केन्द्रीय विद्यालय संगठन

KENDRIYA VIDYALAYA SANGATHAN

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ZONAL INSTITUTE OF EDUCATION AND TRAINING, MYSURU

Competency Based Assessment in Science: Design of test items

(31.07.2024 -02.08.2024)

CLASS- X

SCIENCE

DIRECTOR'S MESSAGE……

It is with profound delight and utmost pride that we present the Competency Based Assessment question bank for **CLASS X** which was prepared by TGT(Science) of the feeder regions during the 03 – day workshop on "**Competency Based Assessment in Science: Design of test items**" It's my firm belief that access to quality education should know no boundaries, transcending social and economic constraints. Our collective vision is to empower all students and teachers with the tools for success and intellectual growth.

With their steadfast dedication, the TGT(Science) from the feeder Regions namely Bangalore, Chennai, Ernakulam and Hyderabad have invested their knowledge and expertise in preparation of the CBA test items.

It is with pleasure that I place on record my commendation for the commitment and dedication of the team of TGT(Science) from the four Regions, Shri. Manoj Kumar Paliwal, Principal KV No.1 Madurai, Chennai Region & Associate Course Director, the Resource persons Ms Seema Saraswat, TGT(Science) KV Vijaypura and Ms Neeta Wage TGT(Science) KV Hebbal and Mr. Dinesh Kumar, Training Associate (Physics) from ZIET Mysore who has been the Coordinator of this assignment.

Wishing you all the very best in your academic journey!

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ZIET MYSURU

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MS MENAXI JAIN

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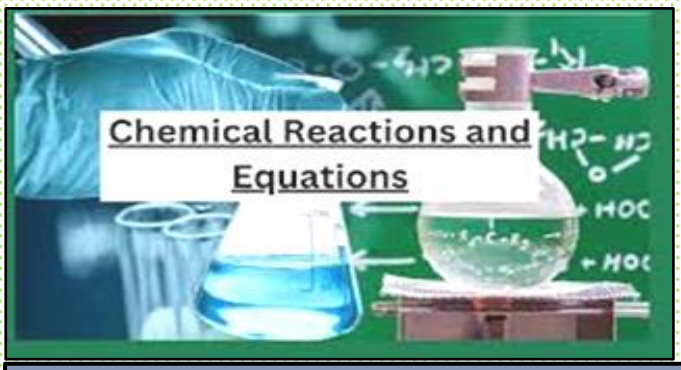
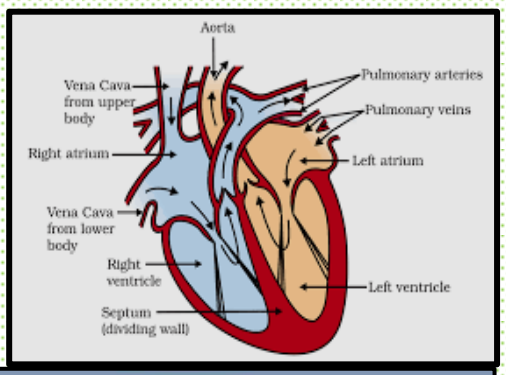
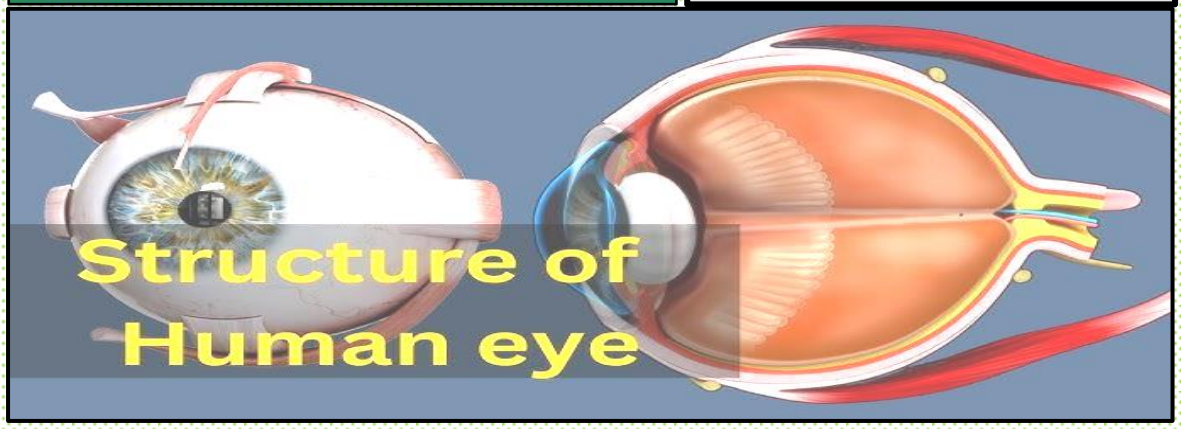






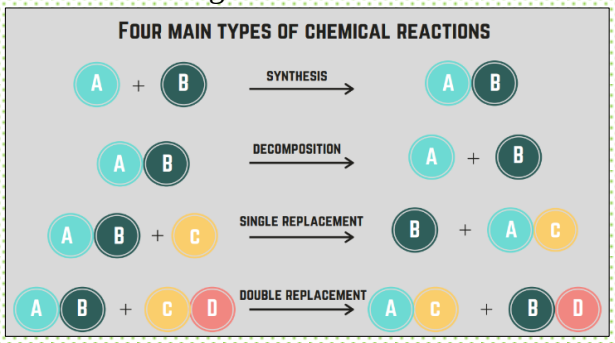
Index

CHAPTER: 1. CHEMICAL REACTION AND CHEMICAL EQUATION

S.NO	QUESTION	POINT VALUE
	SECTION - A (MCQ)	
1	Which law is obeyed when we balance the chemical equation? a) Law of Momentum b) Law of Conservation of Energy c) Law of Conservation of Mass d) Law of Conservation of Time	**1**
2	When can you say that the chemical reaction is said to give complete information? a) When the state of reactants and products are given b) When the state reactants are given only c) When the state of products are given only d) When the states are not mentioned	**1**
3	We keep the smallest numbers first while balancing a chemical equation followed by bigger numbers. What is this method called? a) Trial method b) Hit method c) Hit and trial method d) Trial and try method	**1**
4	Which chemical reaction is not balanced? a) Chemical equation b) Unbalanced chemical equation c) Skeletal equation d) Equation	**1**
5	Magnesium ribbon burns with a dazzling white light in air and form a white powder. Identify the chemical composition of white powder. a) Magnesium Carbonate b) Magnesium Oxide c) Magnesium Nitrate d) Magnesium Sulphate	**1**
6	Seema got her room walls white washed with slaked lime. After two-three days she found that whitewashing gave a shiny finishing on the walls because calcium carbonate reacts with carbon dioxide. Predict the reaction that has taken placed on the whitewashed walls. a) Slaked lime reacts with CO_2 b) Slaked lime reacts with NO_2 c) Slaked lime reacts with O_2 d) Slaked lime reacts with SO_2	**1**
7	$MnO_2 + 4HCl$ ----> $MnCl_2 + H_2O + Cl_2$ Name the reducing agent. a) MnO_2 b) HCl c) $MnCl_2$ d) H_2O	**1**

8	Rajat was writing Chemistry home work . He had learnt the equation but he forgot the product that was formed after heating Ferrous sulphate. Choose the correct option from the following to help Rajat. a) Fe_2O_3, SO_2, SO_3 b) Fe_3O_4, SO_3 c) Fe_2O_3, SO_4 d) Fe_2O_3, SO_2	**1**
9	Usha was heating a salt Lead nitrate. She saw brown fumes coming out of the test tube. Identify the gas released. a) CO_2 b) SO_2 c)NO_2 d) NO_3	**1**
10	Classify the type of reaction in which exchange of ions between reactants takes place. (a) displacement reaction (b) double displacement reaction (c) Combination reaction (d) decomposition reaction	**1**
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion:** Exothermic reactions release heat energy. **Reason:** $CaO + H_2O$----->$Ca(OH)_2$	**1**
12	**Assertion:** Oxidation is the addition of oxygen. **Reason:** Potassium dichromate acts as reducing agent**.**	**1**
13	**Assertion:** The taste of oily food changes after some days which is called rancidity. **Reason**: The taste of the food is changed because it is reduced.	**1**
14	**Assertion:** White silver chloride turns grey in sunlight so it is used in photography. **Reason:** Silver chloride decomposes into silver and chlorine by light.	**1**
15	**Assertion (A) :** Brown fumes are produced when lead nitrate is heated. **Reason (R) :** Nitrogen dioxide gas is produced as a by product due to the decomposition of lead nitrate.	**1**
	SECTION – B (2 MARKS)	
16	Green Ferric sulphate on heating forms red colour ferric oxide. Represent the above chemical reaction in the form of equation.	**2**

17	Rita left her chips uncovered in a plate on the table. After some days, its taste changed. She took out other pieces of chips kept in a tightly packed container. It tasted good. Give reasons why these chips tasted different.	**2**
	SECTION – C(3 MARKS)	
18	Identify the substances which are oxidised and reduced. i) MnO_2 +4HCl ----->$MnCl_2$ + H_2O ii)ZnO +C ----> Zn + CO	**3**
19	Zn +H_2SO_4 --->$ZnSO_4$ + H_2 a) How can you detect that the liberated gas is a hydrogen gas? b) Why has Zn replaced hydrogen from H_2SO_4? c) Which kind of reaction is taking place in the above equation?	**3**
	CCT SOURCES BASED/CASE BASED	
20	Siya took a white-coloured salt and made its aqueous solution. She then added KI solution to it, and its colour changed to yellow. She was surprised to see the colour change. (a)Identify the white-colored salt Siya used. (b)Explain why the color changed to yellow. (c) Write the balanced chemical equation for the reaction that took place.	**4**
21	**Breath Analyzers**  Breath analyzers contain an anode. When a person blows into a breathalyzer, the ethanol in their breath reacts with water from the air at the anode and is oxidized to form acetic acid. Meanwhile, at the cathode, oxygen from the atmosphere is reduced to form water. These two coupled reactions produce an electrical current between the electrodes that's proportional to the amount of ethanol present in the breath and thus gives the information of alcohol consumption to the cops. **Answer the following question** (i) Identify the oxidizing agent (oxidant) in the following reaction: $CuO + H_2$ --> $Cu + H_2O$ (ii) The concentration of alcohol in the breath can be tested by the breath analyser. How ? (ii) Conversion of ethanol to acetic acid is oxidation or reduction? Explain the role of water?	**4**

22	**Types of reaction** There are many chemical reactions taking place around us which are accompanied by different types of changes . These reactions are classfied into various categories on the basis of different criteria.  **Answer the following questions** (i) Give an example where a chemical change is accompanied by a change in colour. (ii) Calcium oxide is made to react with water, this type of reaction is _____, which is accompanied by _____ of heat. (iii) During formation of $MgCl_2$from Mg, the metal is getting oxidised explain?	**4**
	LONG ANSWER TYPE(5 MARKS)	
23	There is a red alert in Kannur, Kerela due to heavy rainfall. Rita collected this rainwater in a beaker and put two electrodes. She observed bubbles in the electrode. a) Name the gases released on each electrode. b) What will happen if you bring a burning candle to each electrode? (c)What will happen if rainwater is replaced by distilled water?	**5**
24	Ram was doing an experiment in the Chemistry lab. The teacher told him to heat 1g of Cu in a test tube. He observed that the colour of the copper turns from brown to black. When Hydrogen gas is passed over it again changes to brown colour. i) Which type of chemical reaction is Ram performing when he is heating Cu? ii) Describe the process that is occurring when Ram is heating Copper in air. iii) Write a chemical equation to represent Ram's experiment. iv) What will happen if hydrogen gas is passed over black Copper oxide?	**5**
25	Balance the following equations: I) $Na_2SO_4 + BaCl_2$ ----> $BaSO_4 + NaCl$ ii) $Fe + H_2O$ ----> $Fe_3O_4 + H_2$ iii) $Mg + O_2$ ---> MgO iv) $Cu + FeSO_4$ ---> $FeSO_4 + Cu$ v) $AgCl$ ----> $Ag + Cl_2$	**5**

CHAPTER: 1.CHEMICAL REACTION AND CHEMICAL EQUATION

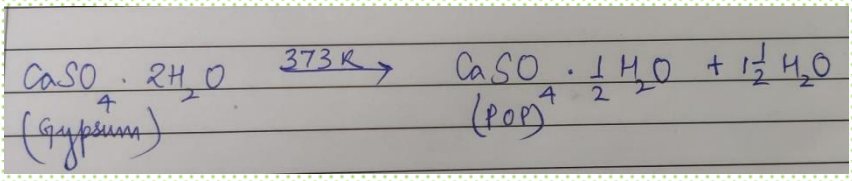
S.NO	ANSWER KEY	POINT VALUE
	SECTION -A (MCQ)	
1	c	1
2	a	1
3	c	1
4	c	1
5	b	1
6	a	1
7	b	1
8	a	1
9	c	1
10	b	1
	ASSERTION AND REASON (1MARK)	
11	a	1
12	c	1
13	c	1
14	a	1
15	a	1
	SECTION – B (2 MARKS)	
16	$2FeSO_4$ ----> $Fe2O_3 + SO_2 + SO_3$	2
17	The chips that Rita left uncovered in the plate got oxidised . Therefore, its smell and taste changes. This oxidation of fats and oil is called rancidity.	2
	SECTION – C(3 MARKS)	
18	HCl, MnO_2	3
19	a) It burns with a pop sound. b) Zinc is placed higher in reactivity series. Therefore, it replaces hydrogen is H_2SO_4.	3
	C C T SOURCES BASED/CASE BASED	
20	(a)The white-colored salt is lead(II) nitrate ($Pb(NO_3)_2$). (b)The color changed to yellow because lead(II) iodide (PbI_2) was formed, which is a yellow precipitate. (c)The balanced chemical equation for the reaction is: Pb(NO3)2(aq) + 2KI(aq) → PbI2(s) + 2KNO3(aq)	1+1+2

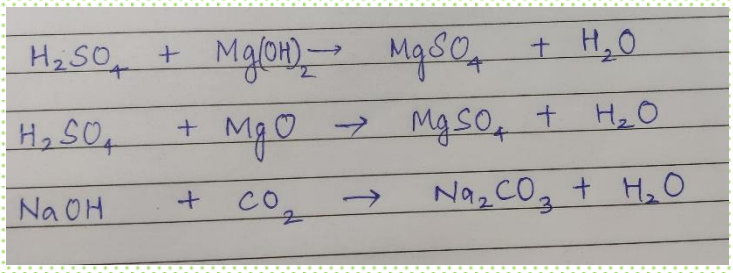
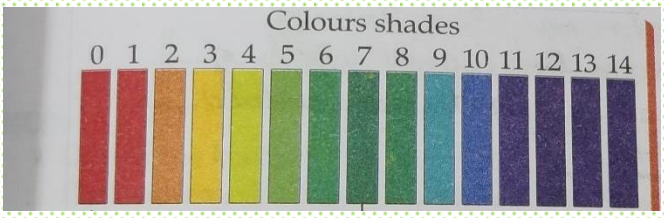
21	(i) The oxidizing agent (oxidant) in the following reaction is CuO, it is getting reduced to Cu. (ii) More the concentration of alcohol in the breath more would be the deflection in the analyser as the current produced between the electrode would be more. (iii) Conversion of ethanol to acetic acid is oxidation because oxygen from water is getting added to the alcohol to form acetic acid. Water is acting as an oxidising agent.	***1+1+2***
22	(i) $CuSO_4$ + Fe--→ $FeSO_4$ + Cu blue colour changing$CuSO_4$ → changing to Green colour $FeSO_4$. (ii) Calcium oxide is made to react with water, this type of reaction is Combination/ Exothermic reaction, which is accompanied by evolution of heat. (iii) During formation of $MgCl_2$,Mg is loosing electrons, loss of electron is oxidation, so the metal is getting oxidised and chlorine is getting reduced.	***1+1/2+1/2+ 2***
	LONG ANSWER TYPE(5 MARKS)	
23	*a) Hydrogen, Oxygen* *b) Hydrogen gas- extinguishes burning splinter* *c) Oxygen gas- splinter kept on burning* *d) It will not split water into ions.*	***5***
24	*i) Oxidation* *ii) Oxidation is the process of adding oxygen.* *iii) $2Cu + O_2$ -------> $2CuO$* *iv) $Fe + CuSO_4$ --------> $FeSO_4 + Cu$* ***v)*** *2 AgCl ------> $2Ag + Cl_2$*	***5***
25	*i) Na_2SO_4 +$BaCl_2$ ----> $BaSO_4$ + 2NaCl* *ii) 3Fe + 4H2O ----> $Fe3O_4$ + $4H_2$* *iii) 2Mg +O_2 ---> 2MgO* *iv) Cu + $FeSO_4$ ---> $FeSO_4$ + Cu* *(v)2AgCl ----> 2Ag + Cl_2*	***5***

CHAPTER: 2. Acids bases and salts

S.No.	QUESTIONS	POINT VALUE
1.	While washing clothes you noticed that after adding lots of detergent sufficient foam is not being formed. What can be added to the wash for better cleaning? (a) Table Salt (b) Washing soda (c) Baking soda *(d)* Bleaching powder	1
2.	Some observations of acid base indicators are given in the following statements. (i) Turmeric turns red in the basic solution. (ii) Blue litmus turns red in the basic solution. (iii) Red litmus turns blue in the basic solution. (iv) Hibiscus extract turns red in the basic solution. Select the correct statements. (a) i, iii (b) ii, iv (c) i, iv (d) Iii, iv	1
3.	When you add lemon juice to a cup of tea, how will the pH change? (a) It becomes neutral (b) It becomes more acidic (c) It becomes more basic (d) It forms a salt.	1
4.	Which of the following is a common example of neutralization reaction in daily life? (a) Boiling water with salt for cooking pasta (b) Mixing lemon juice with honey (c) Using soap to remove oil stains (d) Adding vinegar to baking soda for cleaning	1
5.	Your teacher demonstrated a simple experiment by squeezing lemon juice on a chalk piece, what will you observe? (a) Change in colour of the chalk (b) No reaction will take place (c) Formation of a salt (d) Production of bubbles due to CO_2 gas	1
6.	Which gas is produced when an acid reacts with metal hydrogen carbonate? (a) Oxygen (b) Carbon dioxide (c) Hydrogen (d) Nitrogen	1

<table>
<tr><td>7.</td><td>Identify the pair of weak acids.
(a) HCl, CH_3COOH
(b) H_2SO_4, HCOOH
(c) HNO_3, HCl
(d) CH_3COOH, H_2CO_3</td><td>1</td></tr>
<tr><td>8.</td><td>How many molecules of water of crystallization are present in a formula unit of Copper Sulphate?
(a) 5 (b)10 (c) 2 (d) 0.5</td><td>1</td></tr>
<tr><td>9.</td><td>Which of the following drinks would cause more damage to the tooth enamel due to its pH level?
(a) Coffee (pH = 5)
(b) Milk (pH = 6.4)
(c) Water (pH = 7)
(d) Soda (pH = 3.3)</td><td>1</td></tr>
<tr><td>10.</td><td>Analyze the following data
A student measures the pH of 4 different liquids and records the following values.
<table><tr><td>Liquid</td><td>Liquid A</td><td>Liquid B</td><td>Liquid C</td><td>Liquid D</td></tr><tr><td>pH</td><td>2</td><td>5</td><td>7</td><td>10</td></tr></table>Evaluate which of the conclusions is most accurate.
(a) Liquid D can be used to neutralize the acidity of Liquid A
(b) Liquid C is more acidic than Liquid A
(c) Liquid B is basic in nature
(d) Liquid A can be water as it is neutral</td><td>1</td></tr>
<tr><td></td><td>ASSERTION AND REASON (1MARK)
Question No. 11 to 15 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.</td><td></td></tr>
<tr><td>11.</td><td>Assertion: Most of the metals don’t react with bases.
Reason: Zinc reacts with strong bases because of its ability to be oxidized.</td><td>1</td></tr>
<tr><td>12.</td><td>Assertion: When dry blue litmus paper is exposed to dry HCl gas, it turns red.
Reason: Blue litmus turns red in the presence of an acid.</td><td>1</td></tr>
<tr><td>13.</td><td>Assertion: Non-metallic oxides are acidic in nature.
Reason: Non-metallic oxides form salt and water on reacting with an acid.</td><td>1</td></tr>
<tr><td>14.</td><td>Assertion: Metallic oxides are basic in nature.
Reason: MgO is a metallic oxide.</td><td>1</td></tr>
<tr><td>15.</td><td>Assertion: Brisk effervescence is seen when metal carbonates react with a base.
Reason: carbon dioxide is a colourless gas.</td><td>1</td></tr>
</table>

16.	A Soda acid fire extinguisher is used to put out the fire. Also we know that CO_2 extinguishes fire. Analyze if both these statements are related. Give a chemical equation to justify.	2
17.	You must have seen your mother putting some rice grains in the table salt sprinkler. (i) What can you interpret about the nature of salt from this? *(ii)* What will happen if you replace rice grains with some bigger sugar cubes?	2
18.	(i)Predict how increasing the concentration of NaCl affects the rate of sodium hydroxide formation? (ii) Discuss a limitation that may arise due to lesser concentration of NaCl. (iii)Write a balanced chemical equation for the electrolysis of NaCl to form NaOH.	3
19.	This is an equation showing decomposition of gypsum to Plaster of Paris and water.  (i) What is the chemical name of Plaster of Paris? (ii) How many molecules of $CaSO_4$ will combine with two water molecules to form POP? *(iii)* Give two uses of Plaster of Paris.	3
20.	In the inverter, we add distilled water to the lead-acid battery after every few months. It helps in maintaining electrolyte levels and ensures its proper functioning. During the battery's operation, a small amount of water is converted into hydrogen and oxygen gas and escapes from the battery. (i) Why do we need to add water to a lead-acid battery periodically? (ii) What will happen if we add tap water instead of distilled water? *(iii)* Identify the type of reaction that takes place when water is converted into hydrogen and oxygen gas. Give a chemical equation for this reaction.	1+1+2

21.	Look at the reactions given below and answer the questions.  (i) What is common in all these reactions? (ii) What can you predict about the nature of MgO in the second reaction? (iii) H_2SO_4 is a/an _____, CO_2 is a/an _____ oxide. Compare the nature of H_2SO_4 and CO_2 as per the reactions given above.	1+1+ (0.5+0.5 +1)
22.	A student conducts an experiment for some household substances using a pH paper as an indicator. Lime juice turns the indicator orange. Soap solution turns the indicator blue. Water turns the indicator green. (i)Based on the pH scale provided, estimate the nature of lime juice and water.  (i) Which substance used by the student will have more hydrogen ions? *(ii)* What does the dark blue color indicate about the pH? Give one example of such a substance.	*1+1+2*
23.	(i) How can you distinguish between a reaction involving a metal + acid and metal carbonate + acid, based on the products formed? (ii) Provide an equation of each type of reaction using hydrochloric acid. (iii) In these reactions, some gases are released; write a confirmatory test for any one.	*2+2+1*
24.	A compound which is prepared from Gypsum has the property of hardening when mixed with water. (i) Identify this compound. (ii) Write the chemical equation for its preparation. (iii) For what purpose will this compound be used in the hospitals? (iv) How many molecules of water of crystallization are present in gypsum? (v) What will happen if Gypsum is heated for a longer time?	*1+1+1+ 1+1*

25.	Indicators show color change in the presence of acids and bases. Write the suitable color change in the table given below. *HCl* | *NaOH* *Blue Litmus* | | | *Red Litmus* | | | *Turmeric* | | | *China rose extract* | | | *Phenolphthalein* | | |	*5*

CHAPTER: 2. Acids bases and salts

S. NO.	***ANSWERS***	*POINT VALUE*
1.	*(b) Washing soda*	*1*
2.	*(a)i, iii*	*1*
3.	*(b) It becomes more acidic*	*1*
4.	*(d) Adding vinegar to baking soda for cleaning*	*1*
5.	*(d) Production of bubbles due to CO_2 gas*	*1*
6.	*(b) Carbon dioxide*	*1*
7.	*(d) CH_3COOH, H_2CO_3*	*1*
8.	*(a) 5*	*1*
9.	*(d) Soda (pH = 3.3)*	*1*
10.	*(a)Liquid D can be used to neutralize the acidity of Liquid A*	*1*
11.	*(a) Both A and R are correct, R is the correct explanation of A.*	*1*
12.	*(d) A is false, and R is true.*	*1*
13.	*(c) A is true, and R is false.*	*1*
14.	*(b) Both A and R are correct, R is not the correct explanation of A.*	*1*
15.	*(d) A is false, and R is true.*	*1*

16.	Yes, both statements are related as in both of them CO_2 is used to extinguish fire. $NaHCO_3 + H_2SO_4 = Na_2SO4 + H_2O + CO_2$	*2*
17.	(i)Salt is hygroscopic in nature. (ii)If we replace rice grains with sugar cubes then salt and sugar cubes both will absorb water and clump. Salt will not be free-flowing.	*2*
18.	(i)Initially it will increase the formation of NaOH, but after some time it will stop when all the water molecules are used up. (ii)Less availability of sodium ions will result in lesser formation of NaOH(iii)$2NaCl + 2H_2O = 2NaOH + H_2 + Cl_2$	*3*
19.	(i)Calcium sulphate hemihydrate (ii)4 (iii)Used in hospitals to put fractured bones in the correct position, used in making cheap jewellery.	*3*
20.	In the inverter, we add distilled water to the lead-acid battery after every few months. It helps in maintaining electrolyte levels and ensures its proper functioning. During the battery's operation, a small amount of water is converted into hydrogen and oxygen gas and escapes from the battery. (i)So that acid can ionise more for better conductivity. (ii)Tap water contains some salts, which will be converted to ions. They will deposit on the electrodes damaging them. (iii)Electrolytic decomposition $H_2O = H^+ + OH^-$	*1+1+2*
21.	*Look at the reactions given below and answer the questions.* *(i)All these reactions have products as salts and water* *(ii)MgO is basic in nature* *(iii)Acid, non-metallic* *H_2SO_4 and CO_2both are acidic in nature.*	*1+1+* *(0.5+0.5+1)*

<table>
<tr><td>22.</td><td>(i)Lime juice = acidic nature
Water = neutral
(ii)Lime juice
(iii)It shows a strong base. NaOH is a strong base.</td><td>1+1+2</td></tr>
<tr><td>23.</td><td>(i)Acid reacts with metal to produce salt and hydrogen gas. Acids react with metal carbonates to produce salts, water, and carbon dioxide gas.

(ii)$HCl + Mg = MgCl_2 + H_2$

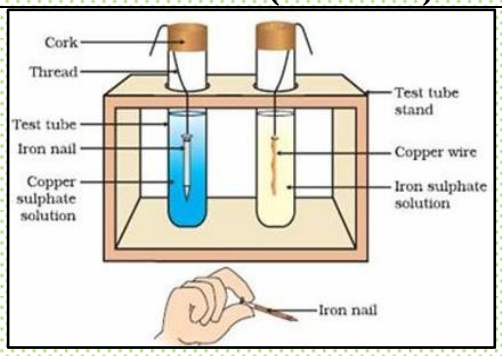
$HCl + MgCO_3 = MgCl_2 + H_2 + CO_2$

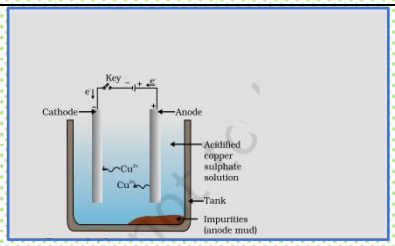
(iii)Pop sound – confirmatory test for hydrogen

Lime water turns milky – confirmatory test for carbon dioxide. (any 1)</td><td>2+2+1</td></tr>
<tr><td>24.</td><td>A compound that is prepared from Gypsum has the property of hardening when mixed with water.
(i)Plaster of Paris
(ii)$CaSO_4.2H_2O = CaSO_4.H_2O + 1\ H_2O$
(iii)To put fractured bones in the correct position.
(iv)2
(v)Gypsum will be converted to dead burnt plaster.</td><td>1+1+1+1+1</td></tr>
<tr><td>25.</td><td>
<table>
<tr><td>Indicators</td><td>HCl</td><td>NaOH</td></tr>
<tr><td>Blue Litmus</td><td>red</td><td>blue</td></tr>
<tr><td>Red Litmus</td><td>red</td><td>blue</td></tr>
<tr><td>Turmeric</td><td>yellow</td><td>Red</td></tr>
<tr><td>China rose extract</td><td>magenta</td><td>green</td></tr>
<tr><td>Phenolphthalein</td><td>colourless</td><td>Pink</td></tr>
</table>
</td><td>5</td></tr>
</table>

CHAPTER :3. METALS AND NON-METALS

S.NO	QUESTION	Point value
	SECTION -A (MCQ)	
1	Which of the following is the most abundant metal in the earth crust (a) Al (b) Fe (c) O (d) Cu	**1**
2	Which one of the following metals is found in liquid state at room temperature? (a) Na (b) Fe (c) Cr (d) Hg	**1**
3	Which of the following is the best conductor of heat? (a) Gold (b) Platinum (c) Silver (d) Lead	**1**
4	The constituent of haemoglobin is (a) Iron (b) Sodium (c) Copper (d) Magnesium	**1**
5	Cinnabar is an ore of (a) Mercury(b) Copper (c) Calcium(d) Lead	**1**
6	Which of the following metals are refined by electrolytic refining? (i) Fe (ii) Cu (iii) Na (iv) Au (a) (i) and (ii) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv)	**1**
7	Which of the following compounds loses its shine and gains a green colour coating if it is kept in open air? (a) $CuSO_4$ (b) $CuCO_3$ (c) $Cu(NO_3)_2$ (d) CuO	**1**
8	Metals react with dilute acids to give (a) Salt and water (b) Salt and hydrogen gas (c) Salt and carbon dioxide gas (d) Salt, water and carbon dioxide gas	**1**
9	The correct arrangement of metals Mg, Zn, Fe and Al in decreasing order of their reactivity with dilute acids is: (a) Al > Mg > Zn > Fe (b) Al > Mg > Fe > Zn (c) Mg > Al > Zn > Fe (d) Mg > Al > Fe > Zn	**1**
10	Which of the following represents an electronegative element (a) 2,8 (b)2,7 (c)2,8,2 (d)2,8,1	**1**

	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion:** Property of beating metal into sheaths is known as malleability **Reason:** Metals are brittle in nature.	**1**
12	**Assertion:** Fe is used in the galvanisation of Zn. **Reason:** Coating of Zinc on iron articles increases their life by protecting iron from rusting.	**1**
13	**Assertion:**Iron displaces Silver from the silver nitrate solution **Reason:** Silver in more reactive than Iron.	**1**
14	**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**
15	**Assertion:**Metals usually acts as oxidising agents **Reason:**Oxidising character can be expressed in terms of gaining electrons.	**1**
	SECTION – B (2 MARKS)	
16	The iron pot was found to have some holes in it after few days of keeping the solution of CuSO4 in it. What can be the possible reason behind this.	**2**
17	A small child had some coins of silver and copper. He observed that these Coins were changing their colour after few days. What is the reason behind this?	**2**
	SECTION – C(3 MARKS)	
18	 Observe the above activity and answer the following question. i. What is the name of reaction taking place here? ii. In which test tube no reaction will take place and why?	**3**
19	Write chemical equations for the following: i. Reaction between Aluminium and oxygen. ii. Reaction of potassium with cold water. **iii.** Reaction of Iron with water.	**3**

	C C T SOURCES BASED/CASE BASED	
20	Rahul performed an experiment to react a lustrous element M with sodium hydroxide. He observed the formation of bubbles in the reaction mixture. He observed the same when this element was treated with hydrochloric acid. Suggest how he can identify the produced gas. Write chemical equations for both reactions.	**4**
21	 After carefully observing the picture, Explain the following questions: a) Name of the process depicted in the picture. b) Explain the process involved in this setup of reaction mixture. c) Give an example of the metal for which this method of extraction is used.	**4**
22	The old iron bridge, constructed several decades ago, is now exhibiting significant signs of rust and deterioration. This has raised concerns among local authorities about its structural integrity and the safety of those who use it. Ensuring the bridge's safety not only involves immediate repairs but also long-term strategies to mitigate corrosion and extend the bridge's lifespan. (a)What environmental factors contribute to the corrosion of iron? (b)What are the potential risks if the corrosion of the bridge is not addressed? (c)What are some common methods used to prevent or slow down the corrosion of iron?	**4**
	LONG ANSWER TYPE(5 MARKS)	
23	While visiting his father's factory Sonali observed some trucks full of ores. She was curious to understand the method with witch the metal from these ores will be extracted. Her father told her that these are the ores of Zn, Mn and Fe. Explain different steps with which these metals can be extracted in pure form.	**5**
24	Shweta saw a kerosene bottle in the science lab of her school. She saw a metal placed in that bottle and asked her teacher about it. Her teacher said that this metal vigorously catches fire if it is kept in open air. The metal is too reactive that it catcher fire even if we keep it in the water. a) Identify 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 and also write the reactions involved in it. d) If the hydroxide of this metal reacts with hydrochloric acid what would be the products formed? What do we call this reaction?	**5**

25	Rahul is conducting an experiment in his school laboratory. He has been given samples of four different metals: A, B, C, and D. He performs the following tests: Reaction with water: Metal A reacts vigorously, producing hydrogen gas. Metal B shows no reaction. Reaction with dilute hydrochloric acid: Metal C reacts rapidly, producing hydrogen gas. Metal D reacts slowly. Reaction with oxygen: Metal A forms a white oxide layer quickly. Metal B shows no reaction. Metal C forms an oxide layer after heating. Metal D forms an oxide layer only after prolonged heating. a) Identify which metal (A, B, C, or D) is most likely to be sodium and which one is likely to be gold. Justify your answer based on the reactivity series. b) Explain why some metals react with water while others do not. c) Predict which metal (A, B, C, or D) could be used for making electrical wires and justify your choice. d) Discuss the importance of the reactivity series in predicting the outcomes of displacement reactions.	**5**

CHAPTER: 3. METALS AND NON-METALS

S.NO	***ANSWER KEY***	***POINT VALUE***
	SECTION -A (MCQ)	
1	(a) Al	**1**
2	(d) Hg	**1**
3	(c) Silver	**1**
4	(a) Iron	**1**
5	(a) Mercury	**1**
6	(d) (iii) and (iv)	**1**
7	(b) $CuCO_3$	**1**
8	(b) Salt and hydrogen gas	**1**
9	(c) Mg > Al > Zn > Fe	**1**
10	(b)2,7	**1**
	ASSERTION AND REASON (1MARK)	
11	(b)	**1**
12	(d)	**1**
13	(d)	**1**
14	(a)	**1**
15	(d)	**1**
	SECTION – B (2 MARKS)	
16	Iron displaced copper from copper sulphate to form Iron sulphate because Iron is more reactive than copper. A portion of the iron pot got dissolved which caused holes in it. $CuSO_4 + Fe \rightarrow FeSO_4 + Cu$	**2**
17	Corrosion of metals is the reason behind this. Silver changes to Black colour	**2**

	Copper changes to Green colour	
	SECTION – C(3 MARKS)	
18	i. Displacement Reaction ii. The reaction is not taking place in the test tube containing iron sulphate solution because Cu is less reactive than Fe.	**3**
19	i. $4Al(s)+3O_2(g)$ $2Al_2O_3(s)$ ii. $2K(s)+2H_2O(l)$ $KOH(aq)+H_2(g)$+ Heat Energy iii. $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$	**3**
	C C T SOURCES BASED/CASE BASED	
20	The gas which is forming the bubble is hydrogen. To check the presence of hydrogen gas, we can bring a burning candle near the evolved gas if the candle burns with a pop sound. It confirms the evolution of hydrogen gas. Reaction with sodium hydroxide: $M + 2\ NaOH \rightarrow Na_2MO_2 + H_2$ Reaction with hydrochloric acid: $M + 2\ HCl \rightarrow MCl_2 + H_2$	**4**
21	a) Electrolytic Refining. b) In this process the impure metal is made anode and the pre metal is made cathode and put in a salt solution of matal. On passing the current the pure metal from anode dissolves into the electrolyte and equivalent amount of pure metal from the anode is deposited on cathode. **c)** Cu, Zn, Ag, Au etc.	***4***
22	*(a) A common form of corrosion, occurs when iron reacts with oxygen and moisture in the environment, forming iron oxide.* *(b)Over time, this process weakens the metal, compromising the bridge's strength and stability.* *(c) Applying protective coatings, using corrosion-resistant materials, and implementing regular maintenance schedules.*	***1+1+2***
	LONG ANSWER TYPE(5 MARKS)	
23	*The metals form the ores present in Sonali's father's factories can be extracted in following steps:* *i. Enrichment of Ores: In this step the impurities from the metal are removed on the bases of physical and chemical properties of the gangue. Gangue is the ore in which the sand, soil etc impurities can be seen.* *ii. Now the metals undergo Roasting or Calcination process based on sulphur or carbonate ore .* *Roasting* $2ZnS(s) + 3O_2(g)$+ *Heat* $\longrightarrow 2ZnO(s) + 2SO_2(g)$	***5***

	Zinc oxide, thus on reduction, gives metallic zinc. Carbon monoxide. The carbon replaces the zinc. Here, carbon acts as a reducing agent. Industrially, coke is used as a source of carbon Calcination Calamine is heated with constrained air before being transformed into zinc oxide (calcination). Thus, when produced zinc oxide is reduced in the presence of carbon (coke), metallic zinc is created.Calcination ZnCO3(s)+ Heat ⟶ZnO(s) + CO2(g)Reduction ZnO(s) + C(s) ⟶ Zn(g) + CO(g)	
24	a) Na b) Sodium metal is highly reactive element and it can catch fire on exposure to moisture. c) Na2O, 4Na+O2 ⟶2Na_2O d) The product formed would be NaCl , the type of reaction is Neutralization Reaction	***5***
25	*a) Metal A is most likely sodium because it reacts vigorously with water and forms an oxide layer quickly with oxygen. Metal B is likely gold because it shows no reaction with water, hydrochloric acid, or oxygen, indicating its low reactivity.* *b) Some metals react with water because they are highly reactive (e.g., alkali metals like sodium). Less reactive metals (e.g., gold) do not react with water because they do not easily lose electrons to form positive ions.* *c) Metal D could be used for making electrical wires. Despite its slow reaction with hydrochloric acid and oxygen, it indicates that it is relatively less reactive and stable, similar to metals like copper or aluminum, which are commonly used for electrical wiring due to their good conductivity and low reactivity.* *d) The reactivity series helps predict the outcomes of displacement reactions by ranking metals based on their reactivity. More reactive metals can displace less reactive metals from their compounds, which is useful in various applications, such as metal extraction and corrosion prevention.*	*5*

CHAPTER : 4. CARBON AND IT'S COMPOUNDS

S.NO	*QUESTION*	*POINT VALUE*
	SECTION -A (MCQ)	
1	Which of the following are the first two members of homologous series having function group - Cl. (a)CH_3Cl,CHCl (b)HCl, NaCl (c)CH_3Cl,C_2H_5Cl (d)$CHCl_3$,$CHCl_4$	*1*
2	Which of the following is an alkyne? (a) C_5H_8 (b) C_5H_{10} (c) C_5H_{12} (d) C_5H_4	*1*
3	Name the following compound CH_3–CH_2-CH_2-COOH a) Butanoic acid (b) Prapanoic acid (c) Propanal d) Butanal	*1*
4	The difference in the molecular masses of X and y is 14 unit and they differ by CH_2 unit. They may be (a) methane and butane (b) methane and propane (c) propane and butane (d) ethene and butene	*1*
5	In the members of any homologous series which of the following remain same (a) the melting point and boiling point (b) the solubility in water (c) the chemical properties (d) the physical properties	*1*
6	Select the compound with four carbon atoms and one triple bond. (a)butane (b)butanal (c)butanol (d)butyne	*1*
7	Why is acidified $K_2Cr_2O_7$ is required in conversion of ethanol into ethanoic acid? (a)to remove Oxygen from a substance. (b) to add oxygen to a substance.	*1*

	(c) to remove water molecule. (d) to produce CO_2	
8	It is advised to avoid animal fat for cooking as it contains (a) denatured alcohol (b) Sodium salts of acids (c)saturated fatty acids (d) unsaturated fatty acids.	*1*
9	The number of isomers of pentane is (a) 2 (b) 3 (c) 4 (d) 5	*1*
10	Name the functional group present in $C_2H_5COCH_3$. (a) Ketone (b) Carboxylic acid c)Alcohol (d) Aldehyde	*1*
	ASSERTION AND REASON (1MARK) ***Question No. 11 to 15 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.***	
11	**Assertion**: Carbon does not lose four electrons from other atoms to attain noble gas configuration. **Reason**:The nucleus of carbon has six protons.	*1*
12	**Assertion**:Melting point of ethanol is less than that of NaCl. **Reason**:Force of attraction between molecules of covalent compounds is strong.	*1*
13	**Assertion**:While converting ethanol to ethane ,some drops of conc.H_2SO_4 is added. **Reason**:in the reaction of conversion of ethanol to ethane, concentrated H_2SO_4removes water molecules and also acts as a catalyst.	*1*
14	**Assertion** -C_3H_6 is a saturated hydrocarbons . **Reason**-Saturated hydrocarbons are those which do not have any double or triple bonds present between 2 carbon atoms.	*1*
15	**Assertion**:Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms, e.g. hydrogen. **Reason** :After the formation of four bonds, carbon attains the electronic configuration of neon.	*1*

	SECTION – B (2 MARKS)	
16	How does propanol and propanal differ from each other?Draw their structures.	*2*
17	Group the following into Alkane and alkenes C_3H_8,C_2H_4,C_4H_8,C_5H_{12}	*2*
	SECTION – C(3 MARKS)	
18	Why does Carbon share its electrons with other atoms to form bond ?	*3*
19	Which of the following belongs to the same homologous series? Give two points to support your answer CH_4,CH_3OH,CH_3COOH,C_2H_5OH	*3*
	C C T SOURCES BASED/CASE BASED	
20	A student Mohan took an organic acid 'X'.It is a liquid which often freezes during winter time. On warming it with ethanol in the presence of a few drops of concentrated sulphuric acid, Mohan found that a compound 'Y' with a sweet smell is formed. (i) Identify 'X' and 'Y'. (ii) Write a chemical equation for the reaction involved. iii) Write the name of above process .What are the uses of the product formed.	*1+1+2*
21	While standing in assembly line,Harsh got an interesting thought.He thought that we children are standing here in a straight line.If we spread our hands ,we would make branched rows We can stand in circle also.This means we act like Carbon. Carbon compounds may have long chains of carbon, branched chains of carbon or even carbon atoms arranged in rings. In addition, carbon atoms may be linked by single, double or triple bonds. (i) Which type of compounds will be formed if carbon atoms link to make long chains with single bonds only? (ii)Give one example of compounds where Carbon atoms are (a)arranged in branched chain b)linked by triple bond. (iii)Compare in between Benzene and Cyclohexane and write one similarity and one difference between these.	*1+1+2*
22	Hina went to her village in summer vacations. She saw that grandmother cook food on wood .It burns with yellow frame and smoke is produced. She remembers that her mother cook food using LPG which burns with clean blue flame. (i) Why does wood burn with yellow flame where is LPG with blue flame? (ii) When heated coal become red hot but does not produce flame. Why?	*1+1+2*

	(iii) Sometimes even LPG burns with Sooty flame and causes black deposit on utensils. Suggest a solution to remove this problem and how does this solution work?	
	LONG ANSWER TYPE(5 MARKS)	
23	(a)Identify the type of bonds in Common salt and vinegar. Compare them with reason on the basis of (i)Melting point (ii)electric conductivity (b)Draw electron dot structure to show bonding in NH_3.	*3+2*
24	(a) Differentiate between saturated and unsaturated compounds. Give structures of both the type of compounds having four carbon atoms in their molecule. (b) Write the name of the following: (i) CH_3CH_2COOH (ii) CH_3CH_2Br (c) Draw the electron dot structure of ethene (C_2H_4).	*3+½+ ½+1*
25	Tanmay took two test tubes A and B with 10 ml of hard water in each. He added few drops of soap solution in test tube A, and in test tube B, few drops of detergent solution. Then he said both the test tube for some time. (a) In which test tube the formation of foam will be more and why? (b) Why did curdy solid form in another test tube? (c) With help of a diagram show the working of soap on oily dirt.	*5*

CHAPTER : 4. CARBON AND IT'S COMPOUNDS

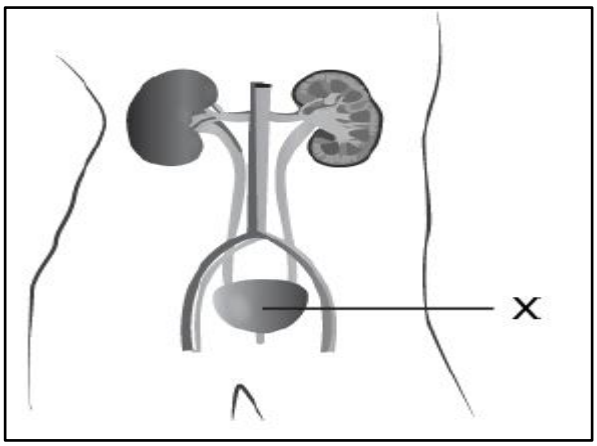
S.NO	*ANSWER KEY*	*MARKS*
	SECTION -A (MCQ)	
1	c	1
2	a	1
3	a	1
4	c	1

5	c	1
6	d	1
7	b	1
8	c	1
9	b	1
10	a	1
	ASSERTION AND REASON (1MARK)	
11	b	1
12	c	1
13	a	1
14	d	1
15	a	1
	SECTION – B (2 MARKS)	
16	Propanol has alcohol group whereas propanal has aldehyde group.correct structures	*1+1*
17	Alkane C_3H_8,C_5H_{12} Alkenes C_2H_4,C_4H_8	*½*4=2*
	SECTION – C(3 MARKS)	
18	Correct answer	*3*
19	CH_3OH,C_2H_5OH Belong to alcohol group Same general formula	*1x3=3*
	C C T SOURCES BASED/CASE BASED	
20	i.X-CH_3COOH Y- ester ,$CH_3COOC_2H_5$ ii correct reaction iii.esterification,used in soap, perfume, flavouring agent (any two)	1 1 1,1

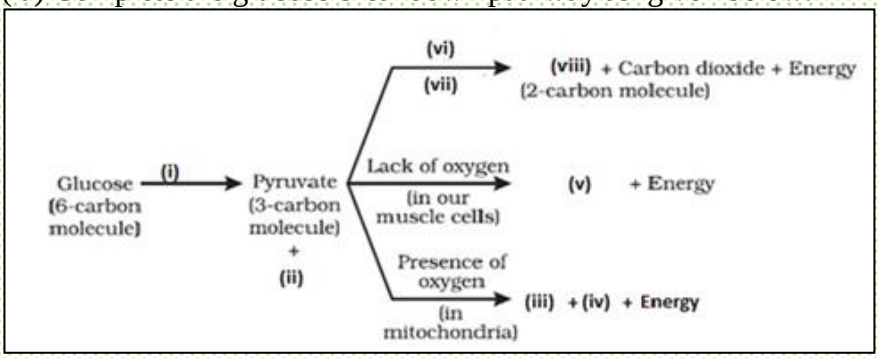
21	i.saturated ii.any correct example iii.similiarity-both have 6 carbon atoms Differences-cyclohexane has only single bonds while penguin has double bonds also.	1 1 1+1
22	i..wood is unsaturated ,LPG is saturated compound. ii.coal does not vapourise on heating. iii.clean air holes in the stove.It will ensure sufficient supply of oxygen for complete combustion	½+½ 1 1+1
	LONG ANSWER TYPE(5 MARKS)	
23	i.Ionic bond in common salt ,covalent bond in vinegar ii.differences in melting point and conductivity with reasons. iii.correct diagram	½+½ 1.5+1.5 1
24	a.correct difference Structures b.Propanoic acid,Bromoehane c.correct diagram	1 1+1 ½+½ 1
25	i)In test tube A .Detergents are more effective in hard water as they don't make insoluble precipitates with calcium and magnesium ions in hard water. ii. Test tube B. It contains so which react with the magnesium and calcium ions present in hard water to give insoluble substance. iii.correct diagram Explanation	½+1 ½+1 1 1

CHAPTER : 5 LIFE PROCESSES

S .NO.	QUESTIONS	POINT VALUE
	SECTION -A (MCQ)	
1	In humans carbohydrates are stored in the form of : (a) glucose (b) starch (c) glycogen (d) pyruvate	1
2	Fishes heart have (a) three chambers (b) two chambers (c) one chamber (d) four chambers	1
3	opening and closing of stomata is due to : (a) High pressure of gases inside the cells. (b) Movement of water in and out of the guard cells. (c) Stimulus of light in the guard cells. (d) Diffusion of CO2 in and out of the guard cells.	1
4	Which of the equations shows the correct conversion of CO2 and H2O into carbohydrates in plants? (a) $6CO_2 + 6H_2O \xrightarrow[\text{Heat energy}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 12H_2O$ (Glucose) (b) $6CO_2 + 6H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 12H_2O$ (Glucose) (c) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (Glucose) (d) $6CO_2 + 12H_2O \xrightarrow[\text{Heat energy}]{\text{Chlorophyll}} C_6H_{12} + 6O_2 + 6H_2O$ (Glucose)	1
5	Which of the following options shows the transport of oxygen to the cell correctly? (a) Lungs →pulmonary vein →left atrium →left ventricle →aorta → body cells (b) Lungs →pulmonary vein →right atrium →right ventricle → aorta → body cells (c) Lungs →pulmonary artery →left atrium → left ventricle → vena cava → body cells (d) Lungs →pulmonary artery →right atrium → right ventricle→ vena cava → body cells	1

6	The image shows the excretory system in humans.  What is the importance of the labelled part in the excretory system? (a) It produces urine. (b) It filters waste from the blood. (c) It stores the urine till urination. (d) It carries urine from the kidney to the outside.	1
7	During deficiency of oxygen in tissues of humans, pyruvic acid is converted into lactic acid in____. (a) Cytoplasm (b) chloroplast (c) mitochondria (d) golgi body	1
8	In the human digestive system, the enzymes pepsin and trypsin are respectively secreted by? (a) Pancreas and liver (b) pancreas and gall bladder (c) stomach and pancreas (d) stomach and salivary glands	1
9	The loss of water in the form of vapour from the aerial parts of the plant is known as (a) condensation (b) transpiration (c) evaporation (d) translocation	1
10	The first step of respiration takes place in (a) mitochondria (b) cytoplasm (c) golgi body	1

	(d) nucleus	
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion (A):** Rings of cartilage are present in the throat. **Reason (R)** : These ensure that the air-passage does not collapse.	1
12	**Assertion (A**): In human beings, the respiratory pigment is haemoglobin **Reason (R**) : It is a type of protein which has high-affinity for carbon dioxide.	1
13	**Assertion (A**) : Ventricles have thicker walls than auricles. **Reason (R**): Ventricles have to pump blood into various organs with great pressure.	1
14	**Assertion (A)** : Pancreatic juice digests proteins and fats. **Reason (R**): Pancreatic juice contains digestive enzymes like trypsin and lipase.	1
15	**Assertion(A)**: The accumulation of lactic acid in the muscles causes muscle cramps. **Reason(R)**: During vigorous physical exercise leg muscles respire anaerobically.	1
	SECTION -B (2 MARKS)	
16.	State two differences between arteries and veins.	2
17.	(i)Which enzyme is secreted by the liver? (ii) Where is that enzyme stored? (iii) What is the function of that enzyme?	2
	SECTION -C (3 MARKS)	
18.	List three characteristics of lungs which make it efficient respiratory surface.	3
19.	State the role of the following in human digestive system : (i) Digestive enzymes (ii) Hydrochloric acid (iii) Villi	3
	C C T SOURCES BASED/ CASE BASED	

20.	Paris olympics are going on including many games where one such game is athletics. An athlete after running on a long track started breathing faster. (a) What observation do you see in the chest, ribs and diaphragm when air is inhaled and exhaled respectively? (b) What prevents air passage from collapsing in our throat? (c) The smallest unit of lungs is ————————	4
21.	The heart is a muscular organ which is as big as our fist. Because both oxygen and carbon dioxide have to be transported by the blood, the heart has different chambers to prevent the oxygen-rich blood from mixing with the blood containing carbon dioxide. The carbon dioxide-rich blood has to reach the lungs for the carbon dioxide to be removed, and the oxygenated blood from the lungs has to be brought back to the heart. This oxygen-rich blood is then pumped to the rest of the body. (a) How many chambers are present in the heart of mammals? (b) Who carries deoxygenated blood from body to heart? (c) What do you mean by the term double circulation? Draw the sketch for the double circulation.	4
22.	Reena in her lunch have food items made up of rice, pulses, milk, ghee. Her digestive system breaks down different nutrients into their simpler form. (a)Write the secretions of gastric glands. (b)In which medium pepsin work and on which nutrient? (c) In which medium pancreatic enzymes work and write the name of enzymes?	4
	LONG ANSWER TYPE(5 MARKS)	
23.	(a) Complete the glucose breakdown pathway as given below.  **(b)** Name the molecule in the cell which stores the energy produced at the end of the pathway. **(c)** Why do you get cramps during vigorous muscular activity?	5
24.	(a)List the three events that occur during the process of photosynthesis. (b) Explain the role of stomata in this process.(any two points)	5
25.	(a)Define excretion. (b) Name the basic filtration unit present in the kidney. (c) Draw excretory system in human beings and label the following organs of	5

	excretory system which perform following functions: (i) form urine (ii) is a long tube which collects urine from kidney (iii) store urine until it is passed out.	

CHAPTER :5. LIFE PROCESSES

S.NO	ANSWER KEY	MARKS
	SECTION - A (MCQ)	
1	c	1
2	b	1
3	b	1
4	c	1
5	a	1
6	c	1
7	a	1
8	c	1
9	b	1
10	b	1
	ASSERTION AND REASON (1MARK)	
11	a	1
12	c	1
13	a	1
14	a	1
15	a	1
	SECTION – B (2 MARKS)	

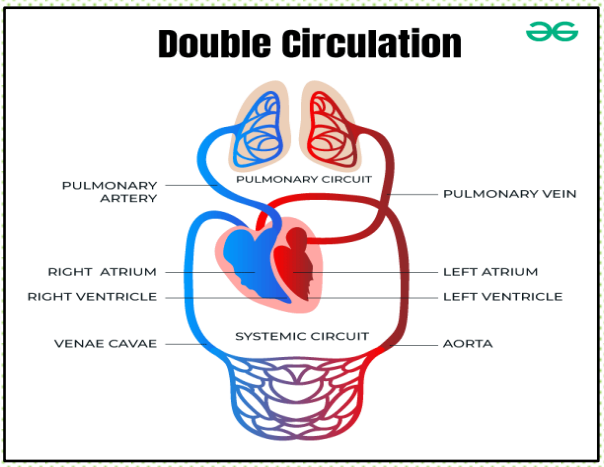
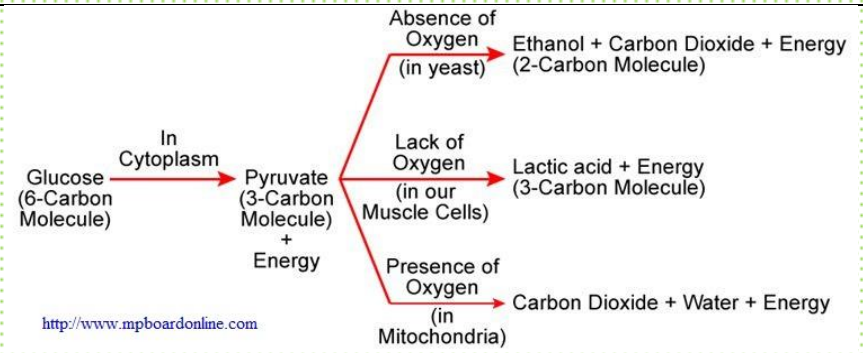
<table>
<tr><td>16</td><td><table>
<tr><td>Arteries</td><td>Veins</td></tr>
<tr><td>(i) Arteries carry blood away from the heart to various organs.</td><td>(i) Veins carry blood from various organs to the heart.</td></tr>
<tr><td>(ii)They have thick walls.Veins</td><td>(ii)They have thin walls.</td></tr>
</table></td><td>2</td></tr>
<tr><td>17</td><td>(i) Bile juice

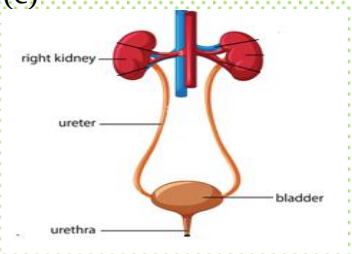
(ii) Gall bladder

(iii) acts on fat</td><td>2</td></tr>
<tr><td></td><td>SECTION – C(3 MARKS)</td><td></td></tr>
<tr><td>18</td><td>The three characteristics of the lungs are:
a. Large surface area: Lungs provide a large surface area in the form of alveoli inside for the exchange of gases by diffusion. This helps in the absorption of oxygen.
b. Thin walls: The air sacs/alveoli are thin which allows the quick diffusion of the gases through it.
c. Rich in capillary supply: The alveoli are richly supplied with the capillaries that bring blood with the carbon dioxide and absorb oxygen.</td><td>3</td></tr>
<tr><td>19</td><td>(i) Digestive enzymes – Foods need to be broken into their small or simpler molecules so that they can be absorbed into the bloodstream.

(ii) Hydrochloric acid – Hydro chloric acid helps to kill the germs which might have entered in to the system through food. It creates acidic medium for the pepsin to act on food to breakdown proteins.

(iii) Villi – Villi are finger like projections in the small intestine. They help to increase the surface area for absorption of the digested food. Villi are richly supplied with blood vessel which help to absorb digested food in to the blood stream.</td><td>3</td></tr>
</table>

	C C T SOURCES BASED/CASE BASED	
20	*(a)*INHALE *chest cavity becomes large, ribs lift up and diaphragm becomes flat.* *EXHALE chest cavity size reduces, ribs move down and diaphragm moves up to its former position.* *(b) Rings of cartilage* *(c) alveoli*	**4**
21	***(a)****Mammals- four* *(b) veins* *(c) Double circulation is a process during which blood passes twice through the heart during one complete cycle.*  	**4**
22	(a) HCl, pepsin,mucus (b) Acidic medium , proteins (c) Alkaline ,trypsin,lipase	**4**
	LONG ANSWER TYPE(5 MARKS)	
23	 *(b)ATP* *(c)*Lactic acid accumulation causes cramps	***2+1+2***

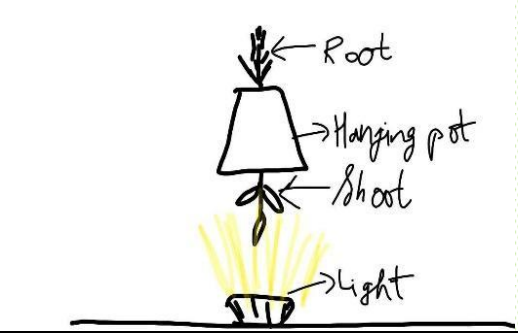
24	(a)The three events that occur during the process of photosynthesis are: (i) Absorption of light energy by chlorophyll. (ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. (iii) Reduction of carbon dioxide to carbohydrates. *(*b)Main functions of stomata: 1. Opening and closing stomata assist in gas exchange between the plant and the environment. 2. Supports transpiration and removal of excess water as water vapor. 3. At night, the pores close to prevent water from leaking through the pores. *4.* The pores assist absorb carbon dioxide and discharging oxygen during photosynthesis.	**3+2**
25	(a) The biological process involved in the removal of wastes, produced during various metabolic activities in the body from the body of an organism is called excretion (b) Basic filtration unit present in kidney is nephron. (c)  (i) Kidney (ii) Ureter (iii) Urinary bladder	**5**

CHAPTER : 6. CONTROL AND COORDINATION

S.No.	QUESTIONS	POINT VALUE
	SECTION - A (MCQ)	
1.	The gap between two neurons is called a (a) Axon (b)Synapse (c)Impulse (d)Dendrite	1
2.	Which part of the brain controls voluntary actions? (a) Medulla oblongata (b) Hypothalamus (c) Cerebrum (d) Cerebellum	1
3.	How does the body maintain homeostasis? (a) By increasing or decreasing hormone levels (b) By adjusting body temperature (c) By controlling voluntary actions (d) By processing sensory information	1
4.	When a plant is placed near a window inside the house, which type of tropic movement will be responsible for the plant bending towards light? (a) Hydrotropism (b) Thigmotropism (c) Geotropism (d) Phototropism	1
5.	When something comes close to our eyes, we automatically blink. Which reflex arc component is functioning while blinking the eyes? (a) Sensory neurons (b) Effector muscles (c) Motor neurons (d) Spinal cord	
6.	Why does a reflex action happen faster than a conscious decision to move? (a) Because it involves multiple brain regions (b) Because the brain requires more time to process the information (c) Because it involves complex brain functions (d) Because it bypasses the brain and uses the spinal cord.	1
7.	If sensory neurons are absent, how will the reflex arc be affected? (a) Reflex actions would be enhanced (b) Reflex actions would be normal but slower (c) Reflex actions would be absent or significantly impaired (d) Reflex actions would be more complex	1
8.	Which of the following body cells is the longest? (a) Bone cells (b) Muscle cells (c) Nerve cells (d) Blood cells	1

9.	Why do athletes practice specific movements repeatedly? (a) To improve their reflexes (b) To strengthen their bones (c) To develop muscle memory (d) To increase their height	1
10.	During puberty, teenagers experience various physical changes due to the release of hormones. Which gland is primarily involved in this process? (a) Thyroid gland (b) Pituitary gland (c) Adrenal gland (d) Pancreas	1
	Question No. 11 to 15 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.**	
11.	**Assertion**: Receptors are the specialized tips of nerve fibers. **Reason**: Receptors are present in the sense organs of the animals.	1
12.	**Assertion**: Insulin regulates blood sugar levels **Reason**: Insufficient secretion of insulin will cause diabetes.	1
13.	**Assertion**: The Cyton region of the nerve cell collects information for the brain. **Reason**: Nerve cells can either have or lack myelin sheath.	1
14.	**Assertion**: A nerve impulse is an electrochemical event. **Reason**: In a nerve impulse there are changes in the resting potential which spreads down the nerve fiber.	1
15.	**Assertion**: The spinal cord is also known as the central nervous system. **Reason**: The Central Nervous System controls and regulates the voluntary actions.	1
	SECTION – B (2 MARKS)	
16.	(a)Describe the coordination between the nervous and endocrine systems in regulating blood sugar levels. (b)What is the role of the pancreas in this regulation?	2
17.	(a)Explain how the brain coordinates the movement of your hand to catch a falling object. (b)What roles do different parts of the brain play in this coordination?	2
	SECTION – C(3 MARKS)	

18.	(a)Describe the process of synaptic transmission in the human nervous system. (b)How does the synapse ensure unidirectional transmission of nerve impulses? (c)Explain the role of neurotransmitters in this process.	1+1+1
19.	(a) Compare and contrast the hormonal and nervous control systems in the human body. (b) Why is the hormonal system referred to as a 'slow control system'? (c) Provide an example of a situation where both systems work together to maintain homeostasis.	1+1+1
	CCT SOURCES BASED/CASE BASED	
20.	Rahul is a high school student who loves playing football. One day during a match, he accidentally falls and injures his knee. He immediately feels a sharp pain and instinctively grabs his knee. His friends help him to the sidelines, where the coach asks him to rest and applies an ice pack to reduce the swelling. As Rahul sits, he notices that his heart is still racing from the excitement of the game, and he feels his hands shaking slightly. The coach explains that this is a natural response of his body to the stress and adrenaline released during the game. After some rest, Rahul feels better and can walk slowly. He is advised to visit a doctor for a proper check-up. (i) Which type of neuron is responsible for transmitting the pain sensation from Rahul's knee to his brain? (ii) What natural response caused Rahul's heart to race and his hands to shake? (iii) Explain how the nervous system and the endocrine system worked together in Rahul's response to the injury.	1+1+2
21.	In a school science experiment, students planted bean seeds in two pots. Pot A was placed in a well-lit area near the window, while Pot B was kept in a dark cupboard. Over the next two weeks, the students observed the growth of the plants. The plant in Pot A grew straight and healthy with green leaves, while the plant in Pot B became dull, pale, and weak, with small yellow leaves. The students concluded that light plays a crucial role in the healthy growth of plants. (i) Which tropic movement is shown by plants here? (ii) Name the hormone present at the shoot tip of the plant. (iii) If Pot A fell, after 1 week in which direction will the shoots start to grow? What can be the reason for this?	1+1+2

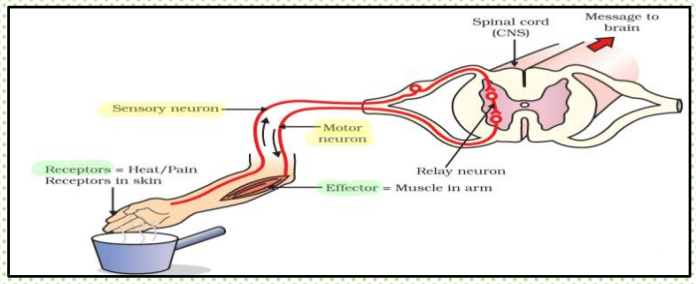
22.	A student performed an experiment where a potted plant was kept upside down, with its roots facing upward and its shoots facing downward. A light source was placed on the floor directly beneath the plant. Over time, the student observed that the shoot started to grow downward towards the light source, while the roots showed a tendency to grow away from the light. The student noted that this growth pattern appeared to conflict with the usual responses of the plant to gravity and light. (i) What type of tropism is the shoot displaying by growing towards the light source placed on the floor? (ii) What type of tropism is the root displaying by growing away from the light source? (iii) Explain how the growth pattern of the shoot and root in this experiment demonstrates the interaction between phototropism and geotropism in plants.  	1+1+2
	LONG ANSWER TYPE(5 MARKS)	
23.	(a) An old man is advised by his doctor to take less sugar in his diet. Name the disease from which the man is suffering. (b) Mention the hormone due to an imbalance of which he is suffering from this disease. (c) Which endocrine gland secretes this hormone? (d) Name two hormones that are secreted from the pituitary gland.	1+1+1+2
24.	A. Name the part of the brain that helps in (a) Maintaining balance of the body (b) Reasoning (c) Controlling blood pressure B. What is CSF? Write its full form. Write its role.	(1+1+1+2
25.	(a) Explain how the nervous system detects and processes sensory information from the environment. (b) What is the role of sensory receptors in this process? (c) Describe the pathway of nerve impulse transmission from the sensory receptor to the brain. (d) Show how the brain interprets this sensory information to produce an appropriate response in the form of a diagram.	1+1+1+2

CHAPTER: 6. CONTROL AND COORDINATION

S.No.	ANSWERS	POINT VALUE
1.	(b) Synapse	1
2.	(a)Medulla oblongata	1
3.	(b)By adjusting body temperature	1
4.	(d)Phototropism	1
5.	(c)Motor neurons	
6.	(d)Because it bypasses the brain and uses the spinal cord.	1
7.	(c)Reflex actions would be absent or significantly impaired	1
8.	(c) Nerve cells	1
9.	(a) To improve their reflexes	1
10.	(b) Pituitary gland	1
11.	(b)	1
12.	(a)	1
13.	(d)	1
14.	(a)	1
15.	(d)	1

16.	(a) The nervous system detects changes in blood sugar levels and signals the endocrine system to release specific hormones from the pancreas. These hormones regulate blood sugar by either increasing or decreasing glucose levels in the blood. *(b)* The pancreas secretes insulin and glucagon, which are crucial in blood sugar regulation. Insulin lowers blood glucose levels by facilitating the uptake of glucose into cells, while glucagon increases blood glucose by promoting the release of glucose from stored glycogen in the liver.	2
17.	(a) The brain receives visual input about the falling object through the eyes. This information is processed by the cerebral cortex, which then sends signals to the motor cortex to initiate hand movement. The motor cortex sends impulses through the spinal cord to the muscles in the arm and hand, coordinating the catch. *(b)* The occipital lobe processes visual information, the frontal lobe (including the motor cortex) plans and initiates movement, and the cerebellum fine-tunes the motor activity.	2

18.	(a) Synaptic transmission occurs at the synapse, a junction between two neurons. When a nerve impulse reaches the end of a neuron (the presynaptic terminal), it triggers the release of neurotransmitters into the synaptic cleft. These chemicals diffuse across the cleft and bind to receptors on the next neuron (the postsynaptic neuron), generating a new nerve impulse. (b) The synapse ensures unidirectional transmission because neurotransmitters are only released from the presynaptic terminal and receptors for these neurotransmitters are only present on the postsynaptic membrane. (c) Neurotransmitters are chemical messengers that carry signals across the synaptic cleft. They bind to specific receptors on the postsynaptic neuron, causing ion channels to open and initiating a new nerve impulse.	3
19.	(a) The nervous system controls body functions through rapid electrical signals transmitted via neurons, leading to quick responses. The hormonal system, on the other hand, controls functions by releasing hormones into the bloodstream, leading to slower but longer-lasting effects. (b) The hormonal system is called a 'slow control system' because hormones travel through the blood and take longer to reach their target organs, and their effects last longer compared to the rapid responses of the nervous system. *(c)* During a stressful situation, the nervous system triggers the "fight or flight" response by releasing adrenaline through the adrenal glands, a part of the hormonal system. This coordination ensures an immediate response (nervous system) and sustained alertness (hormonal system).	3
20.	(a) Sensory neurons (b) Release of adrenaline hormone (c) The nervous system gives an immediate response. It sends signals to the spinal cord and brain. The brain processes the information and pain receptors will be triggered in the knee. The injury activates the pituitary gland which stimulates adrenal glands to release cortisol, a stress hormone to manage inflammation, and provides energy for healing by increasing blood glucose levels.	1+1+2
21.	(i) Phototropism (ii) Auxin *(iii)* The shoots will start growing upwards (against the gravity) as they are negatively geotropic.	*1+1+2*

22.	(i)The shoot is displaying positive phototropism by growing towards the light source. (ii)The root is displaying negative phototropism by growing away from the light source. (iii)In this experiment, the shoot of the plant exhibits positive phototropism by growing towards the light source placed on the floor. However, because the pot is upside down, this growth direction is also towards gravity, which is unusual because shoots typically display negative geotropism (growing away from gravity). Similarly, the root shows negative phototropism by growing away from the light, but this growth is in opposition to positive geotropism, where roots typically grow downward (towards gravity). This case demonstrates how plants prioritize and balance their responses to light and gravity, leading to a compromise in their growth patterns when these stimuli are in conflict.	*1+1+2*
23.	(a) The man is suffering from Diabetes mellitus. (b) Hormone is insulin. (c) The endocrine gland that secretes insulin is the pancreas. *(d)* GH – Growth Hormone / TSH – Thyroid-stimulating Hormone/ ACTH – Adrenocorticotrophic hormone/ FSH – Follicle Stimulating Hormone/ LH – Luteinising Hormone (any 2)	1+1+1+2
24.	(a)i)Cerebellum (ii)Cerebrum (iii)Cerebrum b)CSF is a fluid present in the cranium. Full form: Cerebrospinal fluid. It acts as a shock absorber for the brain.	(1+1+1+2)
25.	(a) The nervous system detects sensory information through specialized sensory receptors that respond to stimuli such as light, sound, touch, and temperature. This information is then transmitted as nerve impulses to the brain for processing. (b) Sensory receptors are specialized cells or nerve endings that convert environmental stimuli into electrical signals. Different types of receptors are sensitive to different stimuli, such as photoreceptors for light and mechanoreceptors for touch. (c) The nerve impulse generated at the sensory receptor travels through sensory neurons to the spinal cord and then to the brain. It is relayed through synapses and eventually reaches the sensory areas of the brain, such as the visual or auditory cortex. (d)  	3+2

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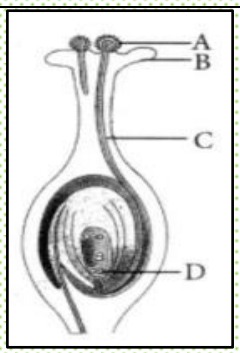
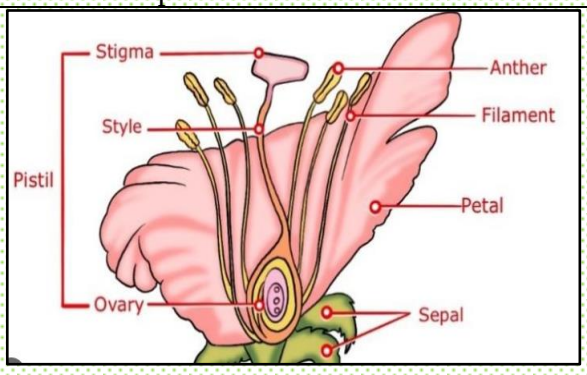
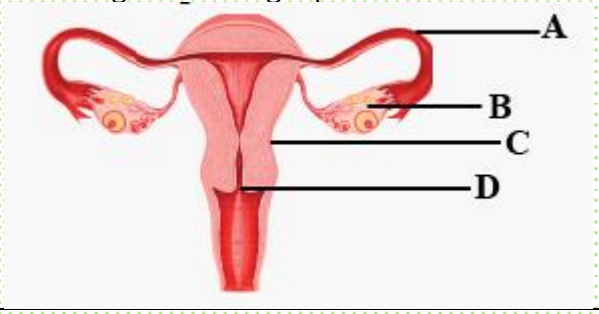
CHAPTER: 8. HOW DO ORGANISMS REPRODUCE?		
S.NO	**QUESTION**	**POINT VALUE**
	SECTION -A (MCQ)	
1	Which of the following is asexual reproduction? (a) Fertilization (b) Budding (c) Pollination (d) Copulation	**1**
2	In which type of reproduction the offspring genetically identical to their parents? (a) Sexual (b) Asexual (c) Both (d) None	**1**
3	Which part of the flower becomes the fruit? (a) Ovary (b) Stigma (c) Style (d) Anther	**1**
4	Which of the following is not a method of asexual reproduction? (a) Fragmentation (b) Binary fission (c) Spore formation (d) Fertilization	**1**
5	Which of the following is the male gamete in flowering plants? (a) Ovule (b) Pollen grain (c) Stigma (d) Sepal	**1**
6	What is the function of the testes in human males? (a) Produce eggs (b) Produce sperm (c) Produce urine (d) Produce bile	**1**
7	In human females, where does fertilization occur? (a) Ovary (b) Uterus (c) Fallopian tube (d) Vagina	**1**
8	Which of the following is a contraceptive method? (a) Intrauterine device (IUD) (b) Antibiotics (c) Vaccination (d) Painkillers	**1**
9	Which type of reproduction results in greater genetic variation? (a) Asexual reproduction (b) Sexual reproduction	**1**

	(c) Binary fission (d) Budding	
10	What is the primary purpose of reproduction? (a) Growth (b) Repair (c) Continuity of species (d) Nutrition	**1**
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion:** Testes are situated outside the body (extra abdominal cavity) **Reason :** Sperms require temperature higher than the body temperature for development	**1**
12	**Assertion**: Sexual reproduction decreases genetic diversities and plays a role in origin of new species. **Reason**: Sexual reproduction involves formation of gametes and fusion of gametes.	**1**
13	**Assertion**: Fertilization in humans usually occurs in the fallopian tube. **Reason**: The fallopian tube provides an ideal environment for the fusion of the sperm and the ovum.	**1**
14	**Assertion**: In flowering plants, the stamen is the female reproductive part. **Reason** : The stamen produces pollen grains that are necessary for fertilization.	**1**
15	**Assertion** : Use of contraceptive methods can help in family planning and population control. **Reason**: Contraceptive methods are designed to facilitate fertilization.	**1**
	SECTION – B (2 MARKS)	
16	What is the difference between external and internal fertilization?	**2**
17	The reproduction is the primary requirement for the continuity of the species. The increasing population requires the adapted individual to survive in this conditions illustrate the significance of DNA replication in this scenario.	**2**
	SECTION – C(3 MARKS)	

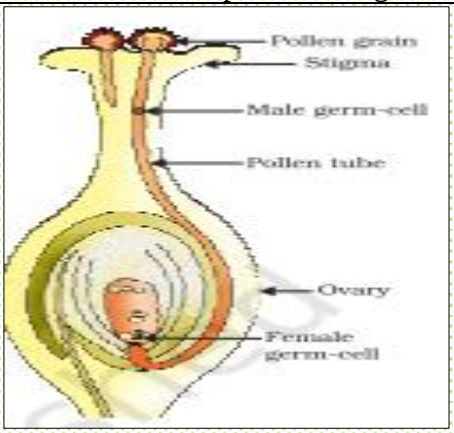
18	 (i) Name the part marked C in the diagram. (ii) How does A reaches part D? (iii) What is the fate of part D after fertilisation?	**3**
19	 Write the fate of different parts of flower shown in the diagram after the successful fertilisation of flower.	**3**
	C C T SOURCES BASED/CASE BASED	
20	A couple does not want to have children for a few years. They consulted a doctor who advised them on the barrier method and chemical method of birth control. Yet another couple who already have two children and are middle aged also consulted a doctor for some permanent solution to avoid unwanted pregnancy. Doctor advised them to use a surgical method of birth control. What are the barrier methods of birth control? (a) Condom (b) Diaphragm (c) Oral pills (d) Both (A) and (B) How do physical barriers prevent pregnancy? (a) They kill the sperms (b) They kill the ovum (c) They prevent sperms from meeting the ovum (d) They prevent intercourse iii. How do chemical methods prevent pregnancy?	**4**
21	In humans, if the egg is not fertilized, it lives for about one day. Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilized egg. Thus its lining becomes thick and spongy. This would be required for nourishing the embryo if fertilization had taken place. The lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes place roughly every month and is known	**4**

	as menstruation. It usually lasts for about two to eight days. (i)What is the sexual cycle in human female that takes place every 28 days and is marked by bleeding (a) Sexual cycle (b) Reproductive cycle (c) Menstrual cycle (d) Blood cycle (ii)If fertilization takes place, initially it results in the formation of: (a) an embryo (b) a zygote(c) a foetus (d) a placenta (iii)Explain the main events of the menstrual cycle in human females.	
22	A, B and C are some of the sexually transmitted diseases in humans. A, C are caused by viruses and B is caused by bacteria. The A reduces the immunity of a person. B causes pain during urination and C shows small rough bumps. (i)Identify the disease caused by A. (ii)Identify the disease caused by C. (iii)What are Sexually transmitted diseases?	**4**
	LONG ANSWER TYPE(5 MARKS)	
23	i. Identify part C in the diagram. ii. Identify part B and also write its functions. iii. Identify part A and write in brief about the important event occurring here during reproduction. 	**5**
24	Write the different modes of asexual reproduction. Write in detail about any two asexual modes of reproduction which you have observed in your life.	**5**
25	Draw a well labelled diagram showing Germination of pollen on stigma. Explain the pre fertilisation events taking place in the plant.	**5**

CHAPTER : 7.HOW DO ORGANISMS REPRODUCE?

S.NO	ANSWER KEY	POINT VALUE
	SECTION -A (MCQ)	
1	(b) Budding	**1**
2	(a)asexual	**1**
3	(a)Ovary	**1**
4	(d) Fertilization	**1**
5	(b) Pollen grain	**1**
6	(b) Produce sperm	**1**

7	(c) Fallopian tube	**1**
8	(a) Intrauterine device (IUD)	**1**
9	(b) Sexual reproduction	**1**
10	(c) Continuity of species	**1**
11	(c)	**1**
12	(d)	**1**
13	(a)	**1**
14	(c)	**1**
15	(c)	**1**
16	The internal and external fertilisation are the steps in the sexual reproduction Internal Fertilisation: The fertilisation that take place inside the female body. Eg. Human Beings External Fertilisation: The fertilisation that take place outside the female's body eg. Frog	**2**
17	The process of DNA replication helps in the inheritance process by transfer of the genetic material from one generation to another it helps to maintain the amount of DNA and number of Chromosomes in the cell.	**2**
18	i. Pollen Tube ii. Through the pollen tube iii. Seed	**3**
19	In the above diagram all other parts sheds off after fertilisation except Ovary and Egg which forms the Fruit and seed respectively.	**3**
20	i (D) ii(C) iii Chemical methods of contraception use chemicals to prevent pregnancy by either stopping the fertilization of the egg or preventing the implantation of a fertilized egg. (a)Oral Contraceptive Pills (Birth Control Pills (b)Spermicides (c)Emergency Contraceptive Pills.	**4**
21	(i)C (ii)B (iii)If fertilisation does not occur, the released egg, and the thickened lining of the uterus along with its blood vessels are shed off. This causes bleeding in women which is called menstruation. Menstruation occurs once in about 28 to 30 days. The first menstrual flow begins at puberty and is termed menarche.	**4**
22	i. A is AIDS ii. C is Wart iii. The diseases which can be transmitted by sexual means are known as sexually transmitted diseases.eg syphilis, gonorrhoea	**4**
23	i)Uterus	**5**

	ii) Ovary; This produces female gamete required for the sexual reproduction in human beings. iii) Fallopian Tube: This is the part of female reproductive system where the fertilisation takes place.	
24	Modes of Asexual Reproduction 1. Binary Fission 2. Budding 3. Fragmentation 4. Regeneration 5. Vegetative Propagation 6. Spore Formation Asexual reproduction allows organisms to produce new individuals that are genetically identical to the parent, ensuring the continuation of their species. 1. Budding: Budding is a type of asexual reproduction where a new organism grows from a small part of the parent organism. The new organism starts as a small bump called a bud, which grows and eventually detaches from the parent. Example: Yeast: In yeast, a bud forms on the surface of the parent yeast cell. The bud grows and, after reaching a certain size, detaches to form a new yeast cell. Hydra: In hydra, a small bud forms on the body of the parent hydra. The bud develops tentacles and a mouth, and when it matures, it detaches to become a new independent hydra. 2. Vegetative Propagation:Vegetative propagation is a type of asexual reproduction in which new plants grow from parts of the parent plant such as roots, stems, or leaves. Example:Potato: Potatoes can reproduce through vegetative propagation. The "eyes" of a potato are buds that can grow into new potato plants. By planting a piece of a potato with an eye, a new potato plant can grow. Rose: A stem cutting from a rose plant can be planted in soil, and it will develop roots and grow into a new rose plant.	**5**
25	 Pre-Fertilization Events in Flowers: 1. Gametogenesis: - Male Gametogenesis: In the anthers of the stamen, pollen	**5**

	grains are produced. Each pollen grain contains male gametes. - Female Gametogenesis: In the ovary of the pistil, ovules are formed. Each ovule contains an embryo sac with a female gamete (egg cell). 2. Pollination: - The transfer of pollen grains from the anther to the stigma of a flower. This can happen through various agents such as wind, water, insects, birds, or other animals. 3. Pollen Germination: When a pollen grain lands on a compatible stigma, it absorbs moisture and germinates. The pollen grain forms a pollen tube that grows down through the style towards the ovary. 4. Pollen Tube Growth: The pollen tube carries the male gametes and grows through the tissues of the style to reach the ovule in the ovary. 5. Entry of Pollen Tube into Ovule: - The pollen tube enters the ovule through a small opening called the micropyle and releases the male gametes into the embryo sac, where fertilization will occur. These events prepare the flower for fertilization, where the male gamete fuses with the female gamete to form a zygote.	

CHAPTER: 8. HEREDITY

Q. NO	QUESTIONS (MCQ)	POINT VALUE
1	*An example of homologous organs is* *(a) our arm and a dog's fore-leg.* *(b) our teeth and an elephant's tusks.* *(c) potato and runners of grass.* *(d) all of the above.*	1
2	*In evolutionary terms, we have more in common with* *(a) a Chinese school-boy. (b) a chimpanzee.* *(c) a spider. (d) a bacterium*	1
3	*Q. 3. The theory of evolution of species by natural selection was given by* *(a) Mendel (b) Darwin* *(c) Morgan (d) Lamarck*	1
4	*A basket of vegetables contains carrot, potato, radish and tomato. Which of them represent the correct homologous structures?* *(a) Carrot and potato (b) Carrot and tomato* *(c) Radish and carrot (d) Radish and potato*	1
5	*Which of the following statement is incorrect?* *(a) For every hormone there is a gene.* *(b) For every protein there is a gene.* *(c) For production of every enzyme there is a gene.* *(d) For every molecule of fat there is a gene.*	1
6	*If a round, green seeded pea plant (RRyy) is crossed with wrinkled, yellow seeded pea plant, (rrYY) the seeds produced in F1 generation are* *(a) round and yellow.* *(b) round and green.* *(c) wrinkled and green.* *(d) wrinkled and yellow.*	1
7	*The maleness of a child is determined by* *(a) the X chromosome in the zygote.* *(b) the Y chromosome in zygote.* *(c) the cytoplasm of germ cell which determines the sex.* *(d) sex is determined by chance.*	1

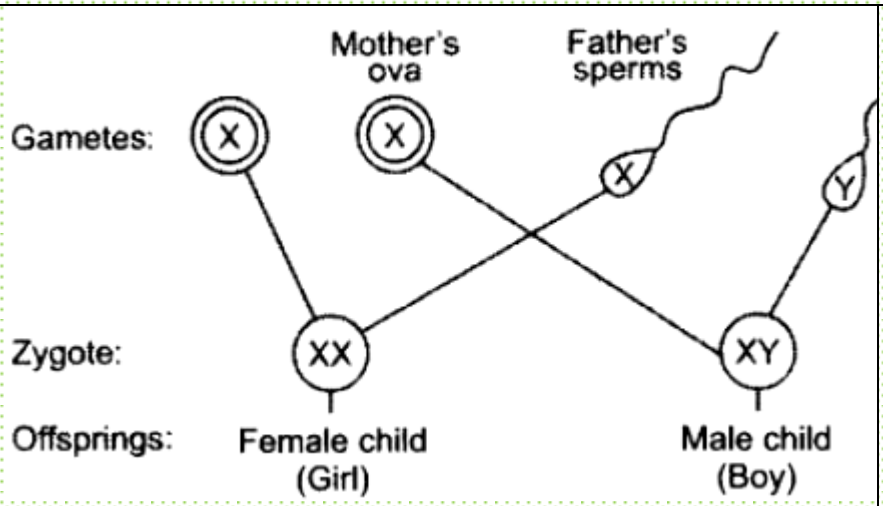
8	*From the list given below, select the character which can be acquired but not inherited.* *(a) colour of eye. (b) colour of skin.* *(c) size of body. (d) nature of hair.*	1
9	*What prevents back flow of blood inside the heart during contraction?* *(a) Valves in heart (b) Thick muscular walls of ventricles* *(c) Thin walls of atria (d) All of the above*	1
10	*Factors responsible for the rapid spread of bread mould on slices of bread are* ***(i)** large number of spores.* ***(ii)** availability of moisture and nutrients in bread.* ***(iii)** presence of tubular branched hyphae.* ***(iv)** formation of round shaped sporangia.* ***(a)** (i) and (iii) **(b)** (ii) and (iv)* ***(c)** (i) and **(ii)** **(d)** (iii) and (iv)*	*1*
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11.	**Assertion (A)**: A geneticist crossed a pea plant having violet flowers with a pea plant having white flowers, he got all violet flowers in first generation. **Reason (R):** White colour gene is not passed on to next generation.	*1*
12.	**Assertion (A)**: Mendel chose a number of varieties of garden pea as plant material for his experiments. **Reason (R):** Garden pea has well defined characters and is bisexual.	*1*
13.	**Assertion (A):** In humans, males play an important role in determining the sex of the child. **Reason (R)**: Males have two X chromosomes	*1*
14	**Assertion (A):** Zygote with two X chromosomes develops into a boy. **Reason (R)**: If the egg cell carrying an X chromosome fuses with the sperm carrying a Y chromosome, the resulting child would be a boy.	*1*
15.	**Assertion (A)**: *Mendel in his experiment selected only two characters of seed.* **Reason (R):** *He studied single character at one time.*	*1*

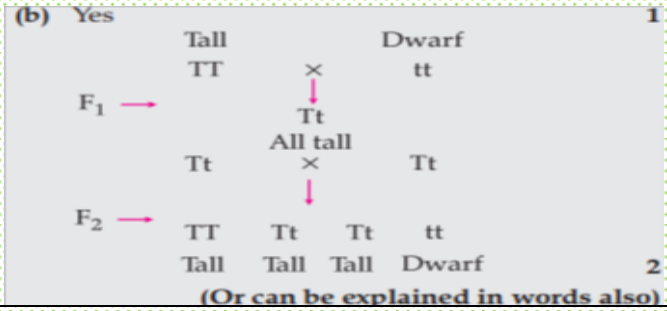
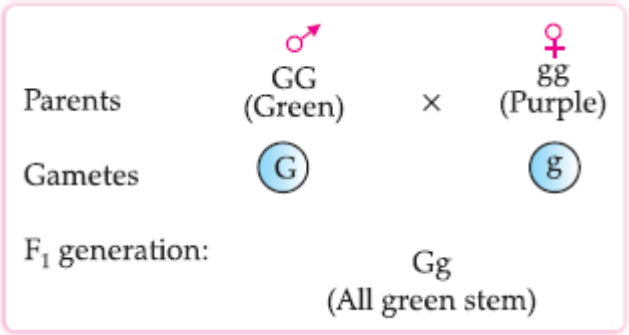
NO	Questions (2 marks)	Point value
16	*Why acquired traits are not inherited?*	2
17	*What is gene? Where are genes located?*	2
	Questions (3 Marks)	
18	(a) Do genetic combination of mothers play a significant role in determining sex of a new born child? (b) How is the sex of the child determined in human beings? Draw a diagrammatic sketch showing the sex determination in human beings.	3
19	(a) How does the creation of variation in a species promote survival? (b) 'It is a possible that a trait is inherited but may not be expressed'. Give a suitable example to justify the above statement.	3
	Question (5 Marks)	
20	*(i) Who provided the evidence of DNA as genetic material?* *(ii) Why DNA is called polynucleotide?* *(iii) List three important features of double helical model of DNA*	5
21	*(a) What are dominant and recessive traits?* *(b) "Is it possible that a trait is inherited but may not be expressed in the next generation?" Give a suitable example to justify this statement*	5
22	*(a) What is the law of dominance of traits? Explain with an example.* *(b)Why are the traits acquired during the life time of an individual not inherited? Explain.*	5
	CCT SOURCES BASED/CASE BASED	
23	A green stemmed tomato plant denoted by (GG) is crossed with a tomato plant with purple stem denoted by (gg). (i) What colour of the stem would you expect in their F_1 progeny? (ii) In what ratio would you find the green and purple coloured stem in plants of F_2 progeny? (iii) What conclusion can be drawn for the above observations?	4
24	Consider a pea plant that is recessive for plant height. Its ,genotype is tt and phenotype is dwarf. (a) Assuming that the gene for plant height obeys the Mendels laws of inheritance, indicate the genotypes and phenotypes of ALL the possible parent pairs that could have dwarf offspring. (b) Using any of the parent pairs mentioned by you in (a), (c) perform a cross to show the genotypes of the offspring that might arise in the next generation.	4

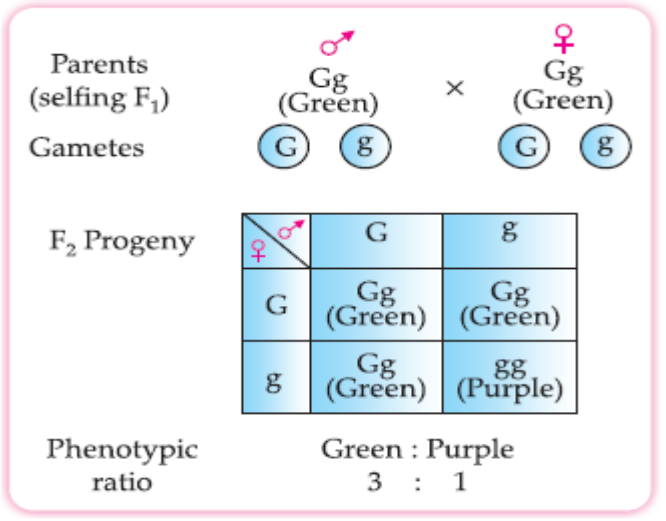
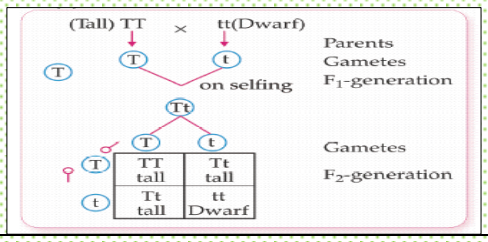
25	If 1600 plants were obtained in F_2 progeny, write the number of plants having traits: (i) Tall with round seeds. (ii) Short with wrinkled seeds. (iii) Write the conclusion of the above experiment.	*4*

CHAPTER: 8. HEREDITY

Q .NO.	ANSWERS	POINT VALUE
1	(d) all of the above.	*1*
2	(a) a Chinese school-boy	*1*
3	(b) Darwin	*1*
4	(c) Radish and carrot	*1*
5	(d) For every molecule of fat there is a gene.	*1*
6	(a) round and yellow.	*1*
7	(b) the Y chromosome in zygote.	*1*
8	(c) size of body.	**1**
9	(a) Valves in heart	**1**
10	(a) (i) and (iii)	**1**
11	c	**1**
12	a	**1**
13	c	**1**
14	d	**1**
15	c	**1**
16	*Acquired traits are those which are developed in the organisms during their life time.* *These traits are because of non-reproductive tissue, so cannot be passed.*	**2**
17	*Segments of DNA are called gene.*	**2**
18	(a) The genetic combination of mothers do not play a significant role in determining the sex of a new born child as the mothers have a perfect pair of sex chromosomes, both called X. All children will inherit 'X' chromosome from their mother regardless of whether they are boys or girls. (b) Males have a mismatched pair XY and women have perfect pair XX. So two types of sperms are formed having either X or Y chromosome. If sperm carrying X chromosome fertilises the ovum carrying X chromosome, then the child born will be a girl. If a sperm carrying Y chromosome fertilises the ovum which carries X chromosome, then the child born will be a boy. Thus, the sex of the child is determined by what they inherit from their father.	**3**

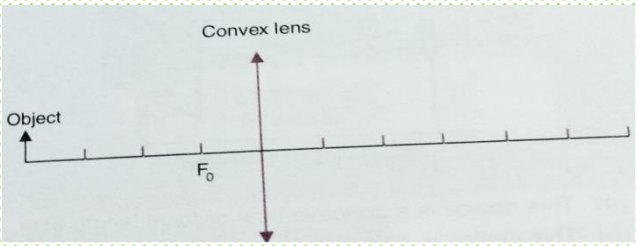
		
19	(a)Variation improves the survival rate of species as it helps the individual organisms adapt based on altering environmental conditions. (b)Yes it is possible that a trait is inherited but may not be expressed.For example when pure tall pea plants are crossed with pure dwarf pea plants only tall pea plants are obtained in F1 generation.On selfing tall plants of F1 both tall and dwarf plants are obtained in F2 generation in the ratio 3 : 1. Reappearance of the dwarf character a recessive trait in F2 generation shows that the dwarf trait was present in individuals of F1 but it did not express.	**3**
20	(i) Mendel. (ii) DNA is made up many units of nucleotides. (iii) Important features- (a) Both the chains in helical runs anti-parallel. (b) There two nitrogenous base Purine (A, G) and pyrimidine (T, C). (c) A always bind with T and C always binds with G.	**5**
21	(a)Dominant Trait: The trait which expresses itself in F_1 (first) generation after crossing contrasting (opposite) trait is known as dominant character (trait). Recessive Trait: The trait which is not expressed itself in F_1 (first) generation after crossing contrasting (opposite) trait. (b)Yes, it is possible for a trait to be inherited but not expressed in the next generation. This occurs when an individual carries a recessive allele for a trait but does not express it because they also have a dominant allele for that trait.	**5**

	(b) Yes  1 2 (Or can be explained in words also)	
22	(a) Law of dominance of traits: -In a cross between a pair of contrasting characters, only one parental character will be expressed in F_1 generation which is called dominant trait and the other is called recessive trait. For example – in pea plants, when a tall pea plant (TT) is crossed with a short pea plant (TT), all the progeny produced in F_1 generation are tall (Tt). All plants in F_1 generation were tall proving that the gene for tallness is dominant over the gene for dwarfness/ short, which is not able to express itself in the presence of dominant trait. (any other example) (b) Traits acquired by an organism during its lifetime are known as acquired traits. These traits are not inherited because they occur in somatic cells only and do not cause any change in the DNA of the germ cells.	**5**
23	(i) All the plants in F_1 progeny will be of green coloured stem.  (ii) Cross for F_2 progeny is:	**1+1+2**

	 The phenotypic ratio will be 3 (green): 1 (purple). (iii) From the above cross, it is confirmed that recessive traits are not expressed in the F_1 generation as they are present in heterozygous condition whereas the recessive traits get expressed in F_2 generation in homozygous condition. This is known as the "law of dominance".	
24	(a) The genotypes of all the possible parent pairs are: (i) Tt × Tt (ii) Tt × tt (iii) tt × tt (b)The correct phenotypes for each of the genotypes are : (i) Tt (Tall) × Tt (Tall) (ii) Tt (Tall) × tt (Dwarf) (iii) tt (Dwarf) × tt (Dwarf) (c) Cross: 	**1+1+2**
25	If 1600 plants were obtained in F_2 progeny, the number of plants having traits will be: (i) Tall plants with round seeds = 916× 1600 = 900 (ii) Short plants with wrinkled seeds = 116× 1600 = 100 The conclusion of the above experiment states the “Law of independent assortment”. This law states that the alleles of two (or more) different genes get sorted into gametes independently of one another.	**1+1+2**

CHAPTER :9.LIGHT: REFLECTION AND REFRACTION

S.NO	QUESTION	Point Value
	SECTION -A (MCQ)	
1	A student put two pencils in a glass of water. He observed the bending of pencils as shown in the picture. This is called  (a) reflection (b) refraction (c) scattering (d) Tyndall Effect	**1**
2	Which of the following lens will converge the light rays most? (a) A convex lens with focal length 10 cm (b) A concave lens of focal length 10 cm (c) A convex lens of focal length 20 cm (d) A concave lens of focal length 20 cm	**1**
3	A doctor has prescribed a corrective lens of -3.0D. Which type of lens is this? a) diverging lens. (b) Converging lens c) bi-focal lens. (d) Plane lens	**1**
4	A plane mirror forms a same sized image. The magnification of plane mirror is a) Zero (b) less than 1 (c) more than 1 (d) 1	**1**

5	While tracing the path of a ray of light through glass slab, a student observes that: (a) refracted ray bends away from normal while emergent ray is parallel to incident ray (b) refracted ray is parallel to incident ray while emergent ray bends away from normal (c) refracted ray bends towards the normal while emergent ray is parallel to incident ray (d) refracted ray bends towards the normal and emergent ray also bends towards the normal	**1**
6	A student focused the image of a distant tree on a screen using a convex lens. What should he measure to find the focal length of the lens? (a) distance between tree and the lens (b) distance between the tree and screen (c) distance between the screen and the lens (d) distance between the student and the lens	**1**
7	When the angle of incidence i on a glass slab is 0^o,angle of refraction r will be (a) 0° (b) 45° (c) 90° (d) depend on the material of the slab	**1**
8	The diagram below represents an object and a converging lens.  What type of image will be formed if the object is bring closer to lens and kept at F? (a) real, inverted and diminished (b) real, inverted and enlarged (c) virtual, inverted and diminished (d) virtual, erect and enlarged.	**1**

9	A candle is placed on the principal axis of a convex lens of focal length 25 cm at some distance from the lens. The image formed is of same size as of the object. This means that image is: (a) virtual and erect and formed at 50 cm from the lens. (b) virtual and inverted and formed at 50 cm from the lens. (c) real and erect and formed at 5 cm from the lens. (d) real and inverted and formed at 50 cm from the lens.	**1**
10	An object is located on the principal axis at a distance of 8 cm from a thin converging lens having focal length 10 cm. The image of the object will be (a) real, upright, and smaller than the object (b) real, inverted, and smaller than the object (c) real, inverted, and larger than the object (d) virtual, erect, and larger than the object.	**1**
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion**: While repairing a wrist watch, watch makers use a convex lens. **Reason:** A convex lens forms a real image.	**1**
12	**Assertion**: The word AMBULANCE on the hospital vans is written in the form of its mirror image. **Reason**: The image formed in a plane mirror is same size of the object.	**1**

13	**Assertion**: When light enters a rectangular glass prism, it emerges parallel to the incident ray **Reason**: The extent of the bending of the ray of light at the opposite parallel faces of rectangular glass slab is equal and opposite.	**1**
14	**Assertion**: The refractive index of water is more than one. **Reason**: The speed of light is less in water than the speed of light in vacuum.	**1**
15	**Assertion:** A full length image of a tall tree can be obtained in a concave mirror. **Reason**: Convex mirror always gives a diminished and erect image.	**1**
	SECTION – B (2 MARKS)	
16	The refractive index of water is 1.33. What does it mean? Find the speed of light in water?	**2**
17	Draw a ray diagram to show image formation by a convex lens when object is placed i) at infinity ii)in between O and F	**2**
	SECTION – C(3 MARKS)	
18	Show the path of ray after refraction from a converging lens in following cases: i .When incident ray is parallel to principal axis. ii.When ray of light is passing through optical centre. iii.When ray of light passes through a principal Focus .	**3**
19	A student used a concave mirror to form enlarged image by keeping the candle at focus. (a)Where else he can place the candle so that concave mirror produce a magnified image of an object placed in front of it. (b) State the difference if any between these two images.	**3**

	C C T SOURCES BASED/CASE BASED	
20	For science exhibition, Ram made a solar cooker using a black box and a mirror .Ram used a plane mirror while shyam used a concave mirror.They kept a cup of water in the solar cooker. (i)After Half and hour,water of which cooker will be hotter and why? (ii) Where should be the cup kept to fasten the heating in shyam's model. (iii) Will the solar cooker made by ram work well if he replace his mirror with convex mirror. Justify your answer.	1+1+2
21	Rohan was studying the venation of leaves in the garden. He found it difficult to see vein pattern in small leaves. Then the teacher gave him a magnifying glass A. now he could better see the pattern of leaves .Teacher give another glass 'B' to see even smaller insect on The leaves. i) Where should Rohan keep the leaf to get a better enlarged view. Draw diagram to support your answer. ii) What will happen if he use a glass slab instead of magnifying glass? Which phenomena will take place? iii) If the power of magnifying glass A and B are in the ratio of 1:3 what would be the ratio of the focal length of A and B?	**4**
22	While taking bath, Ravi's soap dropped into the bucket filled with water. He put his hand in water to pick the soap. He found that soap appears at higher position than its actual position. i) explain why did the soap appear raised? ii) if the water in bucket is replaced with kerosene then how would the apparent position of soap change? iii) the absolute refractive indices of water and glass is 4/3 and 3/2 respectively. If the speed of light in glass is 2×10^{8} m/s, find the speed of light in vacuum.	**4**

	LONG ANSWER TYPE(5 MARKS)	
23	(a)Reena's bike fell and its side mirror broke. She went to the shop to buy a new mirror. The shopkeeper showed her two mirrors, one plane and one convex. Which mirror she should buy and why?? (b)An object is placed at a distance of 15cm from a lens of convex mirror of focal length 20cm. Find the position and nature of the image.	**2+3**
24	a)A child was playing with a mirror. He reflected the sunlight on a paper and got a bright spot. After sometime. The paper begin to produce smoke, Which mirror is used by the child and Why did the paper produce smoke? b) Name the type of mirror used in the following situations. (i) Headlights of a car. (ii) By a dentist. Justify your answer.	**5**
25	a)If the image formed by a spherical mirror for all positions of the object placed in front of it is always erect and diminished. What type of mirror is it? Draw a labelled ray diagram to support your answer. b)The magnification produced by a spherical lens is -2". List three informations you obtain from this statement about the mirror/ image.	**2+3**

CHAPTER : 9. LIGHT: REFLECTION AND REFRACTION

S.NO	**ANSWER KEY**	**Point value**
	SECTION - A (MCQ)	
1	b	**1**
2	a	**1**
3	a	**1**
4	d	**1**
5	a	**1**

6	c	**1**
7	a	**1**
8	b	**1**
9	d	**1**
10	d	**1**
	ASSERTION AND REASON (1MARK)	
11	b	**1**
12	b	**1**
13	a	**1**
14	a	**1**
15	d	**1**
	SECTION – B (2 MARKS)	
16	The ratio of speed of light in air and in water is1.33.It bends away from the normal.	**1+1**
17	Correct ray diagrams	**1+1**
	SECTION – C(3 MARKS)	
18	Correct ray diagrams	**1+1+1**
19	1.Between P and F, the image is virtual and erect 2.Between C and F, The image is real and inverted	½,1 ½,1
	C C T SOURCES BASED/CASE BASED	
20	i) In Shyam's cooker because he has used a concave mirror which concentrates sunlight at one point . ii) At focus of the concave mirror. iii)No because Convex mirror is a diverging mirror .It does not concentrate Sunlight at one point.	1 1 2

21	I)closer to lens between O and F ii) leaf will appear raised . Refraction of light iii)P=1/f P1/P2=F2/F1=3/1 So ratio of focal length of lens a and b is 3:1	1 1/2 ½ 1 1
22	i)due to refraction ii) apparent position is higher in kerosene . iii) absolute refractive index of glass is given by ng= speed of light in vacuum c)/speed of light in water vw $3/2=c/2x10^8$ $c=3x10^8 m/s$	1 1 1 1
	LONG ANSWER TYPE(5 MARKS)	
23	a.She should buy a **convex mirror** as it gives **erect image** and **wider view** b.1/f=1/v+1/u 1/v= 1/f-1/u 1/v=1/20-1/-15 1/V= 7/60 V=60/7=8.5 cm ,image is virtual and erect	1 1 1 1 1 1
24	a)The child used a concave mirror . It concentrates the sunlight at one place to produce heat that's why the paper produced smoke b)i)concave mirror as it gives powerful parallel beams of light ii)concave mirror as it forms enlarged and erect image.	1+1 ½,1 ½,1

25	a)convex mirror,correct ray diagram b)1.The lens is convex lens. 2.The image is real and inverted. 3. The image is two times bigger than object. 4.The image is formed on the other side of the lens.(any three)	1+1 1+1+1

CHAPTER : 10.HUMAN EYE AND THE COLOURFUL WORLD

S.NO	QUESTION	POINT VALUE
	SECTION - A (MCQ)	
1	What is the main function of the Cornea in the human eye? a) To focus light b) To regulate the amount of light entering the eye c) To provide colour vision d) To protect the eye from dust and foreign particles	**1**
2	Which part of the eye is responsible for changing the shape of the lens to focus on near or far objects? a) Iris b) Pupil c) Ciliary muscles d) Retina	**1**
3	What is the term for the ability of the eye to adjust to changes in light intensity? a) Accommodation b) Refraction c) Adaptation d) Reflection	**1**
4	Which type of lens is used to correct near-sightedness (myopia)? a) concave lens b) Convex lens c) Plano lens d) Cylindrical lens	**1**
5	What is the name of the phenomenon by which we see a rainbow in the sky? a) Refraction b) Dispersion c) Total internal reflection d) Scattering	**1**
6	The defect of vision in which a person cannot see nearby objects clearly is called: a) Myopia b) Hypermetropia c) Presbyopia d) Astigmatism	**1**

7	The image formed on the retina is: a) Real, inverted, and magnified b) Real, inverted, and diminished c) Virtual, upright, and magnified d) Virtual, upright, and diminished	**1**
8	Twinkling of stars is due to atmospheric (a) dispersion of light by water droplets (b) refraction of light by different layers of varying refractive indices (c) scattering of light by dust particles (d) internal reflection of light by clouds	**1**
9	A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his textbook. Which of the following statements is correct? (a) The near point of his eyes has receded away (b) The near point of his eyes has come closer to him (c) The far point of his eyes has come closer to him (d) The far point of his eyes has receded away	**1**
10	A person cannot see distinctly objects kept beyond 2 m. This defect can be corrected by using a lens of power (a) + 0.5 D (b) – 0.5 D (c) + 0.2 D (d) – 0.2 D	**1**
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	
11	**Assertion (A) :** Eye lens has the ability to focus clearly on the retina by adjusting its focal length. **Reason (R)** : This phenomenon is known as power of accommodation.	**1**

12	**Assertion (A):**A hypermetropic person prefers to remove his spectacles, while driving. **Reason (R):**When a hypermetropic person wearing the spectacles looks at a distant object, the parallel rays from the distant object get converged in front of the retina. The image thus appears blurred.	**1**
13	**Assertion (A):** Concave lens is used to correct myopia or short-sightedness. **Reason (R):** A concave lens of suitable focal length diverges the parallel rays from the distant objects as if they are coming from the far point of the myopic eye. This helps the eye lens to form a clear image at the retina	**1**
14	**Assertion (A):** The human eye forms a real image on the retina. **Reason (R):** The crystalline lens of the eye acts as a converging lens.	**1**
15	**Assertion (A):** A convex lens is used to correct hypermetropia. **Reason (R):** A convex lens converges the light rays before they reach the eye lens.	**1**
	SECTION – B (2 MARKS)	
16	Describe the process of image formation in the human eye.	**2**
17	Explain the phenomenon of scattering of light. Give two examples of its applications?	**2**
	SECTION – C(3 MARKS)	
18	(a) A person is suffering from both myopia and hypermetropia. (i) What kind of lenses can correct this defect? (ii) How are these lenses prepared? (b) A person needs a lens of power +3 D for correcting his near vision and -3 D for correcting his distant vision. Calculate the focal lengths of the lenses required to correct these defects.	**3**
19	Draw a ray diagram to show the formation of image by a convex lens when the object is placed between focus and optical centre?	**3**
	CCT SOURCES BASED/CASE BASED	

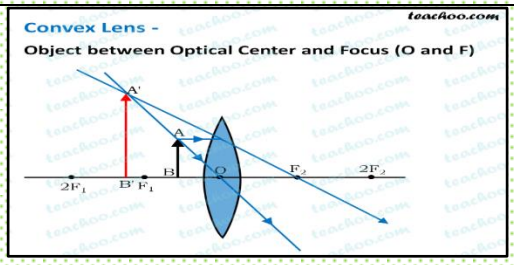
20	A person is unable to see objects clearly beyond a distance of 3 meters. An ophthalmologist prescribes a corrective lens for the person. (i) Identify the defect of vision the person is suffering from? (ii) What type of lens is used to correct this defect? (iii) If the power of the corrective lens is -2.0 D, what is its focal length?	**4** **(1+1+2)**
21	In an experiment, Paheli used an equilateral triangular glass prism and projected a narrow beam of white light source from one side of the surface of the prism. She placed a screen on the other side and saw many colours appearing as patches on the screen. But when she used a red light source, she could only see a red patch on the screen. Similarly she used a blue and green light source and could only see one colour patch on both occasions. (i) What explanation can Paheli give to her friendsto explain this phenomenon? (ii) Why she could not see any other colour when the red light was used? (iii) What is the measurement of angle of prism in an equilateral triangle? Arrange the following component of white light in increasing order of wavelength. Blue ,Red ,Green ,Violet	**4** **(1+1+2)**
22	Sunita saw rays of sunlight entering into a dark room as shown below. Then did something to the air in the room after which she was not able to see the rays of sunlight in the room.  (i) what is the phenomenon responsible for the diagram? (ii) What did Sunita most likely do to the air in the room to make the sunlight path invisible? (iii) Give two examples of where this phenomenon can be observed in our daily life.	**4** **(1+1+2)**

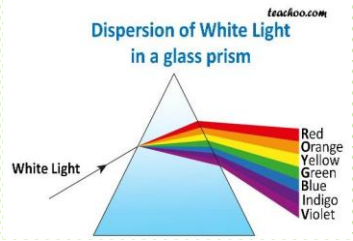
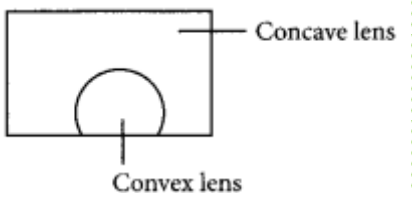
	LONG ANSWER TYPE(5 MARKS)	
23	Explain the phenomenon of dispersion of white light. Draw a labelled diagram to illustrate the dispersion of white light by a glass prism.	**5**
24	a. A person may suffer from both myopia and hypermetropia defects. (i)What is this condition called? (ii)When does it happen? (iii) Name the type of lens often required by the persons suffering from this defect. Draw labelled diagram of such lenses. b.Explain why Sun appears white when it is overhead at noon.	**5**
25	A student is unable to see clearly the words written on the black board placed at a distance of approximately 5 m from him. a. (i)) Name the defect of vision the boy is suffering from. (ii)State two possible causes of this defect (iii) Explain the method of correcting it. b. If, in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention.	**5**

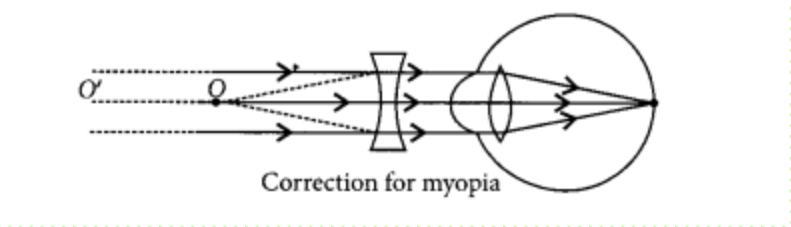
CHAPTER : 10.HUMAN EYE AND THE COLOURFUL WORLD

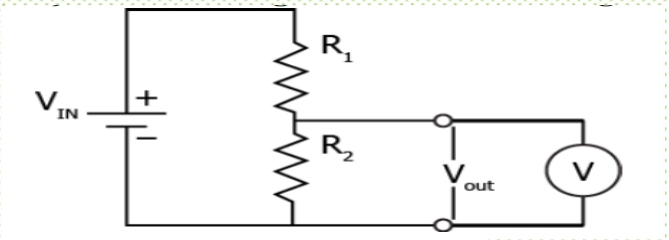
S.NO	ANSWER KEY	Point Value
	SECTION -A (MCQ)	
1	d) To protect the eye from dust and foreign particles	**1**
2	c) Ciliary muscles	**1**
3	c) Adaptation	**1**
4	a) concave lens	**1**
5	b) Dispersion	**1**
6	b) Hypermetropia	**1**
7	b) Real, inverted, and diminished	**1**
8	(b) refraction of light by different layers of varying refractive indices	**1**

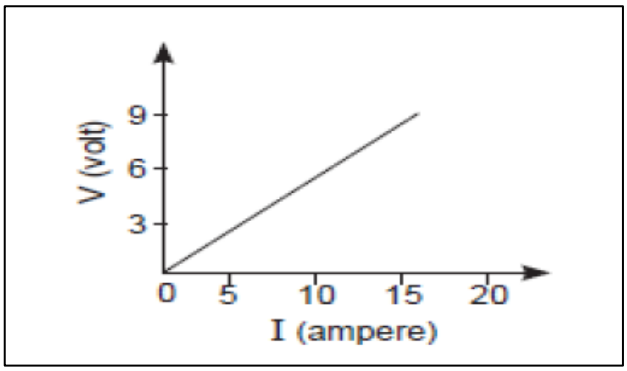
9	(a) The near point of his eyes has receded away	**1**
10	(b) – 0.5 D	**1**
	ASSERTION AND REASON (1MARK)	
11	(a) Both A and R are true and R is the correct explanation of A	**1**
12	(b) Both A and R are true but R is not the correct explanation of A	**1**
13	(a) Both A and R are true and R is the correct explanation of A	**1**
14	(a) Both A and R are true and R is the correct explanation of A	**1**
15	(a) Both A and R are true and R is the correct explanation of A	**1**
	SECTION – B (2 MARKS)	
16	The human eye is a complex optical system that works much like a camera. Light enters the eye and is focused on the retina, where it's converted into electrical signals that are sent to the brain for interpretation.	**2**
17	Scattering of light is the phenomenon where light rays deviate from their straight path when they encounter small particles like dust, water droplets, or gas molecules in their medium. This deviation occurs in all directions, dispersing the light. Example:- 1. Reddish appearance of the sun at sunrise and sunset 2. The blue color of the sky	**2**
	SECTION – C(3 MARKS)	

18	(a)(i) The lens which can correct the vision of such a person suffering from both myopia and hypermetropia is a bifocal lens. (ii) A common type of bifocal lens contains both concave and convex lens. It is prepared with the upper portion consisting of a concave lens facilitating distant vision and the lower portion consisting of convex lens facilitating near vision, (b) The power for correcting his near vision: P_N = +3 D. As P = 1/f(m) ∴ Focal length of convex lens needed, f_N = 1/PN = 0.33 m = +33.33 cm Power required to correct distant vision, P_D = -3D ∴ Focal length of concave lens, f_D = 1/PD = -0.33 m = -33.33 cm.	**3**
19		**3**
	C C T SOURCES BASED/CASE BASED	
20	a. Myopia or near-sightedness. b. Concave lens c. f = -1/2 = -0.5 meters	**4** **(1+1+2)**
21	(i)Different components of white light with different wavelengths travel at different speed in the glass. (ii)The red light is a monochromatic light, has a single wavelength and when enters a prism, it will not split into other different colours. (iii) Angle of prism, Angle A=60° Given components of white light in increasing order of wavelength. **Violet, Blue, Green,Red**	**4** **(1+1+2)**
22	a. Tyndall effect b. Sunita most likely increased the humidity in the room by using a humidifier or spraying water. This would reduce the difference in refractive index between the air and the water droplets, making the path of the sunlight less visible. c. 1. Sunlight passing through a dense forest 2. Shadow of a Tree	**4** **(1+1+2)**

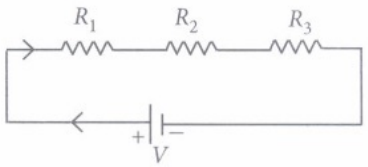
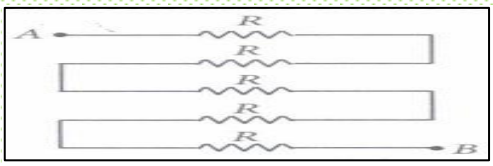
	LONG ANSWER TYPE(5 MARKS)	
23	Dispersion of white light is a phenomenon where white light, which is a combination of different colours, is separated into its constituent colours when it passes through a medium such as a glass prism. This occurs because different colours of light have different wavelengths and therefore different speeds when passing through a medium. As a result, they are refracted by different amounts, causing them to spread out and form a spectrum of colours.  White light is composed of light of different wavelengths (colors) i.e. violet, indigo, blue, green, yellow and red.) Red has the highest wavelength and violet the lowest.	**5**
24	a. (i) This condition is called presbyopia. (ii) It happens due to gradual weakening of ciliary muscles and diminishing flexibility of eye lens due to ageing. (iii)It can be corrected by using bifocal lenses.  b)At noon, the sun is overhead in the sky and the light coming from the sun travels a relatively shorter distance through the atmosphere to reach the earth. In this case the blue light is not scattered much. As the light coming from the overhead sun contains almost all its component colours in the right proportion, the sun appears white to us at noon.	**5**

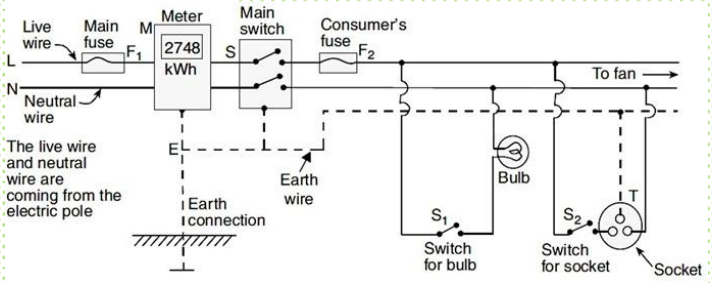
25	a. (i)Student is suffering from myopia. (ii) The two possible reasons due to which the defect of vision arises are : excessive curvature of the eye lens and elongation of the eye ball. A student with myopia has the far point nearer than infinity, thus, the image of a distant object is formed in front of the retina. (iii) Correction of myopia: This defect can be corrected by using a concave lens of suitable power as it brings the image back on to the retina, thus the defect is corrected.  Correction for myopia b. (b) Focal length, f = -5 m P = 1/f(in meters) or, P = 1/5 = -0.2D Hence, the power is – 0.2 D.	**5**

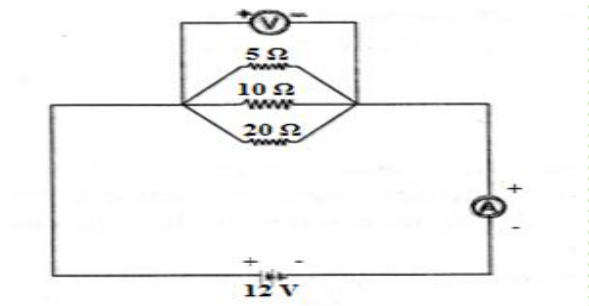
S.NO	QUESTION	POINT VALUE
	SECTION -A (MCQ)	
1	The image shows a circuit diagram.  What is being measured using the voltmeter? (a) Current in the circuit (b) Voltage in the circuit (c) The voltage across the resistor (d) The resistance offered by the resistor	1
2	The least resistance obtained by using 2 Ω, 4 Ω, 1Ω and 100 Ω is (a) < 100 Ω (b) < 4 Ω (c) < 1 Ω (d) > 2 Ω	1
3	A fuse wire repeatedly gets burnt when used with a good heater. It is advised to use a fuse wire of (a) More length (b) Less radius (c) Less length (d) More radius	1
4	Unit of electric power may also be expressed as (a) Volt-ampere (b) Kilowatt-hour (c) Watt second (d) Joule second	1
5	What is the relationship between resistance and current? (a) They are directly related to each other (b) They are inversely related to each other (c) The resistance has a greater magnitude than the current (d) The current has a greater magnitude than the resistance	1

6	The resistance whose V – I graph is given below is  (a) 5/3 Ω (b) 3/5 Ω (c) 5/2 Ω (d) 2/5 Ω	1
7	How much more heat is produced if the current is doubled? (a) Twice the original amount (b) Thrice the original amount (c) Four times the original amount (d) Five times the original amount	1
8	Which of the following represents voltage? (a) Work done / Current × Time (b) Work done × Charge (c) Work done × Time / Current (d) Work done × Charge × Time	1
9	In order to reduce electricity consumption at home, what kind of appliance should one purchase? (a) One which draws low power (b) One which produces less heat (c) One which operates at a higher voltage (d) One which draws a high amount of current	1
10	A coil in the heater consumes power P on passing current. If it is cut into halves and joined in parallel, it will consume power (a) P (b) P/2 (c) 2 P (d) 4 P	1
	ASSERTION AND REASON (1MARK) **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.**	

11	**Assertion (A)** : Tungsten metal is used for making filaments of incandescent lamps. **Reason** (R) : The melting point of tungsten is very low.	1
12	**Assertion** (A) : If a graph is plotted between the potential difference and the current flowing,the graph is a straight line passing through the origin. **Reason** (R) : The current is directly proportional to the potential difference.	1
13	**Assertion** (A) : Alloys are commonly used in electrical heating devices, like electrical iron,toasters etc. **Reason** (R) : Alloys do not oxidise (burn) readily at high temperatures.	1
14	**Assertion** (A) : When the resistances are connected end-to-end consecutively, they are said to be in series. **Reason** (R) : In case the total resistance is to be increased, then the individual resistances are connected in series.	1
15	**Assertion** (A) : The resistivity of a substance does not depend on the nature of the substance and temperature. **Reason** (R) : The resistivity of a substance is a characteristic property of the material.	1
	SECTION – B (2 MARKS)	
16	List two differences between a voltmeter and ammeter.	2
17	State Joule's law of heating.	2
	SECTION – C(3 MARKS)	
18	Draw a schematic diagram of a circuit consisting of a battery of 12V, three resistors of 5Ω, 10Ω and 20Ω connected in parallel, an ammeter to measure the total current through the circuit, voltmeter to measure the potential difference across the combination of resistors.	3
19	How many bulbs of 81 should be joined in parallel to draw a current of 2 A from a battery of 4V? (ii) Two wires, one of copper and other of manganin, have equal lengths and equal resistances. Which wire is thicker? Given that the resistivity of copper is lower than that of manganin.	3
	C C T SOURCES BASED/CASE BASED	
20	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.Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved.The commercial unit of electric energy is kWh. 1 kWh =3.6×10 power 6 a. (i) What is the SI unit of electric energy per unit time. b. How many joules are there in Kilowatt-hour ? c. The energy dissipated by the heater is E. calculate the energy dissipated When the time of operating the heater is doubled	4

21	*Two or more resistances are connected in series or in parallel or both, depending upon whether we want to increase or decrease the circuit resistance.*  *The two or more resistances are said to be connected in series if the current flowing through each resistor is the same. The equivalent resistance in the series combination is given by Rs = R1 + R2 + R3* *i) When three resistors are connected in series with a battery of voltage V and voltage drop across resistors is V1, V2 and V3, which of the relation is correct?* *(a) V = V1= V2 = V3* *(b) V = V1 + V2 + V3* *(c) V1 + V2 + V3 = 3V* *(d) V > V1 + V2 + V3* *(ii)There is a wire of length 20 cm and having resistance 20 Ω cut into 4 equal pieces and then joined in series.* *The equivalent resistance is* (a)20Ω (b)4Ω (c)5Ω (d)10Ω *(iii)In the following circuit, find the equivalent resistance between A and B is (R = 2 Ω)*  	4

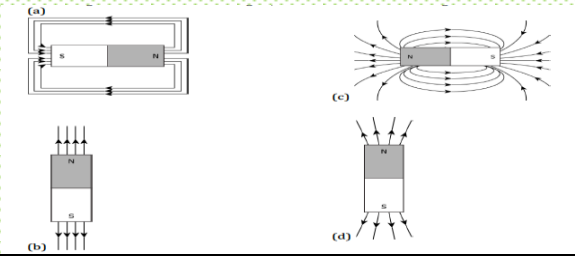
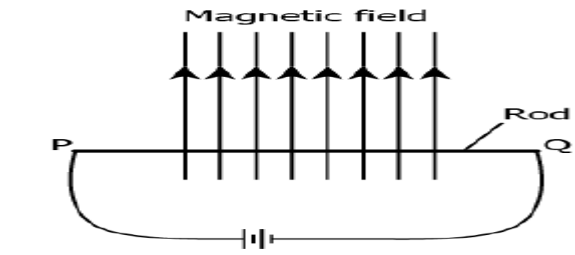
22	*In household electric circuits, the mains supply is delivered to our homes using three core cable as shown here. The cable consists of three wires, live wire, neutral wire and earth wire. The live wire is connected to electric meter through a fuse or a circuit breaker of higher rating. The neutral wire is connected directly to the electric meter.*  (i) Potential difference between live and neutral wire is_____ (ii) What is usual current rating of the fuse wire in the line if electric iron, geysers, room heater etc. are in use? *(iii)*Why is Series arrangement not used for domestic circuits ? (any two points)	4
	LONG ANSWER TYPE(5 MARKS)	
23	Two wires A and B are of equal length, different cross sectional areas and made of same metal. (a)(i) Name the property which is same for both the wires, (ii) Name the property which is different for both the wires. (b)If the resistance of wire A is four times the resistance of wire B, calculate (i) the ratio of the cross sectional areas of the wires and (ii) The ratio of the radii of the wire.	5
24	Explain the following. i)Why is tungsten used almost exclusively for the filament of electric lamps? (ii)Why are the conductors of electrical heating devices, like bread-toasters and electric irons, mostly made of an alloy rather than a pure metal? (iii)Why is the series arrangement not used in domestic circuits? (iv)How does the resistance of a wire vary with its area of cross-section? (v)Why are copper and aluminium wires usually employed for electricity transmission?	5
25	*Compare the power consumed in the 2 Ω resistor in each of the following circuit conditions: (i) a 6 V battery in series connection with 1 Ω and 2 Ω resistors, and (ii) a 4 V battery in parallel connection with 12 Ω and 2 Ω resistors.*	5

G.NO	ANSWER KEY	POINT VALUE
	SECTION -A (MCQ)	
1	c	1
2	c	1
3	d	1
4	b	1
5	b	1
6	b	1
7	c	1
8	a	1
9	a	1
10	d	1
	ASSERTION AND REASON (1MARK)	
11	c	1
12	a	1
13	a	1
14	b	1
15	d	1
	SECTION – B (2 MARKS)	
16	1. Ammeter measures electric current in the circuit. 2. Ammeter is connected in series in an electric circuit. 1. Voltmeter measures the potential difference be-tween two points on a conductor. 2. Voltmeter is connected in parallel across the ends of a conductor or resistor.	2
17	According to Joule's law of heating, the amount of heat produced in a conductor is directly proportional to the square of electric current passing through the conductor, directly proportional to the resistance of the conductor, and directly proportional to the time for which electric current passes through the conductor.	2
	SECTION – C(3 MARKS)	
18		3

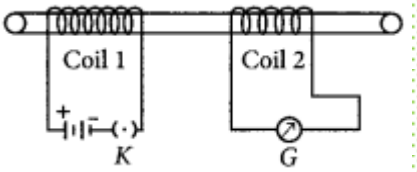
19	(i) R = V/ I = 4/2 =2 Let n be the number of bulbs. 1/R = 1/R1 + 1/R2 +……+ 1/Rn = n8 12 = n8 n=4 The number of bulbs is 4. *(ii)Since l and R of both the wires are the same, so A p . Since, the resistivity ip) of manganin is higher than that of copper, so manganin wire is thicker than that of copper wire.* We know, $R = \frac{\rho l}{A}$ or $A = \frac{\rho l}{R}$	*3*
	C C T SOURCES BASED/CASE BASED	
20	i) b (ii) a (iii) 10 Ω	*1+1+2*
21	a).joule/s b). 3.6×10^{6} C). E=Pt E2= P×2t=2E	*1+1+2*
22	(a)220V (b)15A (c)(1)Electric current will be same for all devices (2)if one stops working,other components will also not work or any other correct point	*1+1+2*
	LONG ANSWER TYPE(5 MARKS)	
23	(a)i) resistivity ii) resistance (b) (i) R1 =4R2 pl/a1=4pl/a2 A1/A2=1/4 ii) 1/2	*1+1+2+ 1*

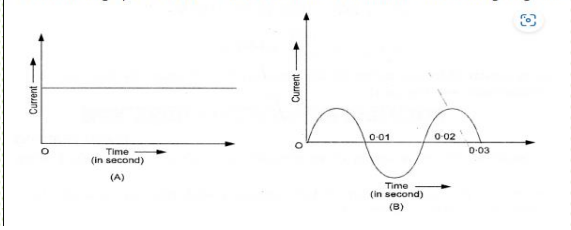
24	1. Tungsten has a very high resistance and melting point. This characteristic prevents it from burning easily when heated. At high temperatures, electric bulbs are operated. As a result, tungsten is a popular metal choice for electric lamp filaments. 2. Due to their high resistivity, alloys are used as the conductors in electric heating equipment like bread-toasters and electric irons. Because of its high resistance, it generates a lot of heat. 3. Because each component in the circuit only receives a tiny voltage as a result of the voltage being divided into a series circuit, when one component fails, the circuit is broken and none of the components work. . Because of this, domestic circuits do not employ series circuits. 4. The relationship between resistance and cross-sectional area is inversely proportional. This means the resistance decreases as the cross-sectional area increases and vice versa. 5. Copper and aluminium are frequently used for the transmission of electricity because they are effective conductors of electricity and have low resistance.	*1+1+1+ 1+1*
25	(i) Since the resistors 1 Ω and 2 Ω are connected in series, and there is a 6 V potential difference, their equivalent resistance is given by 1 Ω + 2 Ω = 3 Ω. Using Ohm's law, the following formula is used to determine the circuit's current: $I = V/R = 6/3 = 2$ A 2 A current will flow across all the components in the circuit because there is no division of current in a circuit of series connection. The power in the 2 resistor is calculated as follows: $P = I^2R = (2)^2 \times 2 = 8$ W Thus, the power consumed by the 2 Ω resistor is 8 W. (ii) The voltage between the resistors stays constant when 12 and 2 resistors are linked in parallel. Given that a 2 Ω resistor has a 4 V voltage across it, we can use the formula below to determine how much power is used by the resistor: $V^2 = 4^2$ $P = V^2/R = 4^2/2 = 8$ W The power consumed by the 2 Ω resistor is 8 W.	3+2

CHAPTER:12. MAGNETIC EFFECTS OF ELECTRIC CURRENT

S.NO	QUESTION	POINT VALUE
	SECTION -A (MCQ)	
1	A student learns that magnetic field strength around a bar magnet is different at every point. Which diagram shows the correct magnetic field lines around a bar magnet? 	1
2	Magnetic needle is : a) isolated north pole pivoted at its centre of mass b) isolated south pole pivoted at its centre of mass. c) ordinary needle made of soft iron and pivoted at its centre of mass. d) small bar magnet pivoted at its centre of mass	1
3	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
4	The magnetic field line around a bar magnet originates and enters at poles respectively: a) N-S b) S-N c) E-W d) W-E	1
5	The strength of magnetic field of a current carrying solenoid is:	1

	a) minimum at its ends b) uniform inside it at all points c) maximum at its centre d) zero at its centre	
6	Fuse is a safety device because a) it protects from overloading b) it has no resistance c) it allows high current to pass d) it does not allow current to pass	1
7	A galvanometer is used to detect: a) magnetic field b) force c) motion d) current	1
8	Magnetic field is directly proportional to: a) electric field b) change in the direction of current c) motion of magnet d) shape of conductor	1
9	The unit of magnetism is: a) Oersted b) Faraday c) Ampere d) Volt	1
10	Field lines are hypothetical lines used to represent: a) Electric field b) Voltage c) Magnetic field d) Force	1
	ASSERTION AND REASON (1MARK) **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.**	
11	**Assertion**: The strength of magnetic field is maximum at its ends. **Reason**: The magnetic field lines never intersect each other.	1
12	**Assertion**: The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the number of turns in it. **Reason**: The current in each circular turn has the same direction and the magnetic field due to each turn then just adds up.	1
13	**Assertion**: Current carrying straight conductor experience a force when placed perpendicular to the direction of magnetic field.	1

	Reason: The net charge on a current carrying conductor is always zero.	
14	**Assertion**: The frequency of AC is 50 Hz. **Reason**: The alternating current reverses its direction periodically.	1
15	**Assertion**: Earth wire is connected to a metal plate deep in the earth near the house. **Reason**: This is used as a safety measure.	1
	SECTION – B (2 MARKS)	
16	Two magnetic lines never intersect. Justify the statement giving your reasons.	2
17	List any two factors on which the magnitude of magnetic field produced by a current carrying straight conductor depends	2
	SECTION – C(3 MARKS)	
18	Two coils of insulated copper wire are wound over a non-conducting cylinder as shown. Coil 1 has comparatively large number of turns. State your observations, when  (i) Key K is closed (ii) Key K is opened Give reason for each of your observations.	3
19	State whether an alpha particle will experience any force in a magnetic field if (alpha particles are positively charged particles) (i) it is placed in the field at rest. (ii) it moves in the magnetic field parallel to field lines. (iii) it moves in the magnetic field perpendicular to field lines. Justify your answer in each case.	3
	C C T SOURCES BASED/CASE BASED	
20	Ram observed the electricity board while the line man was working on it. In that electricity board he noticed two separate circuits. He enquired the line man about it. He informed him that one is for high rating while the other of low rating. (a)Predict the higher rating and low rating for different appliances. B) In our country what is the potential difference between live wire and neutral wire? C) What is short circuiting?	4

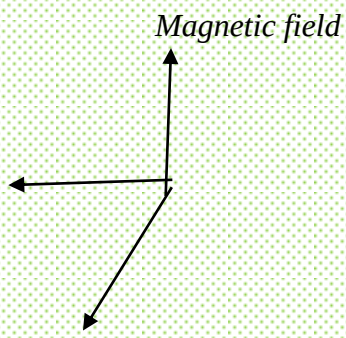
21	Current-time graphs from two different sources are shown in the following diagrams.  Alternating Current, delves into the understanding of electrical currents that periodically reverse direction. The chapter starts by defining Alternating Current (AC) and contrasts it with Direct Current (DC), which flows in a single direction. AC is characterized by its frequency, which is the number of cycles per unit of time, and by its peak and RMS values. The chapter also explores the concept of impedance, which is a measure of opposition to AC, similar to the concept of resistance in DC circuits Answer the following questions. 1. Name the type of current shown by graph A and graph B. 2. Name any one source of the current shown by graph A and graph B 3. What is the frequency of current in case B ?	4
22	It is well known that "magnetic field is caused by electric current." Whenever there is a change in magnetic flux linked with a coil (or circuit) an emf is induced in the coil. This phenomenon is called electromagnetic induction. The emf produced in the coil is called the induced emf. If the coil is closed, the current thus produced is called as induced current. The direction of induced current is determined by Fleming's right hand rule. These induced current are used in a moving coil microphone, tape-recorders, video recorders, hard-discs in computers etc. i) Write one application of Fleming's right hand rule ii) By which instrument, the presence of magnetic field be determined? iii)What is electromagnetic induction?	4
	LONG ANSWER TYPE(5 MARKS)	
23	Siya was performing an experiment to study the force on a current carrying conductor in a magnetic field. She took a small aluminiumm rod AB, a strong horse shoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed. On the basis of your understanding of this phenomenon, answer the following questions: a) Name any two devices that uses current carrying conductors and magnetic field. b) State the rule applicable for the displacement of magnet. c) Mark the direction of the field lines. d) Indicate the direction of the force acting on the magnet.	5

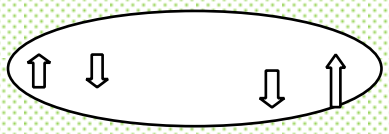
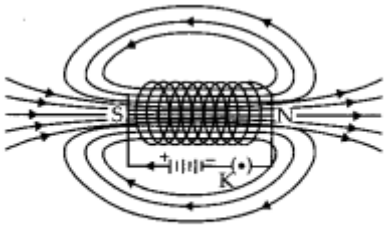
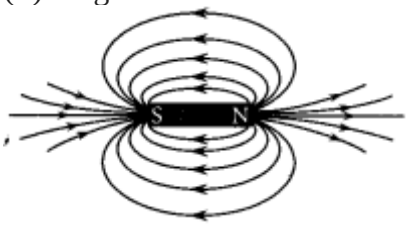
24	A current carrying conductor is placed in a magnetic field. Now answer the following. (i) List the factors on which the magnitude of force experienced by conductor depends. (ii) When is the magnitude of this force maximum? (iii) State the rule which helps, in finding the direction of motion of conductor. (iv) If initially this force was acting from right to left, how will the direction of force change if: (a) direction of magnetic field is reversed? (b) direction of current is reversed?	5
25	a) Consider a circular loop of wire lying in the plane of table. Let the current pass through the loop clockwise. Apply the right-hand rule to find out the direction of the magnetic field inside and outside the loop. b)What is solenoid? Draw the pattern of magnetic field lines of(i) a current carrying solenoid and (ii) a bar magnet.	5

CHAPTER:12. MAGNETIC EFFECT OF CURRENT

S.NO	*ANSWER KEY*	*POINT VALUE*
	SECTION -A (MCQ)	
1	c	*1*
2	d	*1*
3	d	*1*
4	a	*1*
5	b	*1*
6	a	*1*
7	a	*1*
8	a	*1*
9	a	*1*
10	c	*1*
	ASSERTION AND REASON (1MARK)	
11	*b*	*1*
12	*a*	*1*
13	*b*	*1*
14	*a*	*1*
15	*a*	*1*
	SECTION – B (2 MARKS)	
16	*No two field lines are found to cross each other because at the point of intersection the compass needle would point towards two directions which is not possible.*	*2*
17	Current, number of turns in solenoid	*2*
	SECTION – C(3 MARKS)	
18	(i) When key is closed, after setting up the circuit as shown, one can observe a deflection on the galvanometer	*3*

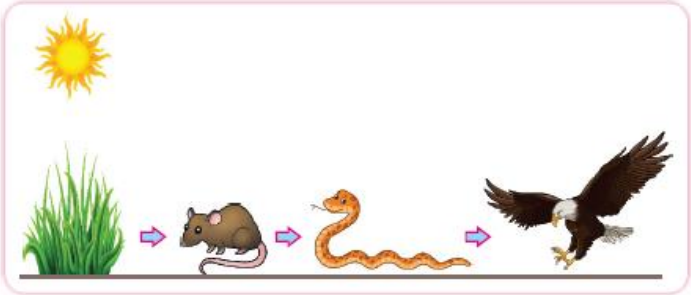
	connected to the second coil. This is because, a potential difference and thus a current is induced in coil 2 as there is change in the current and the magnetic field associated with it in coil 1. When the magnetic field changes in coil 1, the magnetic field lines around coil 2 also changes. This induces a current in coil 2. (ii) When key K is opened, after closing it for sometime it can be observed that the galvanometer show a deflection, but this time in the opposite direction. This is because, when the current stops flowing in coil 1, the magnetic field associated with it changes in the opposite direction as in the first case, thus inducing a current in the opposite direction.	
19	(i) No, alpha particle will not experience any force if it is at rest, because only moving charge particle can experience force when placed in a magnetic field. (ii) No, alpha particle will not experience any force if it moves in the magnetic field parallel to field lines because charge particle experiences force only when it moves at an angle other than 0° with magnetic field. (iii) Alpha particle will experience a force in the direction perpendicular to the direction of magnetic field and direction of motion of alpha particle.	*3*
	C C T SOURCES BASED/CASE BASED	
20	(a)15-high rating 5-low rating b) In our country the potential difference between live wire and neutral wire is 220 V. c) When live wire and neutral wire comes in direct contact, in that situation the current through the circuit increases suddenly and it is called as short circuiting.	*4*
21	(i) Graph A represents direct current (D.C). Graph B represents alternating current (A.C). (ii) A dry cell is the source of current shown by Graph A. An A.C generator is the source of current shown by the graph B. (iii) From graph B, time period, T = 0.02s. Therefore, frequency of current, $f = \frac{1}{T} = \frac{1}{0.02}$ = 50Hz.	*4*
22	a) Flemings Right-hand rule gives the direction of induced	*4*

	current b) Magnetic Needle c)The phenomenon in which electric current is generated by varying magnetic fields around a coil is called electromagnetic induction.	
	LONG ANSWER TYPE(5 MARKS)	
23	*a) Electric motor and electric generator* *b) Fleming's left hand rule*  *d) Away from the magnet*	*5*
24	(i) When a current carrying wire is placed in a magnetic field, it experiences a magnetic force that depends on (a) current flowing in the conductor (b) strength of magnetic field (c) length of the conductor (d) angle between the element of length and the magnetic field. (ii) Force experienced by a current carrying conductor placed in a magnetic field is largest when the direction of current is perpendicular to the direction of magnetic field. (iii) The rule used in finding the direction of motion of the conductor placed in a magnetic field is Fleming's left hand rule.. (iv) (a) Direction of force will be reversed when direction of magnetic field is reversed, i.e., now force on conductor will act from left to right. (b) Direction of force will be reversed, if the direction of current is reversed, i.e., the force on the conductor will act from left to right.	*5*

25	*When we apply right hand thumb rule to the Left side of the loop the direction of magnetic field lines inside the loop are going into the table while outside the loop they are coming out of the loop*  (i) Solenoid : A coil of many circular turns of insulated copper wire wrapped in the shape of cylinder is called solenoid.  Field lines of the magnetic field through and around a current-carrying solenoid The pattern of magnetic field lines inside the solenoid indicates that the magnetic field is the same at all points inside the solenoid. That is, the field is uniform inside the solenoid. (ii) Magnetic field lines around a bar magnet.  Following are the distinguishing features between the two fields. (a) A bar magnet is a permanent magnet whereas solenoid is an electromagnet, therefore field produced by solenoid is temporary and stay till current flows through it.	5

CHAPTER : 13. OUR ENVIRONMENT

S.NO	QUESTION	POINT VALUE
	SECTION - A (MCQ)	
1	What provides the energy which then flows through a food chain? (a) glucose (b) oxygen (c) respiration (d) sunlight	**1**
2	The flow of energy in an ecosystem is always : (a) unidirectional (b) bidirectional (c) cyclic (d) multidirectional	**1**
3	Kitchen wastes can be hygienically disposed of through- a) Dumping b) Composting c) Incineration d) Recycling	**1**
4	Which group of organisms are not constituents of a food chain? (i) Grass, lion, rabbit, wolf (ii) Plankton, man, fish, grasshopper (iii) Wolf, grass, snake, tiger (iv) Frog, snake, eagle, grass, grasshopper a) (i) and (iii) b) (iii) and (iv) c) (ii) and (iii) d) (i) and (iv)	**1**
5	The percentage of solar radiation absorbed by all the green plants for the process of photosynthesis is about: (a)1% (b)5% (c)8% (d)10%	**1**
6	Select the mismatched pair in the following and correct it. (a)Bio-magnification — Accumulation of chemicals at the successive trophic levels of a food chain (b)Ecosystem — Biotic components of environment (c)Aquarium — A man-made ecosystem (d)Parasites — Organisms which obtain food from other living organism	**1**

7	Pyramid of energy is the: (a)total energy in an ecosystem (b)Net energy in an ecosystem (c)Energy consumed by various organisms (d)Graphic representation of energy levels at each tropic level	**1**
8	Which of these statements would be correct if the population of snakes is greatly increased?  (a)Population of green plants will decrease. (b)Population of mice will decrease. (c)Population of snakes will decrease. (d)Population of hawk will decrease.	**1**
9	Which one of the following green house gases is a contributor due to incomplete combustion of coal and petroleum? (a)Oxides of nitrogen (b)Methane (c)Carbon monoxide (d)Carbon dioxide	**1**
10	Depletion of ozone is mainly due to _____. (a)chlorofluorocarbon compounds (b)carbon monoxide (c)methane (d)pesticides	**1**
	ASSERTION AND REASON (1MARK) **Question No. 11 to 15 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.**	

11	**Assertion**: Aquarium needs regular cleaning **Reason**: There are no microbes to clean water in aquarium, therefore, it needs to be regularly cleaned.	**1**
12	**Assertion** : Food chain is responsible for the entry of harmful chemicals in our bodies. **Reason** : The length and complexity of food chains vary greatly.	**1**
13	**Assertion :** Greater number of individuals are present in lower trophic levels. **Reason :** The flow of energy is unidirectional	**1**
14	**Assertion:** Herbivores are called first order consumers. **Reason :** Tiger is a top carnivore.	**1**
15	**Assertion :** Polythene bags and plastic containers are non-biodegradable substances. **Reason :** They can be broken down by microorganisms in natural simple harmless substances.	**1**
	SECTION – B (2 MARKS)	
16	How is ozone both beneficial and damaging? How can we prevent the damaging effect of ozone?	**2**
17	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?	**2**
	SECTION – C(3 MARKS)	
18	Why must we conserve our forests? List two factors responsible for causing deforestation.	**3**
19	Why are bacteria and fungi called decomposers? List any two advantages of decomposers to the environment?	**3**
	CCT SOURCES BASED/CASE BASED	

20	The atmosphere is a blanket of air and a precious natural resource for sustaining life on the Earth. Unfortunately, human activities based on national/personal interests are causing harm to this common resource, notably by depleting the fragile ozone layer, which acts as a protective shield for life on the Earth. Ozone molecules consist of three oxygen atoms, Ozone molecules are exceeding rare: fewer than ten in every million molecules of air. However, for nearly a billion years, their presence in the atmosphere has played a vital role in safeguarding life on Earth. (i)Which chemicals are primarily responsible for ozone layer depletion? (ii)How does ozone layer depletion affect marine ecosystems? (iii) How can individuals contribute to protecting the ozone layer in their daily lives?	**4**
21	A village pond is found fully covered with algae and scum. The people in the village use the water from this pond for their household purposes. It is also found that many children in that village are suffering from diarrhea and muscle cramps. As a precaution the doctor advises them not to drink water from the pond, and if at all they use it, it should be boiled and cooled. (i)As a science student tells the reason for the overgrowth of algae in the pond. (ii) What change will come to the quality of water when it is boiled and cooled? (iii). What are the common causes of diarrhea?	**4**
22	Food chains are very important for the survival of most species. When only one element is removed from the food chain it can result in extinction of a species in some cases. The foundation of the food chain consists of primary producers. Primary producers, or autotrophs, can use either solar energy or chemical energy to create complex organic compounds, whereas species at higher trophic levels cannot and so must consume producers or other life that itself consumes producers. Because the sun's light is necessary for photosynthesis, most life could not exist if the sun disappeared. (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? (ii)In a food chain, which organisms are typically the primary consumers? (iii)What are the consequences of removing one element from a food chain?	**4**
	LONG ANSWER TYPE(5 MARKS)	

23	(a) Indicate the flow of energy in an ecosystem. Why is it unidirectional? Justify. (b) What will happen if decomposers are absent in an ecosystem?	**5**
24	(a) Explain the role of UV radiation in producing ozone layer. (b) Mention the reaction involved. (c) Why is excessive use of CFCs a cause of concern?	**5**
25	Students in a school listened to the news read in the morning assembly that the mountain of garbage in Delhi, suddenly exploded and various vehicles got buried under it. Several people were also injured and there was traffic jam all around. In the brain storming session, the teacher also discussed this issue and asked the students to find out a solution to the problem of garbage. Finally they arrived at two main points – one is self management of the garbage we produce and the second is to generate less garbage at individual level. (a) Suggest two measures to manage the garbage we produce. (b) As an individual, what can we do to generate the least garbage? Give two points. (c) List two values the teacher instilled in his students in this episode.	**5**

CHAPTER:13. OUR ENVIRONMENT

S.NO	**ANSWER KEY**	**Point Value**
	SECTION -A (MCQ)	
1	d) sunlight	**1**
2	(a) unidirectional	**1**
3	b) Composting	**1**
4	(ii) and (iii)	**1**
5	(a)1%	**1**
6	(B) Ecosystem — Biotic components of environment	**1**
7	D) Graphic representation of energy levels at each tropic level	**1**
8	B) Population of mice will decrease.	**1**

9	c) Carbon monoxide	**1**
10	a. chlorofluorocarbon compounds	**1**
	ASSERTION AND REASON (1MARK)	
11	The assertion is **true**, but the reason is **false**.	**1**
12	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A).	**1**
13	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A).	**1**
14	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A).	**1**
15	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A).	**1**
	SECTION – B (2 MARKS)	
16	Damaging, as it is a deadly poison and beneficial as it shields the surface of the earth from UV radiations of the Sun. By not using synthetic chemicals like CFCs, that depletes ozone layer.	**2**
17	Plastic cups are non-biodegradable and harm the environment. They were, thus, replaced by Kulhads. Making Kulhad, which is 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.	**2**
	SECTION – C(3 MARKS)	
18	Forests help in preventing soil erosion / protect biodiversity / maintain ground water level / help in rainfall / provide raw materials / prevent floods / (any other two points). Exploitation by industries / increase in population / urbanization / cattle grazing are the causes of deforestation	**3**
19	Bacteria and fungi are called decomposers because they decompose or consume the dead remains of other organisms. Advantages. (i) Decomposers degrade garbage and the organic wastes which would otherwise cause environment problems. (ii) Decomposers recycle the nutrients through biochemical cycle.	**3**

	C C T SOURCES BASED/CASE BASED	
20	(i) CFCs (ii) It impacts on phytoplankton, which are crucial to the marine food web. (iii) 1.Reducing their use of ozone-depleting substances 2.Supporting environmentally friendly alternatives 3.Properly disposing of electronics and appliances	**4 (1+1+2)**
21	(i) If the water body has excess nutrient especially phosphorus, then, higher growth of algae is seen in the water body (ii). Water is boiled to kill the pathogenic organisms. So that the water can be consumed (iii). Pathogens, intestinal disease, such as inflammatory bowel diseases	**4 (1+1+2)**
22	(i) 1000 J (ii) Herbivorous (iii)Removing one element from a food chain can have significant consequences for the ecosystem, including the extinction of species that rely on it for food.	**4 (1+1+2)**
	LONG ANSWER TYPE(5 MARKS)	
23	(a)The flow of energy is generally from **Sun → producer → herbivore → carnivore.** Since the flow of energy is progressively from one trophic level to another and does not revert back, it is said to be unidirectional. Further, the available energy decreases in the higher trophic levels making it impossible for energy to flow in the reverse direction. (b) Decomposers include micro-organisms such as bacteria and fungi that obtain nutrients by breaking down the remains of dead plants and animals. It breaks down the complex organic substances of garbage, dead animals and plants into simpler inorganic substances that go into the soil and are used up again by the plants. In the absence of decomposers, recycling of material in the biosphere will not take place.	**5**

24	(a)High energy UV radiations split apart some molecular oxygen into free (O) atoms, these atoms combine with molecular oxygen to form ozone. (b) $O_2 \rightarrow$UV O + O $O + O_2 \longrightarrow O_3$(Ozone) (c) • Depletion of the ozone layer. • If these UV radiations reach the earth they may cause skin cancer in human beings. Detailed Answer: (a) Ozone is formed in the upper atmosphere when solar UV radiation dissociated molecules of oxygen (O) and then this oxygen atom (O) combines with an oxygen molecule. (b) Reaction involved: $O_2 \rightarrow O + O$ $O + O_2 \rightarrow O_3$ (c) When CFCs reach upper layers of the atmosphere, they cause depletion of ozone layer, and allow harmful UV radiations to reach the surface of the earth to create health hazards.	**5**
25	(a) Incineration/Waste compaction/Biogas generation/Composting/Segregation and safe disposal/Vermicomposting. (b) Reuse of empty bottles, books etc. Reduce the use of non-biodegradable substances like polythene, thermocol, etc. (c) Awareness about environment, scientific attitude, concern for community health and personal health.	**5(2+1+2)**