a by-product.

OR

(ii) (I) Cloudy weather reduces sunlight, so photosynthesis slows down.

(II) Dust blocks stomata, reducing CO_2 intake, hence photosynthesis decreases.

29. i) Herbivores have longer intestines to digest tough plant cellulose and carnivores having shorter ones for easily digestible meat.

5

(ii) **Role of pancreas and bile juice in digestion in humans:**

- **Pancreas** secretes pancreatic juice containing enzymes:

Amylase → breaks starch into simple sugars.

Trypsin → digests proteins into amino acids.

Lipase → breaks down fats into fatty acids and glycerol.

- **Bile juice** (from liver, stored in gall bladder):

Bile emulsifies fats and makes the medium alkaline.

(iii) Rings of cartilage are present in the throat ensure that the air-passage does not collapse.

(iv) Ribs move up/out and diaphragm flattens to increase lung volume for air intake.

SECTION C

30. (B) Hydrochloric acid, Pepsin, Mucus

1

31. (A) Nasal cavity → Trachea → Bronchi → Alveoli

1

32. (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion A).

1

33. (1) The absorption of light energy by chlorophyll, (2) The conversion of this light energy into chemical energy, leading to the splitting of water molecules into oxygen and hydrogen, and (3) the reduction of carbon dioxide into carbohydrates (glucose)

2

34. To prevent the entry of harmful microbes and maintain blood pressure .Platelets gather at the injury site, sticking to the vessel wall, and forming a temporary plug that initiates the formation of a blood clot to seal the wound.

2

Or

The plant transport system is slower because plants lack pumping organ and depends on slower passive mechanisms like diffusion, osmosis, and transpiration pull

Phloem helps in translocation of food which is active process and ATP is used in this process.

35.(i) Oxygenated blood to left atrium→ Pulmonary veins

3

(ii) Deoxygenated blood to right atrium → Superior and Inferior vena cava

Deoxygenated blood enters the right atrium and is pumped to right ventricle .From right ventricle it is pumped to lungs through the pulmonary artery.

Veins have thin walls because blood flows at low pressure.

36. (a) **Respiration Type** ----

Products

3

Aerobic ----

Carbon dioxide (CO₂) + Water (H₂O) + Energy (ATP)

Anaerobic ----

Lactic acid + Energy (ATP)

(b) Respiration and Photosynthesis in plants (Gas released):

Process

Gas Released

Respiration -- Carbon dioxide (CO₂)

Photosynthesis -- Oxygen (O₂)

(c) Respiration organs in terrestrial animals and fishes:

Organism Type

Organ/Organ System

Terrestrial animals -- Lungs

Fishes -- Gills

37. a) X is Bowman's capsule.

3

Role: It helps in initial filtration (water, salts, glucose, urea, etc

b).Because the initial filtrate contains both useful substances and wastes. Useful substances like glucose, certain salts, and water are selectively reabsorbed into the blood to prevent loss and maintain homeostasis.

Waste substances remain in the filtrate and form urine.

38. **1. Objective of the experiment:**

4

To prove that **sunlight is essential for photosynthesis.**

2. Steps involved

(Materials needed:

two healthy potted plants, black paper, paper clips/pins, alcohol, iodine solution, beaker, burner.)

a. Take two healthy potted plants of the same species.

b. Keep both plants in a dark place for 2–3 days to **destarch** the leaves.

c. Expose both plants to the same environment, but cover part of one leaf with **black paper** (to block sunlight) while leaving the rest exposed.

d. Keep the plants in sunlight for a few hours.

e. Pluck the leaves (one covered and one uncovered).

f. Boil them in **alcohol** to remove chlorophyll.

g. Dip the leaves in warm water to soften.

h. Test the leaves with **iodine solution** to check for starch.

3. Observation:

The uncovered part of the leaf turns blue-black.

The covered part (which didn't get sunlight) does not change color.

4. Conclusion:

Only the part of the leaf that received sunlight showed presence of starch, proving that sunlight is essential for photosynthesis.

39 (i) Pancreatic Juice contains the following enzymes and salts:

5

1. **Amylase** – breaks down starch (carbohydrates) into simple sugars like maltose.
2. **Trypsin** – digests proteins into simpler peptides and amino acids.
3. **Lipase** – breaks down fats into fatty acids and glycerol.
4. **Bicarbonate salts** – make the medium **alkaline**, which is necessary for the enzymes of the small intestine to work effectively.

(ii) Sphincter muscle is a muscle which regulates food movement in one direction .

The exit of food from the stomach is regulated by a sphincter muscle which releases it in small amounts into the small intestine. The waste material is removed from the body via the anus. The exit of this waste material is regulated by the anal sphincter.

KENDRIYA VIDYALAYA SANGATHN AGRA REGION

PRACTICE PAPERS (2026-27) CLASS X

SCIENCE (086)

CH- 6, CONTROL AND COORDINATION

MARKING SCHEME

Marks: 80

TimeAllowed:3hours

SECTION –A		MARKS
1	c) Hydrotropism	1
2	c)Medulla oblongata	1
3	d)Ethylene	1
4	b) Emergency situations	1
5	b) pituitary	1
6	a .Oestrogen	1
7	b)The plant uses electrical-chemical signals to transfer information from cell to cell.	1
The following two questions consist of two statements–Assertion (A) and Reason(R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of C. A is true R is false. D. A is false R is true.		
8	C. A is true, R is false	1

9	A.Both A and R are true, and R is the correct explanation of A	1
10	Electrical impulses are faster and provide quick response, unlike chemical messages which are slower than the electric impulse.	2
11	A.Tropic movements are growth-related directional movements that depend on the stimulus's direction, while nastic movements are non-directional movements that do not depend on the stimulus's direction and are often caused by changes in turgor pressure. Tropic movements are slow responses involving differential growth, such as a plant's stem growing towards light (phototropism), whereas nastic movements are fast responses to stimuli like touch or temperature, such as a mimosa plant's leaves folding up when touched (thigmonasty). (any 2 differences) OR B.The tiny gap between two nerve cells is called synapse. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in a dendrite of the next neuron. Thus, information is transmitted from one nerve cell to other nerve cell by synapse.	2
12	Receptors are specialized cells or organs that detect specific stimuli from the environment and convert them into nerve impulses, while effectors are organs, muscles, or glands that respond to the command received from the motor neuron by carrying out an action, such as movement or secretion. Examples of receptors include the eyes for detecting light and the ears for detecting sound, whereas examples of effectors include muscles that contract in response to a signal and glands that release substances like hormones.	2
13	Movement of leaves of the sensitive plant 1. It does not depend on the direction of stimulus applied. 2. Touch is the stimulus. 3. Caused by the sudden loss of water from the swellings at the base of leaves. 4. Occurs very fast Movement of a shoot towards light 1. Depends on the direction of stimulus applied. 2. Light is the stimulus. 3. Caused by the unequal growth on the two sides of the shoot. Occurs slowly.	3
14	A. Oxytocin a-pineal b-pituitary, c-thyroid d-thymus	3
15	a) Answer: (a) The phenomenon shown by the flowers of plants A and B is photonasty. (b) A flower which behaves like the flower of (i) plant A is sunflower or dandelion and (ii) plant B is moonflower.	4

	(c) The leaves of plant C exhibit thigmonasty. E. A plant whose leaves behave like those of plant C is <i>Mimosa pudica</i> .	
16	Attempt either option A or B. A. i) The medulla oblongata controls <i>involuntary activities</i> such as breathing, heartbeat, swallowing, blood pressure, and digestion. Therefore, these functions will be disturbed. ii) Because the medulla regulates vital processes like respiration and heartbeat, injury to it can stop breathing and circulation, leading to death. ii) Medulla oblongata: Controls involuntary actions (breathing, heartbeat, swallowing, etc.). Cerebrum: Controls voluntary actions (thinking, memory, reasoning, intelligence etc) iv) 1.Skull (cranium): Hard bony case that encases the brain. 2. Cerebrospinal fluid (CSF): Cushions the brain against shocks and injuries. OR B. i) Phototropism: The growth movement of a plant in response to light. Stem shows positive phototropism (bends towards light). Root shows negative phototropism (grows away from light). A plant hormone called auxin controls phototropism. When light falls on one side of the stem, auxin accumulates on the shaded side. Cells on the shaded side elongate more due to higher auxin concentration. This unequal growth causes the stem to bend towards light. Activity to demonstrate phototropism: Take a potted plant with straight, vertical shoots. Keep it in a dark room with a small hole on one side so that light enters from only one direction. After a few days, you will observe the shoots bending towards the source of light. This proves phototropism.	5
	ii) The growth of plant parts in response to some chemical stimulus is called chemotropism. Example Growth of pollen tube towards ovule.	
Section –B		
17	Correct Answer: Option (d)	1
18	(a) Olfactory receptors → dendritic tip of a nerve cell → axon → nerve ending → release of the signal dendritic tip of another nerve cell.	1

19	(a)Bright light →receptors in eyes →sensory neuron→spinal cord→motor neurons →eyelid closes	1
20	(b)To stimulate growth in all organs	1
21	(d)Absciscic acid	1
22	d)Iron is essential for the synthesis of thyroxin.	1
23	(c)Rapid cell division and elongation in tendril cells that are away from the support	1
The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true ,and R is the correct explanation of A. B. Both A and R are true,and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.		
24	Both A and R are true, R is the correct explanation	1
25	(a)Hormone secretion is stimulated and increased by positive feedback. The hormone's production is stopped and inhibited by negative feedback. For instance, eating foods high in carbohydrates causes the blood glucose level to rise. The pancreas secretes insulin as blood glucose levels rise. When sugar level falls, insulin secretion reduces.To stimulate growth in all organs	2
26	Attempt either option A or B. A. (i) Nervous system: - Information, acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals (neurotransmitter). These chemicals synapse and start a similar electrical impulse in a dendrite of the next neuron. (ii) Endocrine system: - endocrine system chemical messenger hormones conduct the message. The hormone is secreted by the ductless glands like pancreas, testes, ovaries, adrenaline glands OR B. (i) Positive phototropism: shoots growing towards light. (ii) Negative phototropism: roots growing away from light towards ground. (iii) Positive geotropism: growth of roots towards earth due to the pull of the earth. (iv) Negative geotropism: shoots growing away from the earth.	3

	(v) Hydrotropism: roots growing towards the source of water Chemotropism: growth of pollen tubes towards the ovules 3	
27	Three diseases caused by excess or deficit secretions of endocrine glands: 1. Diabetes mellitus Gland involved: Pancreas (Islets of Langerhans) Cause: <i>Deficiency of insulin</i> hormone Effect: Blood glucose level rises because cells cannot utilize glucose properly. 2. Goitre • Gland involved: Thyroid gland • Cause: <i>Deficiency of thyroxine</i> , often due to lack of iodine in diet • Effect: Enlargement of thyroid gland in the neck. 3. Gigantism and Dwarfism • Gland involved: Pituitary gland • Cause: ○ <i>Excess secretion</i> of Growth Hormone (GH) during childhood → Gigantism (abnormally tall stature). ○ <i>Deficiency of GH</i> during childhood → Dwarfism (abnormally short stature).	3
28	a) Receptor P – Thermoreceptor; Neuron Q – Sensory; Organ R – Spinal cord (b) Neuron S – Relay; Neuron T – Motor (c) Tissue U – Muscle Reflex action	4
29	Attempt either option A or B. A.) i) The movement in sensitive plants, such as <i>Mimosa pudica</i> , is a unique phenomenon. It occurs through a process called thigmonasty, where the plant responds to touch or mechanical stimulation. This response is driven by changes in cell turgor pressure. When stimulated, certain cells rapidly lose water, leading to a loss of pressure that causes the leaves to fold inward and droop. In contrast, movement in human legs is a complex, voluntary action controlled by the nervous system. It involves a coordinated effort between the brain, spinal cord, and neuromuscular system. When we decide to move our legs, the brain sends electrical signals through motor neurons to the muscles in the legs. ii) Control and coordination in living organisms help to maintain balance in the body or homeostasis and respond to changes occurring in the environment. Such systems enable animals to process information, make appropriate decisions, respond, survive and function properly. OR B.) i) Phytohormones, also known as plant hormones, are organic compounds that regulate various physiological processes in plants. They play crucial roles in growth, development, and responses to environmental stimuli. Four types of phytohormones include: 1. Auxins 2. Gibberellins 3. Cytokinin 4. Absciscic acid	5

	ii) Functions of cytokinin :-a) Helps in promoting cell division and growth of the plant. b) It slow down the aging process (senescence) in leaves and cut flowers	
SECTION- C		
30	(b)Phototropism	1
31	(a) Dendrite -> cell body - > axon -> nerve ending	1
The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.		
32	A. Both A and R are true, and R is the correct explanation of A.	1
33	a. Sensory neuron b. Spinal cord c. Motor neuron d. Muscle	2
34	The Peripheral Nervous System (PNS) is a network of nerves that branches out from the spinal cord and brain to connect the central nervous system (CNS) to the rest of the body. It is responsible for transmitting sensory information from the body to the brain and spinal cord, as well as carrying motor signals from the brain and spinal cord to the muscles and glands. The two main components of the Peripheral Nervous System are: - Cranial Nerves: These are the nerves that emerge directly from the brain. e. Spinal Nerves: These are the nerves that arise from the spinal cord.	2
35	Involuntary actions are actions that are not under conscious control and are typically automatic or reflexive in nature. These actions are often driven by physiological processes or external stimuli, rather than by conscious decision-making. Examples of involuntary actions include blinking, breathing, and the contraction of muscles in response to a stimulus. Involuntary actions are essential for the functioning of the body and are typically regulated by the autonomic nervous system. Voluntary actions, on the other hand, are actions that are consciously initiated and controlled by an individual. These actions are typically goal-directed and require a level of cognitive processing and decision-making. Voluntary actions involve the activation of the motor cortex in the brain, which sends signals to the muscles to carry out the desired action. Examples of voluntary actions include walking, talking, and reaching for an object.	3

36	a.) Loss of sensation- Hypothalamus b.) Lowered ability to salivate- medulla oblongata c.) Difficulty in maintaining posture and balance-Cerebellum	3
37	The sudden involuntary movement in a voluntary organ; in response to a stimulus; is called reflex action. Examples of reflex action: (a) Moving your hand away from a hot iron plate (b) Blinking of eyes Reflex Arc. The reflex arc is a path of electrical impulse during a reflex action. It is composed of sensory neurons, the spinal cord, motor neurons and muscles. Steps of the reflex arc • The sensory neuron picks signals from the stimulus and carries the signals to the spinal cord. • Spinal cord process the signals and sends a message through the motor neuron. Motor neuron transmits the signals to the effector muscle so that the muscle can take immediate action.	3
38	(a)W – Pancreas; X – Insulin; (b)controls blood sugar levels (c) Y – Diabetes; Z – Diabetic patient; (d)Advice – diet control, exercise, medication	4
39	i) Wwhen an electrical signal reaches the axonal end, it releases a chemical substance(neurotransmitter). This chemical then moves towards the dendrite end of the next neuron where it generates an electrical signal. Since neurotransmitters are only released from axon terminals and receptors are only present on dendrites, the signal transmission is unidirectional (axon → dendrite) and cannot happen in the reverse direction. ii) - Dendrite - Cell body - Axon - Axon terminal/nerve endings Function- - Dendrites receive nerve impulses. - Nerve endings releases a chemical substance(neurotransmitter)	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

SUBJECT SCIENCE (086)

MARKING SCHEME

CLASS- X (2026-27)

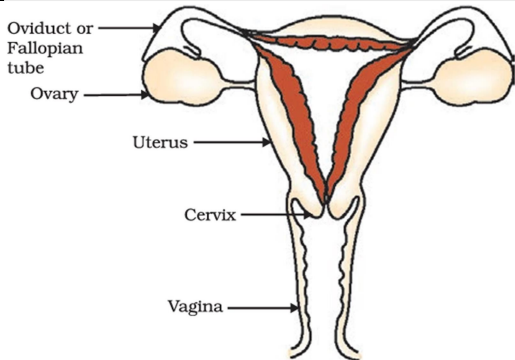
CHAPTER- 07 HOW DO ORGANISMS REPRODUCE

SECTION A		
1	D) Fertilization	1
2	C) Plasmodium	1
3	B) Both parts regenerate	1
4	D) Provides the site for fusion of gametes.	1
5	B) Females, by cutting fallopian tubes	1
6	C) Introduces variation in population	1
7	B) Ovum is fertilized by sperm	1
8	C. Assertion (A) is true, but Reason (R) is false	1
9	A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1
10	Tissue culture is a biotechnological technique for growing plant cells, tissues, or organs on a sterile nutrient medium in a laboratory. This method is used to produce many genetically identical plants	2
11	Produces plants genetically identical to parent. Enables propagation of seedless plants (banana, sugarcane, rose, jasmine). Or Fermentation, production of alcohol, beer and food articles like bread making etc.	2
12	Fragmentation- Parent body breaks down into small fragments and each fragment gives rise to a new individual. Fragmentation example – Spirogyra Regeneration - regaining of the lost part and making the new individual. Regeneration example – planaria or any other example.	2

13	Banana: Vegetative propagation (asexual). Papaya: Sexual reproduction (seeds). Differences: Sexual reproduction involves gamete fusion; asexual does not. Asexual offsprings are genetically identical; sexual offsprings show variations.	3
14	Variation helps species survive in changing environments. Some individuals with useful variations can adapt, survive, and reproduce. Example: When antibiotics are used, most bacteria die, but the resistant ones survive and reproduce. This variation helps the bacterial species survive despite the environmental change (presence of the antibiotic).	3
15	Budding: New individual forms as an outgrowth called bud on parent body (Hydra). Multiple fission: Nucleus divides repeatedly; cytoplasm divides later and form many daughter cells at once (Plasmodium). Both are asexual reproduction and involve a single parent. Multiple fission is faster since many offspring are produced simultaneously. OR a) Testes b) Testosterone c) Two functions of the sperm are: 1. To carry and transfer the father's genetic material (DNA) to the egg during fertilisation. 2. To enable fertilisation by swimming towards and fusing with the female egg cell.	4
16	A - seminal vesicle, B-prostate gland (b) Testosterone Role of testosterone- Stimulates development of Secondary Sexual Characteristics, sperm production C - sperms, D - sperms / semen and urine. For visually impaired (a) A - seminal vesicle, B-prostate gland	5

	(b) Testosterone Role of testosterone- Stimulates development of Secondary Sexual Characteristics, sperm production (i) sperms (ii)sperms / semen and urine .	
SECTION- B		
17	D) All of the above	1
18	A)Hydra and planaria	1
19	B) Asexual Reproduction	1
20	A) Ovary	1
21	C) Binary Fission	1
22	C)Leaf	1
23	B) Ovule	1
24	A. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1
25	STDs: Sexually Transmitted Diseases (e.g. AIDS, syphilis, gonorrhoea, warts). Prevention: (i) Avoid unsafe sexual practices (ii) Use of condoms or any other method.	2
26	Regeneration: Ability of an organism to form a complete individual from its body parts. Regeneration is carried out by specialised cells. These cells proliferate and make large numbers of cells. Example: Planaria can be cut into any number of pieces and each piece grows into a complete organism. Complex organisms cannot regenerate as their body cells are highly specialized & organized. OR (a) Vasectomy in males and tubectomy in females (b) By changing the hormonal cycle or the time of ovulation.	3
27	DNA copying ensures transfer of genetic material to next generation. Accurate DNA copying maintains the basic body design of a species, while occasional errors (mutations) create variations. In sexual reproduction, DNA comes from two parents, recombination increases variation	3

28	(i) Barrier → Condom, Surgical → Vasectomy/tubectomy. (ii) Oral pills alter hormonal balance to stop ovulation. (iii) Prevent unwanted pregnancies, control population, protect against STDs. OR (i) The mode of reproduction in <i>Bryophyllum</i> is vegetative propagation (by leaves). (ii) Difference from <i>Rhizopus</i>: • <i>Bryophyllum</i> reproduces asexually through vegetative parts (leaf margins). • <i>Rhizopus</i> reproduces asexually by spores (sporangia release spores that germinate into new plants). (iii) Advantage: • Large numbers of plants can be produced quickly and economically without seeds, and all new plants are genetically identical to the parent. .	4
29	1) vagina 2 cervix 3 endometrium 4. ovary 5. Fimbriae 6. Fallopian tube/oviduct 7. Uterus Function Function of part 4. (ovary) :To release egg and sex hormone estrogen for secondary sexual characters in females. Function of part 6. (fallopian tube / oviduct) : receive the egg released from ovary, serves as site of fertilization. For Visually impaired Functions: (a) Ovary (b) Fallopian tube/Oviduct (c) (i)Function of ovary (produces eggs and hormones) (ii) Function of oviduct (site of fertilisation and egg transport) (d) Placenta is a disc shaped tissue which is embedded in the uterine wall that connects mother and foetus . Function- (1) Provides nutrients & oxygen to foetus. (2) Removes waste from foetus.	5

SECTION- C		
30	D) All of the above	1
31	B) Fragmentation	1
32	D. Assertion (A) is false, but Reason (R) is true.	1
33	Unisexual flower (ex-papaya, watermelon) contains either stamens or pistil. Bisexual (ex-Hibiscus, mustard) flower contains both stamens and pistil. Disadvantage of sexual reproduction in plants: Requires two parents and is a slow process; fewer plants are produced in a given time. Disadvantage of asexual reproduction in plants: Offspring are exact copies of parent, so they lack variation and may not survive in changing environments.	2
34	Pollination: i) Transfer of pollen grains from anther to stigma. ii) It involves agents. Fertilization: i) Fusion of male gamete (pollen nucleus) with female gamete (egg cell). ii) It does not involve agents. OR If an egg is not fertilized in a human female menstruation occurs it involves 1. Egg degeneration 2. Uterine lining breakdown. 3. Menstrual bleeding This process is a natural part of the menstrual cycle, which prepares the female body for a potential pregnancy each month. If the egg is not fertilized, the cycle repeats itself, and menstruation occurs.	2
35	 For visually impaired	3

	A) During reproduction, inheritance of different proteins occurs because the offspring receive genetic information (DNA) from their parents, which codes for these proteins B) Fertilization cannot take place in a flower if pollination does not occur because pollination is the transfer of pollen grains (containing the male gametes) to the stigma (the female reproductive part of the flower). For fertilization, the male and female gametes must be brought together. Without pollination, the male gamete is not available to reach the female.	
36	Pollen grains land on stigma (pollination). Pollen tube grows through style → ovary → ovule. Male gamete fuses with egg cell (fertilization). Zygote is formed due to fusion of male and female gamete. Zygote develops into embryo.	3
37	(i) Introduces variations in offspring. (ii) Offspring are better adapted to environment. (iii) Provides stability to species against environmental changes.	3
38	(a) Rose → Asexual (vegetative propagation), Maize → Sexual reproduction. (b) Asexual: One parent, no gamete fusion, identical offspring. Sexual: Two parents, gamete fusion, offspring with variation. (c) Maize shows variation because DNA from two parents recombines during fertilization. OR (a) Growing tip of the plant. (b) Callus. (c) Produces many plants from one parent in disease-free conditions. (d) Ornamental plants.	4
39	Binary fission: Parent splits into two (Amoeba). Multiple fission: Nucleus divides into many, cytoplasm separates later (Plasmodium). Budding: New organism develops from a bud (Hydra, yeast). Fragmentation: Organism breaks into parts, each part forms new individual (Spirogyra). Regeneration: Lost body part regenerates into whole organism (Planaria). OR	5

Vegetative reproduction is a type of asexual reproduction in plants where new individuals are produced from vegetative parts, such as stems, leaves, or roots, without the involvement of seeds.

Types of Vegetative Reproduction

1. **Natural vegetative propagation** – occurs through natural plant parts:

Root: e.g., sweet potato, dahlia

Stem: e.g., potato (tuber), ginger (rhizome), onion (bulb)

Leaf: e.g., *Bryophyllum* (plantlets arise from leaf margins)

2. **Artificial vegetative propagation** – carried out by humans for agriculture and horticulture:

1. **Cutting** : New plants grow from cuttings of stems (e.g., rose, hibiscus)

2. **Layering** A stem is bent and covered with soil, allowing roots to form (e.g., jasmine, strawberry)

3. **Grafting** is a method of artificial vegetative propagation in which the stem of one plant is joined to the stem of another plant so that they grow as a single plant. example- rose plant, mango plant.

4. **Tissue culture** (used for orchids, ornamental plants, etc.) cells from the growing tip of a plant are placed in an artificial medium where they divide rapidly to form a small group of cells then to plantlets.

Advantages of Vegetative Reproduction

1. **Rapid Propagation:** Vegetative reproduction allows for rapid production of new plants, which can be beneficial for crop production and plant breeding.
2. **Preservation of Traits:** Vegetative reproduction ensures that the new plants retain the same characteristics as the parent plant, which is useful for preserving desirable traits in crops.

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

SUBJECT SCIENCE (086)

MARKING SCHEME

CLASS- X (2026-27)

CHAPTER- 08 HERADITY

Maximum Marks: 80

Time: 3 hrs

SECTION A

1. (b) Dominant 1
2. (a) Tall 1
3. (a) 3:1 (phenotypic) 1
4. (a) 23 1
5. (b) Sperm of the father 1
6. (b) 50% 1
7. (c) Ability to play a musical instrument 1
8. (c) Assertion is true but Reason is false 1
9. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion 1

10. Violet (PP) × White (pp):

F1: All Pp (violet)

2

F2 Generation (Selfing F1: Pp × Pp)

Punnett Square:

	P	p
P	PP	Pp
p	Pp	pp

- Genotypes: **1 PP : 2 Pp : 1 pp**
- Phenotypes: **3 Violet : 1 White**
Visible Characters
- **F1 progeny:** All plants bear violet flowers.
- **F2 progeny:** 75% violet flowers, 25% white flowers

11. Dominant trait: are expressed (e.g., Tallness TT in F1 generation) 2
 Recessive trait: A **recessive trait** is a trait that is expressed in an organism **only when both alleles are recessive** (e.g, dwarfness tt in F2 generation)

12. Plant chosen: Garden pea (Pisum sativum) 2
 Reasons (any two):
 - Short life cycle
 - Many observable contrasting traits

13. Chromosomes are thread like structure which carry DNA/genes 3
 In sexually reproducing organisms, gametes are haploid (n) and fuse during fertilisation to restore the diploid (2n) number, thus maintaining chromosome number in progen

14. a) **Possible genotypes of children** 3
 Cross: Ee × ee → 50% Ee, 50% ee

	e	e
E	Ee	Ee
e	ee	ee

- b) percentage of children with free earlobes: 50%
 c) Law of dominance

15. (a) All F1 progeny were tall, indicating the tall trait is dominant over the short trait, and The short (recessive) trait did not appear in the F1 progeny, as it was masked by the dominant tall allele.

4

(b) Mendel obtained the F2 generation by **selfing (self-pollination) of the F1 hybrids (RrYy × RrYy)**. Phenotypic ratio obtained is 9:3:3:1,

Conclusions drawn (Mendel's Law of Independent Assortment):

- Two traits are inherited **independently** of each other.
- New combinations (Round Green, Wrinkled Yellow) appear in F2 along with parental types.

OR

A recessive trait may be inherited but not expressed in the presence of a dominant allele.
 For example, a person carrying **Tt** remains tall even though the allele for dwarfness (t) is inherited.

16. a) In **asexually reproducing species**, traits are passed on **directly to the offspring** without mixing. 5

A trait that appears **earlier** will spread to **more individuals** over generations.

Given:

Trait A = 10% population

Trait B = 60% population

Trait B is more widespread, so it is likely to have arisen earlier.

b) **Full form of DNA:** Deoxyribonucleic Acid

Location: In the **nucleus** of the cell (within chromosomes).

Role in reproduction:

DNA carries the hereditary information of the organism. During cell division, DNA makes an **exact copy of itself** so that each daughter cell receives the same genetic material. This ensures that traits are faithfully passed from parent to offspring

DNA is Deoxyribonucleic acid. It is located within the nucleus

SECTION B

- | | |
|--|---|
| 17. (b) Gregor Johann Mendel | 1 |
| 18. (b) 3 : 1 | 1 |
| 19. (a) XX | 1 |
| 20.(c) Leaf type | 1 |
| 21. (b) 25% | 1 |
| 22.(b) Tt | 1 |
| 23. (c) Knowledge of English language | 1 |
| 24. (c) Assertion is true, Reason is false | 1 |
| 25. The possible genotypes of the offspring are Tt and tt in a 1:1 ratio, the possible phenotypes are Tall and Dwarf also in a 1:1 ratio | 2 |
| 26. Environmental Cue: (i) In some animals, the temperature at which fertilised eggs are kept determines whether the developing animal in egg is male or female. | 3 |
| (ii) In some animals like snail, individual can change sex. | |
| Genetical Cue: A child who inherits an X-chromosome from her father will be a girl and one who inherits a Y- chromosome from the father will be boy. | |
| 27. In human beings, the sex of a child is determined by the type of sperm that fertilizes the ovum. | 3 |

The **mother always produces eggs** containing only the **X chromosome** (22 + X).

The **father produces two types of sperms:**

50% sperms carry **X chromosome** (22 + X)

50% sperms carry **Y chromosome** (22 + Y).

When fertilization occurs:

If an **X-bearing sperm** fuses with the egg (X), the zygote will be **XX** → **girl child**.

If a **Y-bearing sperm** fuses with the egg (X), the zygote will be **XY** → **boy child**.

Thus, the probability of a boy or a girl being born is **50% each**, and the sex of the child is determined by the **father's sperm**.

28. (i) F₁ genotype = Tt 4
 (ii) Tall allele dominant over dwarf
 (iii) If self pollinated: F₂ ratio 1 TT : 2 Tt : 1 tt → 200 TT (tall), 400 Tt (tall), 200 tt (short). Tall = 600, Short = 200

OR

If test-crossed with tt: ratio 1:1 → 400 tall (Tt), 400 short (tt). Tall = 400, Short = 400

- 29.(i) **Phenotype of F₁ progeny:** F₁: Axial Round 5 (ii)
Phenotype of F₂ progeny (on selfing F₁ AaRr × AaRr): The F₂ shows four phenotypic classes:

Axial -round, Axial-wrinkled, Terminal- round and Terminal - wrinkled

(iii) Ratio 9:3:3:1

(iv) **Law and explanation: Mendel's Law of Independent Assortment.**

This law states that alleles of different genes (here the gene for flower position A/a and the gene for seed shape R/r) assort independently of one another during gamete formation. As a result, the F₁ (AaRr) produces four types of gametes (AR, Ar, aR, ar) in equal proportion, which combine on selfing to give new allele combinations in F₂ and the characteristic **9:3:3:1** phenotypic ratio.

SECTION C

30. (b) Dihybrid cross 1
 31. (b) Father's gamete decides the sex of the child 1
 32. (a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion 1
 33. Asexual progeny genetically similar to parent and show no variation 2 Sexual and progeny show **genetic variation**, as DNA comes from two parents and recombines and produces a lot of variation in offspring
 34. Variations help organisms to adapt to the changing environment. 2 Variations ensure survival of at least some individuals of a species in case of environmental changes such as climate shift, disease, or scarcity of food.
 35. Sex determination in humans is based on the combination of sex chromosomes inherited from the parents. 3

Humans have 23 pairs of chromosomes, including one pair of sex chromosomes

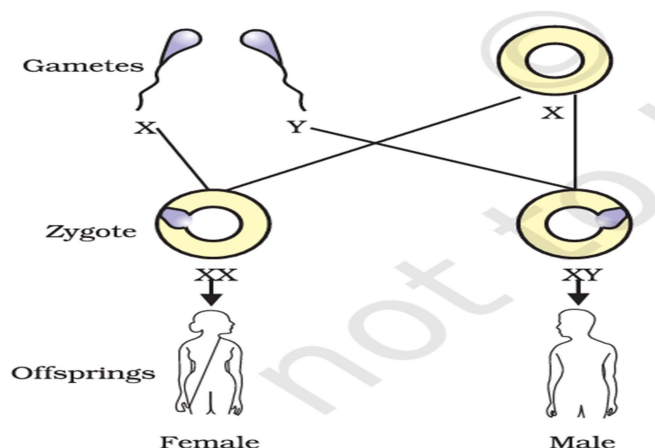
Females have two X chromosomes (XX).

Males have one X and one Y chromosome (XY).

Mechanism of Sex Determination

- The mother always contributes an X chromosome to the offspring because she has only X chromosomes.
- The father can contribute either an X or a Y chromosome because he has both.
- When the sperm carrying an X chromosome fertilizes the egg (which has an X), the resulting zygote is XX, which develops into a female.
- When the sperm carrying a Y chromosome fertilizes the egg, the resulting zygote is XY, which develops into a male.

Thus, the sex of the child depends on whether the sperm carrying an X or a Y chromosome fertilizes the egg.



36. a) Punnett Square:

3

F₁ parent genotype: RrYy × RrYy

Gametes: RY, Ry, rY, ry

	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

(b) Phenotypic ratio of F₂ progeny:

9 Round Yellow

3 Round Green

3 Wrinkled Yellow

1 Wrinkled Green

Ratio = 9 : 3 : 3 : 1

(c) Law illustrated:

Mendel's Law of Independent Assortment – alleles of different traits (seed shape and colour) assort independently and recombine freely during gamete formation.

37. a) Monohybrid cross TT × tt → F₁: all tall, F₂: 3 tall : 1 dwarf

3

b) Recessive trait: dwarfness

c) Recessive masked by dominant in F₁

38. (a) Genes in F_1 :

4

Cross: $TTRR \times ttrr \rightarrow \text{all } F_1 = TtRr$

(b) Reason for tall & red F_1 :

Each F_1 plant has one dominant allele **T** and one dominant allele **R**, so both dominant traits (tall and red) are expressed.

(c) Selfing of F_1 ($TtRr \times TtRr$):

- Gametes: TR, Tr, tR, tr
- Phenotypic ratio (Mendel's dihybrid cross) = **9 : 3 : 3 : 1**

Out of 1600 ($1600 \div 16 = 100$ per part):

- Tall red ($9/16$) = **900**
- Tall white ($3/16$) = **300**
- Dwarf red ($3/16$) = **300**
- Dwarf white ($1/16$) = **100**

Phenotypic ratio = **9 : 3 : 3 : 1**

OR

Test cross ($TtRr \times ttrr$), total 1600:

- Gametes of $TtRr$ = TR, Tr, tR, tr
- Gametes of $ttrr$ = tr only

So offspring in ratio **1 : 1 : 1 : 1**

- Tall red = **400**
- Tall white = **400**
- Dwarf red = **400**
- Dwarf white = **400**

39. (a) In **sexual reproduction**, offspring receive DNA from **two parents**. During gamete formation, **crossing over and recombination** of genes occur, producing new genetic combinations.

5

In **asexual reproduction**, offspring are produced from a single parent and are **genetically identical (clones)**, so very little variation is seen.

(b) Variations help some individuals adapt better to changes in the environment (e.g., climate change, scarcity of food, resistance to disease)

Such

individuals are more likely to **survive and reproduce**, ensuring the survival of the species.

(c) Example: An example of an inherited trait that can be modified by the environment is height. A person inherits genes for height, but their ultimate height can be significantly influenced by factors like proper nutrition during childhood. Without adequate vitamins and nutrients, an individual may not reach their full inherited height potenti

SECTION A

Ans 1. b) Virtual, erect, laterally inverted

Ans2. b) 40 cm in front

Ans 3. b) Slows down

Ans 4. a) +50 cm

Ans 5. b) Convex

Ans 6. b) 2.25×10^8 m/s

Ans 7. c) deviates away from normal

Ans 8. a) Both A and R are true and R is the correct explanation of A.

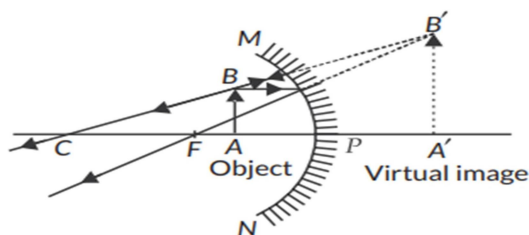
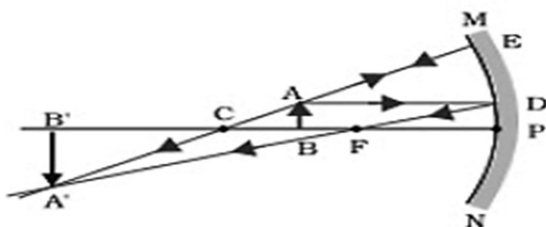
Ans 9. c) A is true but R is false.

Ans 10. Convex mirrors provide wider field of view, hence used as rear-view mirrors.

Ans 11. Given: Focal length, $f = -20$ cm, Image distance, $v = -30$ cm, Object height, $h_o = 4$ cm

Using mirror formula: $1/f = 1/v + 1/u \rightarrow u = -60$ cm; Image size $h_i = -2$ cm

Ans 12. Ray diagram shows magnified real image when object between C and F, virtual magnified when object within F.



Ans 13. The ratio of the speed of light in air or vacuum to the speed of light in any medium is called the absolute refractive index.

Absolute refractive index $n = c/v = 1.5 \rightarrow v = 2 \times 10^8 \text{ m/s}$.

Ans 14. Power of lens = reciprocal of focal length (in m). SI unit: Dioptre. $P = 1/\text{focal length in meters}$.

Ans 15. A) b) Size of the image decreases.

B) To provide wider field of view

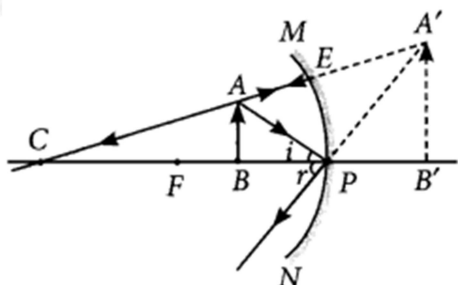
C) Plane mirror covers less area

D) Advantage: wide view; Disadvantage: smaller image size.

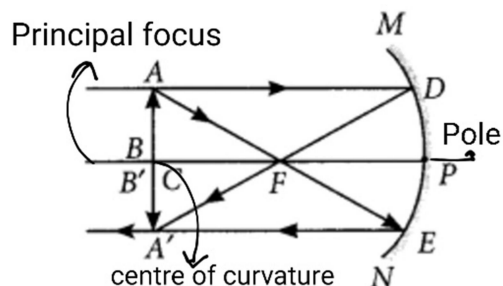
Ans 16. Given : focal length of the concave mirror $f = 12 \text{ cm}$

(i) If the object is placed between the pole and focus of the concave mirror, then the image formed is virtual and erect. Therefore, the range of distance of the object should be $0 < u < 12 \text{ cm}$.

(ii) The image formed will be enlarged as shown below.



(iii) If the object is placed 24 cm in front of the mirror i.e., at the centre of the curvature then the image will also be formed at the centre of the curvature.



SECTION B

Ans 17. b) Virtual, erect, diminished

Ans 18. b) Focal length

Ans 19. a) 12 cm

Ans 20. d) Beyond the centre of curvature

Ans 21. (a) A rectangular glass slab

Ans 22. c) Dioptre

Ans 23. a) +1

Ans 24. d) A is false but R is true

ANS Here, $h_o = +4 \text{ cm}$, $f = -10 \text{ cm}$, $u = -15 \text{ cm}$, $v = ?$, $h_i = ?$

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} \quad \left[\frac{1}{2} \right]$$

or

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

as

$$\frac{1}{v} = \frac{1}{-10} - \frac{1}{-15} \quad \left[\frac{1}{2} \right]$$

$\therefore$

$$v = -30 \text{ cm} \quad \left[1 \right]$$

$$\frac{h_i}{h_o} = -\frac{v}{u} \quad \left[\frac{1}{2} \right]$$

or

$$h_i = -\frac{v}{u} \times h_o$$

or

$$h_i = -\frac{-30 \text{ cm}}{-15 \text{ cm}} \times 4 \text{ cm}$$

$\therefore$

$$h_i = -8 \text{ cm} \quad \left[\frac{1}{2} \right]$$

[1+1+1] [Marking Scheme, 2017]

Ans 25.

Ans 26. $f = 100/4 = 25 \text{ cm}$. Positive $\rightarrow$ Convex lens.

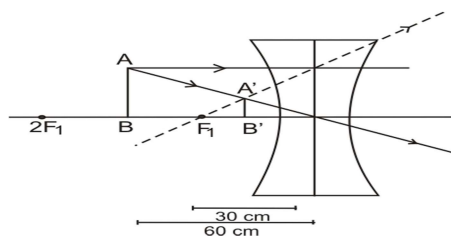
Ans 27. The given values are substituted into the lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$.

For a concave lens, the focal length is negative, so, $f = -30 \text{ cm}$.

The object distance is taken as negative so $u = -60 \text{ cm}$.

Substituting these values into the lens formula, $\frac{1}{-30} = \frac{1}{v} - \frac{1}{-60}$

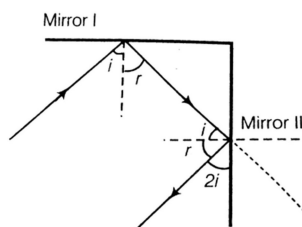
$$\frac{1}{v} = \frac{1}{-30} + \frac{1}{-60}, \frac{1}{v} = -\frac{3}{60}, \therefore v = -20 \text{ cm}.$$



b) Virtual, erect, diminished, c) Ray diagram.

Ans 28. (a) Phenomenon: Refraction. (b) Pencil looks bent due to change in speed. (c) Speed increases from water to air. (d) The pencil will appear more bent if placed in kerosene. Kerosene has a higher refractive index than water, meaning light travels slower in kerosene.

Ans 29. a) Mirrors at 90° . When two plane mirrors are placed at right angle with each other, then incident ray and reflected ray will always be parallel to each other, whatever may be angle of incidence.



b) (i) Concave mirror, (ii) Convex mirror, (iii) Concave mirror.

SECTION C

Ans 30. b) 10 cm/s

Ans 31. b) 10 cm

Ans 32. d) A is false but R is true.

Ans 33. It bends away from the normal because light is going from denser to rarer medium.

Ans 34. $n = c/v = 3 \times 10^8 / 2.25 \times 10^8 = 1.33$.

Ans 35. $v = 3 \times 10^8 / 2.42 \approx 1.24 \times 10^8$ m/s.

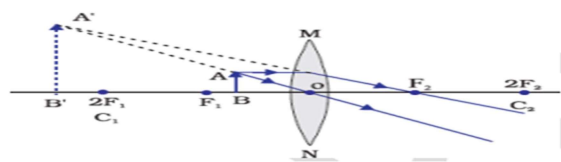
Ans 36. Laws of refraction: i. The incident ray the refracted ray and the normal all lie in the same plane. ii The ratio of sine of the angle of incidence in the first medium to the sine of angle of refraction in the second medium is a constant and is known as refractive index of the second medium with respect to the first medium.

$$n = \sin i / \sin r = (1/2) / (1/\sqrt{2}) = \sqrt{2}/2 \approx 0.707.$$

Ans 37. a) Concave mirror b) Convex lens c) Concave lens.

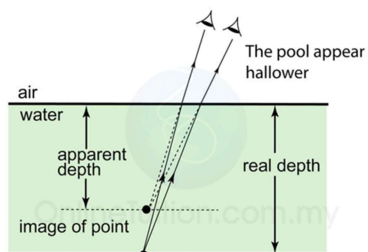
Ans 38. (a) $f=10\text{cm}$ (b) position= 15cm

(c) Yes, when object is placed between the focus and optical centre the image will be virtual and magnified



d)

Ans 39. i) Refraction, A pool of water appears shallower than its actual depth due to the phenomenon of refraction, which is the bending of light as it passes from one medium to another. When light rays from the bottom of the pool travel from water into air, they bend away from the normal, causing our brains to perceive the objects as being at a shallower depth than they actually are



ii)

iii) Speed slower in water,

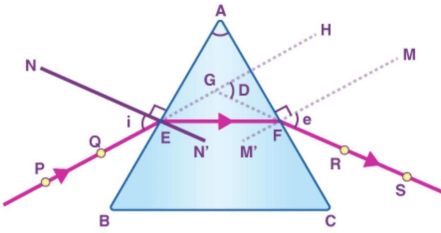
iv) Higher refractive index = higher optical density.

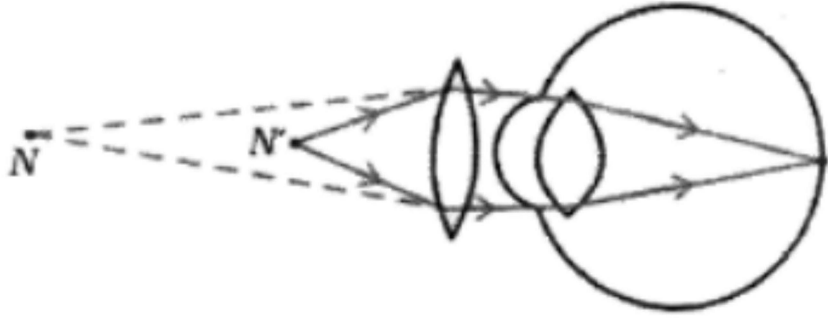
A medium with a higher refractive index is optically denser because the refractive index, defined as the ratio of the speed of light in a vacuum to its speed in the medium, directly correlates with how much the medium slows down light. A higher refractive index (n) means light travels at a slower speed ($v = c/n$), and this greater slowing of light is what defines a medium as optically denser.

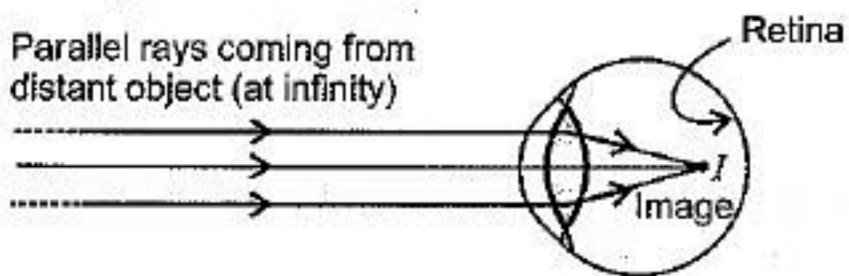
KENDRIYA VIDYALAYA SANGATHAN AGRA REGION
SUBJECT –SCIENCE(086)
CH – 10 HUMAN EYE AND COLOURFUL WORLD
MARKING SCHEME
CLASS – X (2026-27)

Max. Marks: 80

Time Allowed: 3 hours

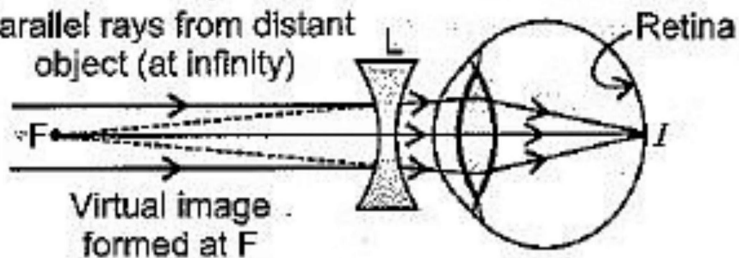
Section – A		Marks
1	(d) Retina	1
2	(a) (A) and (B)	1
3	(C) Blue	1
4	(C) Colour used to paint the danger signals	1
5	(b) Myopia, concave lens	1
6	(c) Presbyopia	1
7	(b) –66.7 cm	1
8	C	1
9	C	1
10	The phenomenon responsible is the Tyndall Effect, where light scatters due to tiny particles in the medium, making the beam visible in a smoke-filled room. Dependence on Particle Size: Small Particles – Scatter shorter wavelengths (blue/violet) more, making the sky appear blue. Medium Particles – Scatter all wavelengths almost equally, making the light appear white. Large Particles – Scatter all wavelengths equally, giving a white or greyish appearance, like clouds.	2
11	 PE - Incident ray EF - Refracted ray FS - Emergent ray A - Angle of the prism i - Angle of incidence r - Angle of refraction e - Angle of emergence D - Angle of deviation	2

12	(A) When we see a distant object, the muscles relax and the lens become thin and its focal length increases. (B) When we see a nearby object, the ciliary muscles contract, this increases the curvature of the eye lens and it becomes thicker. Consequently the focal length of the eye lens decreases. A normal eye is unable to clearly see the objects placed closer than 25 cm because the ciliary muscles of eyes are unable to contract beyond a certain limit.	2
13	(i) Hypermetropia or Far-sightedness. Reason – Image is formed behind the retina. Near point for the person is farther away from the normal near point (25 cm) (ii) Focal length of the eye lens is too long. The eyeball has become too small. (iii)  N = Near point of a hypermetropic eye N' = Near point of a normal eye	3
14	(i) Far point of myopic eye = 50 cm = - 50 cm = v u = infinity Lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $\frac{1}{f} = \frac{1}{-50} - \frac{1}{\infty}$ f = - 50 cm = - 0.5 m (ii) Near point of hypermetropic eye = -150 cm = v u = -25 cm	3

	Using lens formula $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $\frac{1}{f} = \frac{1}{-150} - \frac{1}{-25}$ $f = 30\text{cm}$	
15	i. A-Optic nerve; B-Iris; C-Retina; D-Crystalline lens; E-Ciliary muscles ii. Real and inverted iii. (c) outer surface of part F iv. The ability of eye lens to adjust its focal length is called power of accommodation. Or iv. The space between cornea and eye lens is filled with a watery liquid called aqueous humour, whereas vitreous humour is a transparent jelly-like substance filled between eye lens and retina.	4
16	Myopia (Nearsightedness): Myopia is a defect of vision in which a person can see nearby objects clearly but cannot see distant objects distinctly. The image of a distant object is formed in front of the retina instead of on it. Causes: Excessive curvature of the eye lens. Elongation of the eyeball. Correction: Concave lens (Diverging lens) is used to correct myopia. It diverges the incoming light rays so that the eye lens forms the image on the retina instead of in front of it. Ray Diagrams: (i) Defective Eye – Image of a distant object forms in front of the retina. (ii) Corrected Eye – Concave lens diverges light rays, shifting the image onto the retina. 	5

(ii) Corrected eye

Parallel rays from distant object (at infinity)



SECTION- B

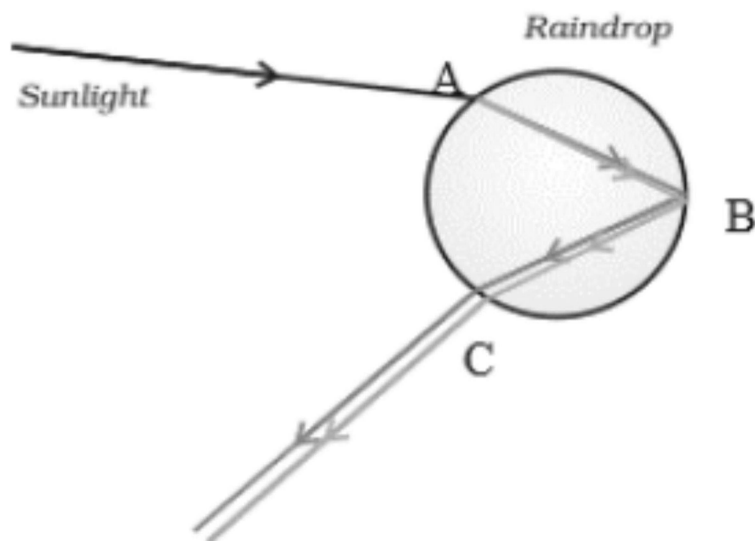
17	(b) Blue light is scattered the most by the atmosphere	1
18	(b) Red light is scattered least and passes through the atmosphere	1
19	(c) Dispersion, refraction and total internal reflection	1
20	(b) Planets are much closer and appear as extended sources	1
21	(b) Hypermetropia	1
22	(b) Concave lens spectacles	1
23	(b) Hypermetropia and needs convex lens	1
24	Both A and R are true and R is the correct explanation of A	1
25	The defect of vision that arises due to gradual weakening of ciliary muscles and diminishing flexibility of the eye lens is Presbyopia. Most people find it difficult to see nearby objects comfortably and clearly without using corrective lenses. This is corrected by using convex lens of appropriate power. However, sometimes people may suffer from both myopia and hypermetropia. This can be corrected by using a bifocal lens. A bifocal lens consists of two parts – the upper part is concave lens and lower part is convex lens. The upper part is for viewing distant objects and the lower part facilitates near vision.	2
26	The ability of the eye lens to adjust its focal length, so as to clearly focus rays coming from distant as well as near objects on the retina, is called the power of accommodation of the eye. Ciliary muscles play a major role in maintaining power of accommodation. (i) While focusing on nearby objects ciliary muscles contract, eye lens becomes thick and its	3

focal length decreases.

(ii) While focusing on distant objects ciliary muscles relax, eye lens becomes thin and its focal length increases.

OR

(b)



Two conditions:

(i) The Presence of tiny water droplets in the atmosphere.

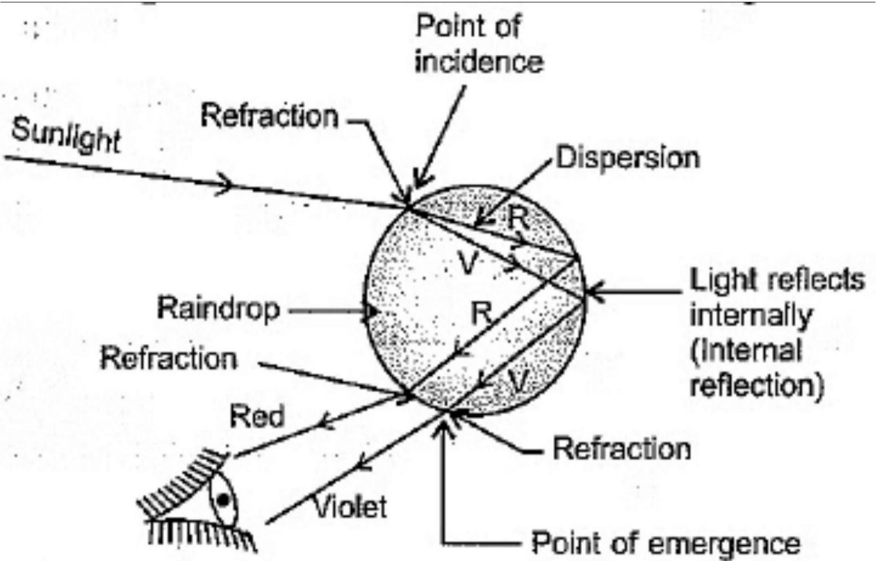
(ii) Position of Sun at the back(behind) of the observer.

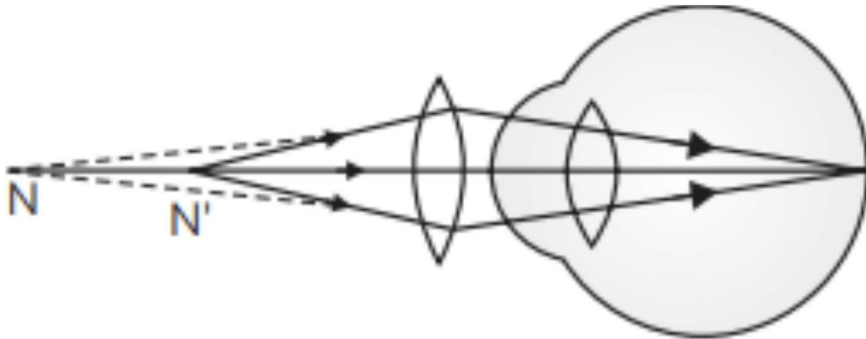
27 (A) Red danger signals are used because red light has the longest wavelength in the visible spectrum and is scattered the least by atmospheric particles, fog, or smoke. This allows red light to be visible from greater distances, making it effective for warning signals.

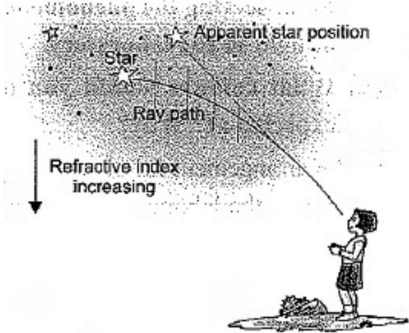
(B) At higher altitude either the atmospheric medium is very rare or there are no particles present/no atmosphere, thus the scattering of light taking place is not enough at such heights or no scattering of sunlight takes place. Hence, the sky appears dark to the passengers flying at very high altitude.

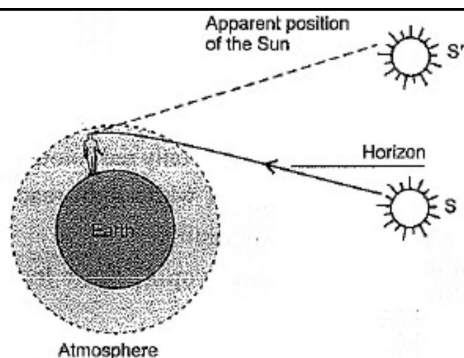
(C) Tyndall effect deals with the phenomenon of scattering of light by colloidal particles. When a fine beam of sunlight enters a room, the particles present in the room become visible due to scattering of light by these particles. When sunlight passes through a canopy of a dense forest, tiny water droplets in the mist scatter light.

28 i. (d) All of the above Cold air is denser and heavier than hot air. Also, cold air has higher refractive index than hot air. Hence, all are true.

	ii. (c) refraction of star light iii. (d) The Sun appears flattened because of atmospheric refraction. iv. (c) The time from sunrise to sunset is lengthened by 4 minutes. Or iv.(b) When light rays from Stars enter into Earth's atmosphere, it travel from rarer to denser medium.	
29	(a) Dispersion: The splitting up of white light into its component colours is called dispersion. Cause of dispersion: From Snell's law of refraction, the angle of refraction of light in a prism depends on the refractive index of the prism material. Moreover, the refractive index of the material varies with the speed of light. The different constituent colours of white light have different speeds in the transparent material of the prism. Hence for each colour/wavelength, the refractive index of prism material is different. Therefore, each colour bends (refracted) through a different angle concerning incident rays, as they pass through the prism. The red colour has maximum speed in the glass prism, so it is least deviated, while the violet colour has minimum speed so its deviation is maximum. Thus, the ray of each colour emerges along different paths and becomes distinct. (b) Rainbow: It is an optical natural spectrum, produced by nature in the sky, in the form of a multicoloured arc. The rainbow is formed due to the dispersion of sunlight by water droplets suspended in the atmosphere after rainfall. These water droplets act like small prisms. The Sunlight enters the water droplets. At the point of incidence, it refracts and disperses then gets reflected internally and finally gets refracted again at the point of emergence as it comes out of the rain-drop.  Formation of primary rainbow Therefore, due to refraction, dispersion and internal reflection of the sunlight, different colours reach the observer's eye along different paths and become distinct. It creates a rainbow in the sky. Hence "Rainbow is an example of dispersion of sunlight."	5

	Necessary conditions for the formation of a rainbow. (i) The presence of water droplets in the atmosphere, and (ii) The sun must be at the back of the observer, i.e. the observer must stand with his back towards the sun.	
33	(a) Ravi is suffering from myopia (short-sightedness). (b) It is caused due to either elongation of the eyeball or high converging power of the eye lens. (c) Corrected using a concave lens.	2
34	(a) At sunset, sunlight travels a longer distance through the atmosphere, so blue light is scattered away and only red light (longest wavelength) reaches our eyes. (b) Red colour is scattered the least. (c) It proves that light is made up of different colours of different wavelengths.	2
35	(A) We know that the ability of the accommodation factor to alter the focal length declines with ageing. Without corrective spectacles, aged people have difficulty seeing surrounding objects clearly. (B) The person is suffering from presbyopia. (C)  <i>Correction for Presbyopia eye</i>	3
36	Refraction of light through prism: PE - Incident ray EF - Refracted ray FS - Emergent ray $\angle A$ - Angle of the prism $\angle i$ -	3

	Angle of incidence $\angle r$ - Angle of refraction $\angle e$ - Angle of emergence $\angle D$ - Angle of deviation Refraction of light through a triangular glass prism: The refraction of light takes place at two surfaces firstly when light enters from air to prism and secondly when light emerges from prism. Angle of prism: The angle between the two lateral faces of the prism is called angle of prism. Angle of deviation: The angle between incident ray (produced forward) and emergent ray (produced backward).	
37	Atmospheric Refraction: The refraction of light caused by the earth's atmosphere due to gradual change in the refractive indices of its different layers by the varying conditions of it, is called atmospheric refraction. (a) Twinkling of stars  The hot layers (low densities) of air at a high altitude, behave as an optically rarer medium for the light rays, whereas the cold dense layers (high densities) of air near the earth's surface, behave as an optically denser medium for the light rays. So, when the light rays (starlight) pass through the various layers of the atmosphere, they will deviate and bend toward the normal. As a result, the apparent position of the star is slightly different from its actual position. Thus, the stars appear slightly higher (above) than their actual positions in the sky. The fluctuation in the positions of the stars occurs continuously due to the changing amount of light entering the eye. The stars sometimes appear brighter and at some other times, they appear fainter. This causes the twinkling of stars.	3



Atmospheric refraction effects at sunset or sunrise

(b) Advanced sunrise and delayed sunset: The sun is visible 2 minutes before sunrise and 2 minutes after sunset because of atmospheric refraction. This can be explained below.

The figure shows the actual position of the sun S at the time of sunrise or sunset, just below the horizon while the apparent position S' above the horizon appears to us.

When the sun is slightly below the horizon, the light rays move through the different layers of varying refractive indices of air and get bent towards the normal. These rays appear to come from S' which is the apparent position of the sun. That is why, the sun is visible to us when it has been actually below the horizon or before the actual crossing of the horizon by the sun at the time of sunrise or sunset. So, due to the atmospheric refraction, the phenomenon of advanced advance sunrise and delayed sunset is observed.

39

(a) Hypermetropia (far-sightedness).

(b) Cause – Decrease in converging power of lens or shortened eyeball.

(c) Given, $u = -25 \text{ cm}$, $v = -75 \text{ cm}$, $f = ?$

$$1/f = 1/v - 1/u$$

$$f = 37.5 \text{ cm}$$

$$P = 100/f$$

$$= +2.67 \text{ D}$$

5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

SUBJECT SCIENCE (086)

MARKING SCHEME

CLASS- X (2026-27)

CHAPTER-11 ELECTRICITY

Maximum Marks: 80

Time: 3 hrs

Section A – MCQs

1. B – Same through each resistor
2. C – Less than the smallest resistance
3. C – Electric bulb
4. A – 2 V
5. C – Heating effect of current
6. A – V vs I (straight line through origin)
7. C – Electric heater
8. Both A and R are true, and R is the correct explanation of A.
9. Both A and R are true, and R is the correct explanation of A.

Section A – Short Questions

10. $R_p = (2 \times 3)/(2+3) = 1.2 \, \Omega$; $R_s = 1.2 + 6 = 7.2 \, \Omega$;

$$I = V/R = 12/7.2 = 1.67 \, A$$

11. $R = \rho L/A = (2.8 \times 10^{-8} \times 2)/(1.55 \times 10^{-6}) \approx 0.036 \, \Omega$

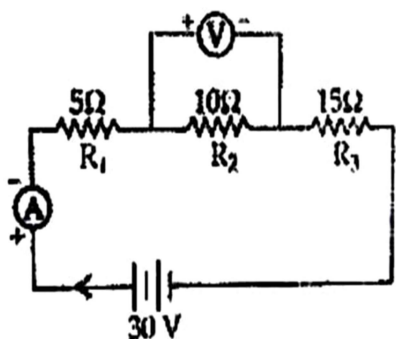
OR: Alloys are used because they have higher resistivity, high melting point, and do not oxidize easily.

12. A fuse is a safety device connected in series with the live wire; it melts when current exceeds the safe limit.

13 (a) MCBs are reusable, quicker, and more reliable than traditional fuses.

(b) 3-pin plug ensures earthing for safety.

(c) Power = VI = $220 \times 10 = 2200 \, W$



$$\text{Total } R = 5 + 10 + 15 = 30 \Omega$$

$$\text{Current} = 30/30 = 1 \text{ A}$$

$$V \text{ across } 10 \Omega = IR = 10 \text{ V}$$

$$15.1 \text{ Total power} = 1000 + 400 + 200 = 1600 \text{ W}$$

$$\text{Energy/day} = 1.6 \times 5 = 8 \text{ kWh}$$

$$2. \text{ Cost/day} = 8 \times 6 = ₹48$$

3. Ways to save: use LED bulbs, switch off appliances when not in use.

4. Electricity is transmitted at high voltage to reduce current and minimize heat loss.

16.a) Tungsten is used for the filament of electric lamps because of its extremely high melting point, allowing it to withstand the intense heat generated by the electric current without burning out.

b) because alloys have high electrical resistivity, which is necessary for generating heat, and are resistant to oxidation and melting at high temperatures.

c) because if one appliance fails, the entire circuit breaks, causing all others to stop working. Additionally, the voltage is divided among appliances, providing insufficient power, and each appliance cannot be switched on or off independently,

d) The resistance of a wire is inversely proportional to its area of cross-section, meaning a thicker wire (larger area) has less resistance, while a thinner wire (smaller area) has more resistance.

e) Copper and aluminum wires are used for electricity transmission because they are excellent conductors with low electrical resistance and high conductivity, allowing current to flow easily with minimal energy loss.

Section B

17. B – Voltage is same across each resistor

18. $C - R = \rho L/A$

19. B – Electric iron

20. B – 220 V supply

21. B – Voltage is same across each resistor

22. D – All of these

23. B – Kilowatt-hour

24. A is true but R is false.

Section B – Short/Long

25.(a) Ohm's Law Statement: The current flowing through a conductor between the points is directly proportional to the voltage across the two points, provided the temperature and other physical conditions should remain constant .

Ohm's Law: $V \propto I \rightarrow V = IR$

(b) Resistance: opposition to current; SI unit = ohm (Ω).

26. Energy/day = $0.5 \times 2 = 1$ kWh

Cost/month = $1 \times 30 \times 6 = ₹180$

27. (i) $Q = IT = 10 \times 120 = 1200$ C

(ii) $Q/e = 1200 / 1.6 \times 10^{-19} = 7.5 \times 10^{21}$ electrons

Or $R = \rho \text{ multiplies } L/A = 2.8 \times 10^{-8} \times 2 / 1.55 \times 10^{-6} = 0.036$ ohm or $R = 0.036 \Omega$

28. 1. Filament = Tungsten

2. Copper is used as connecting wire (good conductor).

3. Relation: $V = IR$

4. $I = V/R = 2/10 = 0.2$ A

29. (a) (i) Position 2 $\rightarrow$ 12 ohm lamps (only) on ; (ii) Position 3 $\rightarrow$ 4 ohm lamps (only) on

(b) V across each = 12 V

(c) (i) $I = V/R = 12/12 = 1$ A

(ii) $I = 12/4 = 3$ A

OR: Power = $V^2/R \rightarrow$ lower R gives higher power $\rightarrow$ 4 Ω lamp has higher power

Section C – MCQs

30. A – Straight line through origin

31. D-240 C

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

Section C – Short/Long

33(a) Live ,Neutral, Earth

(b).Earth wire directs leakage current to ground and prevents shock.

34. (a) No, the electrical resistance of the copper wire and aluminum wire cannot be the same if they have the same length and same cross-sectional area because copper and aluminum have different resistivities.

(b) because alloys have higher electrical resistivity and a higher melting point than pure metals, which allows the coils to generate more heat from the same length of wire and prevents them from burning or melting at high operating temperatures

35. (i) In parallel combination each appliance gets the full voltage.

(ii) If one appliance is switched on, others are not affected.

(iii) The parallel circuit divides the current through the appliances. Each appliance gets proper

current depending on its resistance.

36. (i) Doubling L doubles R

(ii) Doubling diameter $\rightarrow$ area $\times 4 \rightarrow$ R becomes $1/4$

(iii) Alloys have high resistivity, do not oxidize, withstand high temperature

37. Here, Power rating, $P = 1000 \text{ W}$

Voltage rating, $V = 220 \text{ V}$

(a) Using the relation $P = V^2/R$

Resistance of element when in use,

$$R = V^2/P = 220 \times 220/1000$$

$$= 48.4 \text{ W}$$

(b) Using the relation $P = VI$

Safe current, $I = P/V = 1000/220$

$$= 4.55 \text{ A}$$

38.(a) Doubling L $\rightarrow$ R doubles.

(b) Larger area $\rightarrow$ R decreases.

(c) To reduce resistance: increase thickness, use low resistivity material.

(d) Copper has lower resistivity $\rightarrow$ resistance decreases compared to nichrome.

39. (i) C – watt

(ii) B – $3.6 \times 10^6 \text{ J}$

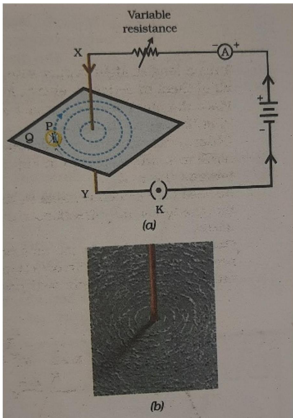
(iii) Doubled

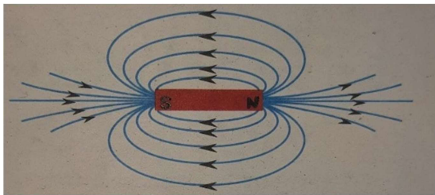
(iv) A – 3600 J

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION
SCIENCE – Code no. 086
ANSWER KEY
CH – 12 MAGNETIC EFFECTS OF ELECTRIC CURRENT
CLASS – X (2026-27)

Section A

1.	c)	1
2.	b)	1
3.	a)	1
4.	b)	1
5.	c)	1
6.	a)	1
7.	d)	1
8.	a)	1
9.	a)	1
10.	Principle of Galvanometer – Works on principle that current-carrying coil in a magnetic field experiences a torque.	2
11.	Magnetic field is strongest where lines are close. Hence, field is strongest near poles and weaker farther away.	2
12.	Magnetic field strength (B) is inversely proportional to the distance (r) from the wire: $B \propto 1/r$. Closer to the wire magnetic field is stronger and farther from the wire it decreases.	2
13.	Rule: Stretch forefinger, middle finger and thumb of left hand mutually perpendicular. • Forefinger → magnetic field, Middle finger → current, Thumb → direction of force. Device: Electric Motor.	3
14.	Draw a well labelled diagram	3

	 (i) Increasing current (ii) Decreasing distance of observation.	
15.	(i) Solenoid = coil of many turns of insulated wire. (ii) The magnetic field in solenoid always comes from south and goes to north inside the solenoid, just like in bar magnet. (iii) Strength $\uparrow$ by: increasing current, number of turns, inserting soft iron core. OR Claim incorrect; field outside solenoid is non-uniform and weak.	4
16.	(i) Current produces magnetic field. (ii) Deflection reverses if current is reversed. (iii) Direction $\rightarrow$ Right-Hand Thumb Rule. (iv) Devices: electric motor, galvanometer, loudspeaker. (v) Reason: no current/weak cell/loose connection.	5
Section B		
17.	d)	1
18.	a)	1
19.	b)	1
20.	b)	1
21.	d)	1
22.	c)	1
23.	a)	1
24.	a)	1
25.	High Power rating circuit: The circuit which draw heavy current (15 A) from mains and used for high power rating devices such as microwave, oven, air conditioners, geysers, washing machine, etc., Low Power rating circuit: The circuit which draw small amount of current(5 A) from the mains and used for low power rating devices such as bulb, tube light, fans, T.V., Computer, etc.	2
26.	Force is perpendicular to both motion and field. Use Fleming's Left-Hand Rule / Right-Hand Palm Rule to predict direction.	3

27.	• PM has fixed strength, EM adjustable. • PM made of steel, EM of soft iron. • PM cannot be switched off, EM can be.	3
28.	i) Composition : lead and tin alloy(pb and sn alloy)Fuse protects appliances by melting when current > limit. It has low melting point and high resistance. (ii) Live + neutral touch → short circuit (sparks/fire). (iii) Live wire is dangerous (220V). Earth wire provides low resistance path, and prevents shock. OR Miniature circuit breakers. Reusable, more reliable , easy to operate ,safer etc.	4
29.	Fig- B, Lines from N→S, continuous Not intersecting. NORTH AND NORTH facing each other. Well labelled diagram of bar magnet field lines (symmetrical).	5
	 Section C	
30.	d)	1
31.	b)	1
32.	a)	1
33.	(i) Easily magnetised (ii) Loses magnetism quickly – avoids permanent magnetisation.	2
34.	Fuse disconnects supply immediately if current > limit; if placed in neutral, device may remain live – dangerous.	2
35.	Correct – field strongest at centre, decreases on moving away.	3
36.	AC: Changes direction periodically. DC: Flows in one direction only. Advantage: AC can be transmitted over long distances with less loss (step-up/step-down using transformers), AC can be easily converted into DC.	3
37.	Too many appliances connected to a same socket , draw a current exceeding the circuit's safety limit. Short circuit: Live & neutral direct contact → sudden current rise.	3

	Fuse: Melts & breaks circuit, preventing fire.	
38.	i) Fleming's Left-Hand Rule (ii) If the current is reversed, the direction of force on the conductor will also reverse (wire will move downward instead of upward). (iii) If the magnetic field is reversed while keeping the current same, the direction of force will also reverse (iv) Application: Electric motor, Loudspeaker etc.	4
39.	a) Bar Magnet : i) A bar magnet is a permanent magnet; it produces a magnetic field naturally without any current ii) Magnetic field lines emerge from the north pole and enter the south pole, forming a curved, non-uniform pattern iii) When iron filings are sprinkled, they arrange along these curved lines, showing stronger density at poles and weaker at the middle. Solenoid: i) A solenoid is a coil of wire carrying electric current, behaves like a magnet. ii) Its magnetic field is produced only when current flows, and it can be turned on or off. iii) Magnetic field lines inside the solenoid are nearly uniform and straight, while outside they resemble the field of a bar magnet. Iron filings near a solenoid show straight, parallel lines inside and curved lines outside, showing the difference from a bar magnet. b) Reason for Difference: i) The difference arises because a bar magnet has a permanent dipole field, whereas solenoid has a field induced by moving charges ii) Field strength & pattern are controllable in a solenoid by changing current or number of turns.	5

KENDRIYA VIDYALAYA SANGATHAN AGRA REGION

MARKING SCHEME (2026-27) CLASS-X

SUBJECT SCIENCE (086)

CHAPTER -13 OUR ENVIRONMENT

MM-80

TIME ALLOWED- 3 hour

1.	C. Use of plastic as packaging material	1
2.	B. (ii), (iii), (iv)	1
3.	C. It utilizes 10% of light energy and transfers the rest to the next trophic level.	1
4.	B. Enrichment of oxygen in the atmosphere.	1
5.	C. CFCs, Ozone	1
6.	A. Broken down by biological processes	1
7.	B. Polyethene bags, plastic toys	1
8.	D. A is false but R is true	1
9.	B. Both Assertion & Reasoning are correct, Reason is not correct explanation of Assertion	1
10.	Ponds and lakes are natural and complete ecosystems with self-cleaning mechanisms provided by decomposers and other food web components whereas aquarium is an artificial ecosystem and lack decomposers. The aquarium is cleaned regularly to prevent the build-up of toxic substances and maintain the healthy environment for inhabitants	2

11.	A. Tree food chain- tree, zebra, tiger /Any other food chain Grassland food chain- grass, zebra, tiger / Any other food chain Food web- Join the two food chains at a common point (zebra) . 1. Grass → Rabbit → Fox → Tiger —┐ └→ Zebra → Tiger —┐ └→ Vulture 2. Trees →Insects →Frog→Snake →Owl —┐ └→ Bird/Peacock → Tiger → Vulture Water insects → Fish → Duck---- →┐ (water chain is mostly separate but duck can also be eaten by larger predators / scavenged by vulture) OR B.(i) Increase in concentration of harmful chemicals in organisms at successively higher trophic levels of the food chains. (ii) Only 10 percent of the energy from one trophic level in an ecosystem is transferred to the next trophic level in an ecosystem,90% being lost as heat and through metabolic processes.	2
12.	Pesticide is non-biodegradable/keep getting accumulated at each trophic level, persist for longer time/ and thus last trophic level has highest concentration/ humans will have the highest concentration of pesticides/leads to bio-magnification. (any 2 points)	2
13.	a. Gas A is Ozone / formula of the gas ozone is O₃ (½ mark) Ozone at the higher levels of the atmosphere is a product of UV radiation acting on oxygen (O₂) molecule. The higher energy UV radiations split apart some molecular oxygen (O₂) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone atoms. OR $\text{O}_2 \xrightarrow{\text{UV}} \text{O} + \text{O}$ $\text{O} + \text{O}_2 \rightarrow \text{O}_3 \text{ (Ozone)}$	3

22.	A. Carnivores	1
23.	C. Producers, consumers & decomposers	1
24.	D. A is false but R is true.	1
25.	A.10000J because only 10 % of energy is available for the next trophic level. b) No, since the loss of energy at each step is so great that very little usable energy will remain after 4 trophic levels	1+1
26.	Use of Plastic cups raised the concern towards hygiene thus they were replaced by disposable plastic cups. Plastic cups are non-biodegradable and harm the environment friendly. They were thus replaced by Kulhads. Making Kulhad made of clay on a large scale resulted in the loss of top fertile soil. Now, disposable paper cups are used because - the paper can be recycled, it is biodegradable and is eco-friendly material which does not cause environmental pollution.	3
27.	Damage to the ozone layer is a cause for concern because the ozone layer shields the surface of earth from harmful UV radiations from the sun which cause skin cancer in human beings. Synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in the fire - extinguishers are the main reason for the depletion of the ozone layer. Steps taken to limit this damage - Many developing and developed countries have signed and are obeying the directions of UNEP (United Nations Environment Programme) to freeze or limit the production and usage of CFCs at 1986 levels. (1 x 3 = 3 marks)	3
28.	(i) b) 100 J (ii) c) Third Trophic level (iii) c) Energy is unidirectional and matter is repeatedly circulating. (iv) a) Decrease in energy at higher trophic levels (1mark each) <u>For visually impaired students</u> a) Many of the food chains which exist in nature are interconnected by species which exist in more than one food chain. The network of a large number of food chains in the ecosystem forms a food web. This is being illustrated by following food chains 1. Plants → rabbit → Hawk 2. Plants → Mice → Hawk	4

	3. Plants → Mice → Snake → Hawk 4. Plants → Seed eating Bird → Hawk 5. Plants → Grasshopper → Hawk (2Marks) In the above food chain plants, Hawk and mice exist in more than one food chain which will form a network of interconnected food chains called food web. b) Yes, bacteria and fungi act as vital "cleaning agents" or <u>decomposers</u>, breaking down dead organic matter and waste materials into simpler substances, thereby recycling nutrients and cleaning up the environment. In the absence of decomposers, the dead bodies of plants and animals would keep lying as such and thus making the environment polluted (2marks)	
29.	1. Energy flows in one direction — from the sun → producers (plants) → consumers (herbivores, carnivores) → decomposers. It never goes backward. 2. The sun is the ultimate source of energy for almost all ecosystems. 3. At every trophic level, a large part of energy is lost as heat during respiration and other activities. 4. Only about 10% of the energy is transferred from one trophic level to the next; the rest is lost. 5. Due to the significant loss of energy at each trophic level, the number of levels in a food chain is limited, typically to 3 to 4 levels. 6. The total number of organisms and the total biomass at each trophic level decreases as you move up the food chain, forming a pyramid structure. (Any five)	2+3
30.	(d) (ii) and (iv)	1
31.	c) Biomass and Trophic level	1
32.	C. A is true but R is false.	1
33.	● DDT being a non- biodegradable pesticide will enter the food chain from the first trophic level i.e. Plankton. (½mark) ● Non – biodegradable pesticides accumulate progressively at each trophic level. This phenomenon is known as biological magnification. (1mark) ● HAWK will have the highest level of pesticide. (½mark)	2

34.	A will represent more energy transfer as compared to C and E. (½mark) B will represent more energy transfer as compared to D. (½mark) When green plants are eaten by primary consumers, a great deal of energy is lost as heat to the environment, some amount goes into digestion and in doing work and the rest goes towards growth and reproduction. An average of 10% of the food eaten is made available for the next level of consumers. This loss of energy takes place at every trophic level. (1mark) Alternatively accept - In accordance with 10% law of transfer of energy in a food chain only 10% of energy available at one trophic level is transferred to the next trophic level. <u>For visually impaired students</u> Maximum energy loss to the environment occurs at the level of green plants (producers). - Reason: Plants capture solar energy, but a large part is lost as heat or used up in their own life processes (respiration, growth). Only a fraction is available to herbivores. 2. More energy transfer occurs from plants to deer than from deer to tiger. - Reason: According to the Ten Percent Law, only about 10% of the energy at each trophic level is passed on. Since plants have the maximum energy, the transfer to deer is greater than the transfer from deer to tiger	2
35.	A. Each level of food chain where transfer of energy takes place B(i). Environment (ii). Trophic level (iii). Abiotic factors (iv). heterotrophs	1+2
36.	- An artificial self-sustainable aquatic ecosystem can be created in a transparent jar by adding water, oxygen, food and aquatic plants and animals. - Oxygen/oxygen pump. - Fish food. - Aquatic plants/Producers provide O₂ during photosynthesis.	3

	• Aquatic animals/Consumers release CO₂ for the process of photosynthesis. • Decomposers for natural cleaning of the aquarium. (0.5 mark for each point)	
37.	a. If all the tigers are removed from the food chain, then there will be increase in deer population leading to overgrazing and depletion of food vegetation. There will desertification and loss of biodiversity leading to ecological imbalance. b. The grass population will increase due to absence of herbivore to consume it. The population of carnivores like lion and tigers will decrease leading to ecological imbalance c. The decomposition of biodegradable substances will not take place and there will be pile of dead organisms everywhere, Nutrient cycles will not function properly.	1X3
38.	(i) Non-biodegradable waste like plastics, glass, and synthetic chemicals do not decompose easily. a) When dumped in soil, they block the natural exchange of nutrients, reduce soil fertility, and release harmful chemicals that make the soil toxic. b) In water, plastics and chemicals pollute rivers, lakes, and oceans. They harm aquatic organisms, disturb the natural balance, and eventually enter the food chain, affecting all living beings. (ii) a) Reduce and recycle non-biodegradable materials like plastics, glass, and synthetic chemicals instead of dumping them in the environment. b) Dispose of non-biodegradable waste properly through segregation and scientific waste management methods (such as recycling plants or safe incineration).	2+2
39.	Effects on aquatic ecosystem: a) Fertilizers cause excessive growth of algae (<i>algal bloom</i>). When algae die, decomposers use up oxygen for decomposition, leading to oxygen depletion → fish and other aquatic life may die. (2 marks) b) Plastic waste does not decompose and enters food chains when aquatic animals consume microplastics. This causes disruption of food chains and food webs and may lead to biological magnification. (1 mark)	3+2

	Eco-friendly measures: (any two, 2 marks) • Promote organic farming instead of chemical fertilizers. • Proper plastic waste management: recycling and reducing usage. • Construct sewage treatment plants before waste enters rivers. • Encourage cloth/jute bags instead of plastics.	
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