

## A Word To The Students

Present day understanding of learning is that '**learning is an exercise in meaning - making**'. When indulging in the process of meaning making, mental ideas or **concepts** are built by the learner. Acquiring mere concepts is of no use and the ability to use them in real life situations is the requirement of the day. Therefore, the purpose of learning is to identify, understand and use these concepts to situations in real life.

Knowing a concept is at the bottom of hierarchy of learning outcomes and it can easily be achieved even by rote learning. Whereas, the ability to use these concepts in different situations is the next stage to knowing and therefore the questions which test these are referred to Higher Order Thinking Skills (HOTS) questions. The essential first step in acquiring the competence to answer HOTS questions is the development of a clear understanding of the concepts in its totality by the learner. Therefore, every learner is advised to learn the lessons thoroughly before venturing to answer the questions included in this material.

This material has been prepared chapter wise, with the focus primarily on the HOTS questions. And in each chapter you will find two sections, one in which both questions and answers will be there and the other in which only questions are there for which you have to find the answers (which we presume is within the reach of each and every learner).

I take this opportunity to thank all the teachers and Principals who were involved in the preparation of this material in the short time that was given to them. Every effort has been made to ensure that there are no errors in this material and in case you find that there are errors / discrepancies, you are advised to consult your teacher without fail to resolve those discrepancies.

I wish you all the best for your success.

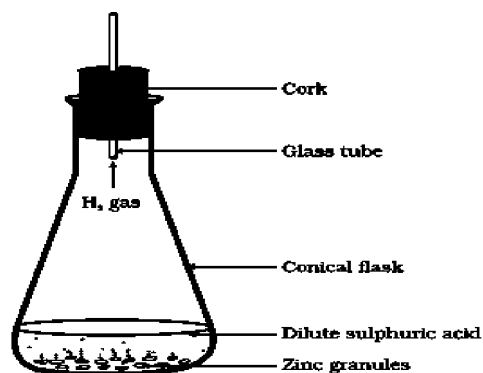
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## CHAPTER No. 1

### CHEMICAL REACTIONS AND EQUATIONS

#### HOTS: (High Order Thinking Skill) Questions with Answers:

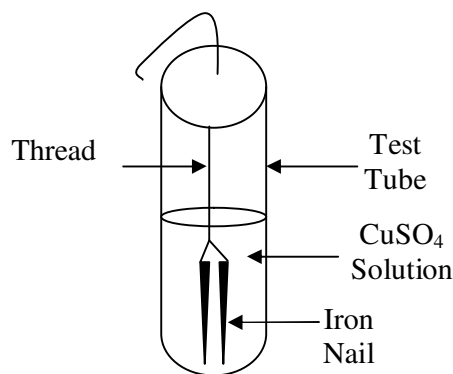
- 1 A compound `X` is used for drinking, has pH =7. Its acidified solution undergoes decomposition in presence of electricity to produce gases `Y` and `Z`. The volume of Y is double than Z. Y is highly combustible whereas Z is supporter of combustion. Identify X, Y & Z and write the chemical reactions involved.
- 2 An aqueous solution of metal nitrate P reacts with sodium bromide solution to form yellow ppt of compound Q which is used in photography. Q on exposure to sunlight undergoes decomposition reaction to form metal present in P along with reddish brown gas. Identify P&Q. Write the chemical reaction & type of chemical reaction.
- 3 Bhawana took a pale green substance A in a test tube. and heated it over the flame of a burner. A brown colored residue B was formed along with evolution of two gases with burning smell of sulphur. Identify A & B. Write the chemical reaction involved.
- 4 A student took 2-3 g of a substance X in a glass beaker & poured water over it slowly. He observed bubbles along with hissing noise. The beaker becomes quite hot. Identify X. What type of reaction is it?
- 5 A reddish brown vessel developed a green colored solid X when left open in air for a long time. When reacted with dil H<sub>2</sub>SO<sub>4</sub>, it forms a blue colored solution along with brisk effervescence due to colourless & odourless gas Z. X decomposes to form black colored oxide Y of a reddish brown metal along with gas Z, Identify X, Y, & Z.
- 6 A substance X used for coating iron articles is added to a blue solution of a reddish brown metal Y, the color of the solution gets discharged Identify X and Y & also the type of reaction.
7. A student has mixed the solutions of lead (II) nitrate and potassium iodide.
  - (i) What was the colour of the precipitate formed? Can you name the compound? precipitated ?
  - (ii) Write the balanced chemical equation for this reaction.
  - (iii) What type of reaction is it?
8. Observe the following activity & answer the questions



- Do you observe anything happening around the zinc granules?
- Is there any change in its temperature?
- Why is glass tube not dipped in dil  $\text{H}_2\text{SO}_4$ ?
- How is  $\text{H}_2$  gas collected by downward displacement or upward displacement of water?
- Is  $\text{H}_2$  gas soluble or insoluble in water?
- Is  $\text{H}_2$  gas heavier or lighter than air?

9. A reddish brown metal X when heated in presence of oxygen forms a black compound Y which is basic in nature when heated with hydrogen gas gives back X. Identify X & Y. Write the chemical reaction between Y &  $\text{H}_2$ . Identify the substance being oxidized & reduced.

10 Name the type of reaction seen in the diagram below. Write the reaction for the same.

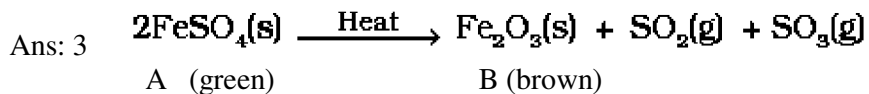
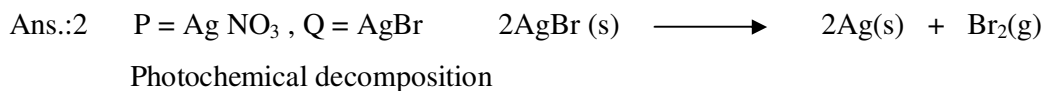
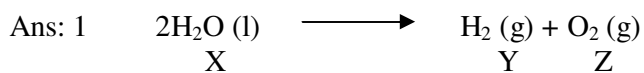


11. A student burnt a metal A found in the form of ribbon. The ribbon burnt with a dazzling flame & a white powder B is formed which is basic in nature. Identify A & B. Write the balanced chemical equation.

12. A student dropped few pieces of marble in dilute  $\text{HCl}$  contained in a test tube. The gas evolved was passed through lime water. What change would be observed in lime water? Write chemical reactions for both the changes observed.

13. Astha has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings

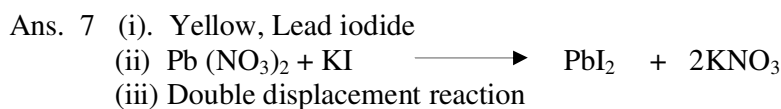
## Answers



Ans: 4 a) X = Calcium oxide (Quick lime), Combination reaction.

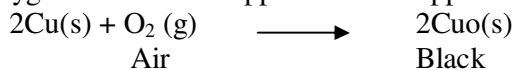
Ans. 5 X = CuCO<sub>3</sub>. Cu (OH)<sub>2</sub>, Y = CuO, Z = CO<sub>2</sub>

Ans. 6 X = Fe, Y = Cu, Displacement reaction.



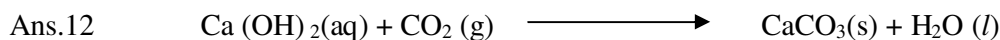
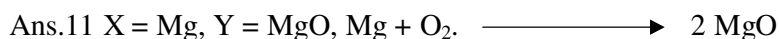
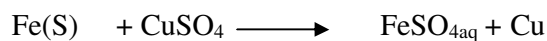
- Ans.8 a. Bubbles of hydrogen gas.  
 b. Yes temperature will increase.  
 c. H<sub>2</sub>SO<sub>4</sub> will rise in glass tube, preventing H<sub>2</sub> to evolve  
 d. downward displacement  
 e. Insoluble  
 f lighter than air

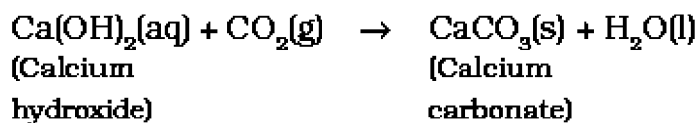
Ans. 9 Oxygen reacts with copper to form copper oxides which has black colour



The copper (II) oxide is losing oxygen and is being reduced. The hydrogen is gaining oxygen and is being oxidized.

Ans.10 Displacement Reaction





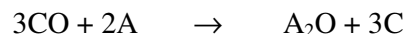
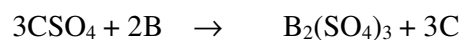
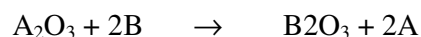
Ans.13 Corrosion is responsible for this coating. Black coating is due to formation of  $\text{Ag}_2\text{S}$  and green coating is due to formation of  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$

## PRACTICE QUESTIONS

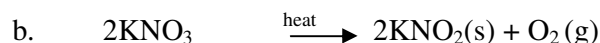
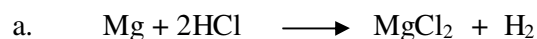


Identify the type of reaction.

2. What does the symbol (g) used with water indicate?
3. How can we prevent fried food from turning 'Rancid'?
4. Why does lime water turn milky when  $\text{CO}_2$  is passed into it?
5. Which gas is evolved when lead nitrate is heated?
6. During electrolysis of water, how can we identify the gas present in each test tube?
7. Give an example of a photolytic reaction which is not a decomposition reaction?
8.  $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$   
In above reaction iron nail becomes brownish in colour and the blue colour of copper sulphate solution fades. Why?
9. Identify the element which is most reactive and the element which is least reactive?



10. Write a chemical equation of a reaction in which a precipitate is formed.
11. Write your observation when Magnesium ribbon is burned in air? Name the powder formed.
12. Which characteristics of a chemical change do you observe when dilute sulphuric acid is added to zinc granules in a conical flask ?
13. Write word equation for the following chemical equation :



14. What happens when  $\text{CO}_2$  (g) is bubbled through lime water. Write the chemical equation.
15. What happens when a silver spoon is kept immersed in aqueous copper sulphate solution?
16. Why does copper not liberate hydrogen on reacting with dilute sulphuric acid?
17. Write a chemical equation to show the process of respiration. Mention the type of reaction.
18. Which of the following reactions show evolution of gas.
  - a.  $2\text{AgCl} \rightarrow 2\text{Ag} + \text{Cl}_2$
  - b.  $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$
  - c.  $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
  - d.  $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
19. Name 2 metals which get tarnished. Why does this happen ?.
20. Why is corrosion harmful?
21. Mention three situations in daily life where a chemical change occurs.
22. Balance the following chemical equations.
  - a.  $\text{H}_2\text{SO}_4 + \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
  - b.  $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$
  - c.  $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
23. Write chemical equations for the following word equations :
  - a. Hydrogen + Chlorine  $\rightarrow$  Hydrogen Chloride
  - b. Sodium + Water  $\rightarrow$  Sodium Hydroxide + Hydrogen
  - c. Zinc Oxide + Carbon  $\rightarrow$  Zinc + Carbon Monoxide
24. What do you mean by endothermic and exothermic reactions? Give examples.
25. What happens when potassium iodide solution is added to lead nitrate solution? Give equation of reaction and mention the type of reaction involved?
26. How can we make a chemical equation more informative?
27. Write one chemical equation to show:
  - a. Combination reaction
  - b. Decomposition reaction
  - c. Double Displacement Reaction
28. Write short notes on:
  - a. Corrosion
  - b. Rancidity
29. A substance X when mixed with water is used for white washing. The substance X is also formed when a substance Y decomposes.

- a. Identify X and Y and write their formula.
30. Define oxidation and reduction. Give an example of a Redox reaction.

## CHAPTER No.: 2

### ACIDS, BASES AND SALTS

#### **HOTS: (High Order Thinking Skill) Questions with Answers:**

1. Kazi and priyam want to prepare dil  $\text{H}_2\text{SO}_4$ . Kazi added conc.  $\text{H}_2\text{SO}_4$  to water slowly with constant stirring & cooling whereas Priyam added water to conc.  $\text{H}_2\text{SO}_4$ . Name the student who was correct and why?
2. A compound X is bitter in taste. It is a component of washing powder & reacts with dil. HCl to produce brisk effervescence due to colourless, odourless gas Y which turns lime water milky due to formation of Z. When excess of  $\text{CO}_2$  is passed, milkiness disappears due to formation of P. Identify X, Y, and Z & P.
3. Compound P forms enamel of teeth. It is the hardest substance of the body. It does not dissolve in water but it is corroded when pH in the mouth is below 5.5. How does tooth paste prevent dental decay?
4. The oxide of a metal M was water soluble when a blue litmus strip was dipped in this solution, it did not go any change in colour. Predict the nature of oxide
5. A first aid manual suggests that vinegar should be used to treat wasp sting and baking soda for bee stings.
  - (i) What does this information tell you about the chemical nature of the wasp stings
  - (ii) If there were no baking soda in the house, what other household substance could you use to treat bee stings?
6. 'A' is a soluble acidic oxide and 'B' is a soluble base. Compared to pH of pure water. What will be the pH of (a) solution of A (b) solution of B?
7. A road tanker carrying an acid was involved in an accident and its contents spilled on the road. At the side of the road, iron drain covers began melting and fizzing as the acid ran over them. A specialist was called to see if the acid actually leaked into the nearby river.
  - (a) Explain how the specialist could carry out a simple test to see if the river water contains some acid or not.
  - (b) The word melting is incorrectly used in the report. Suggest a better name that should have been used.
  - (c) Explain why drain covers began fizzing as the acid ran over them.
8. A compound 'X' on electrolysis in aqueous solution produces a strong base. 'Y' along with two gases 'A' and 'B'. 'B' is used in manufacture of bleaching powder. Identify X, Y, A and B. Write chemical equations.
9. A yellow powder X gives a pungent smell if left open in air. It is prepared by the reaction of dry compound Y with chlorine gas. It is used for disinfecting drinking water. Identify X and Y. and write the reaction involved.
10. When  $\text{CO}_2$  gas pass through saturated solution of ammonical brine, two compound 'X' and 'Y' are formed. 'Y' is used as antacid and decomposes to form another solid 'Z'. Identify 'X', 'Y', 'Z' and write chemical equations.
11. A compound 'A' on heating at 370 K gives 'B' used as plaster for supporting fractured bones in the right position. 'B' on mixing with water changes to 'A'. Identify 'A' and 'B' and write the chemical reaction.

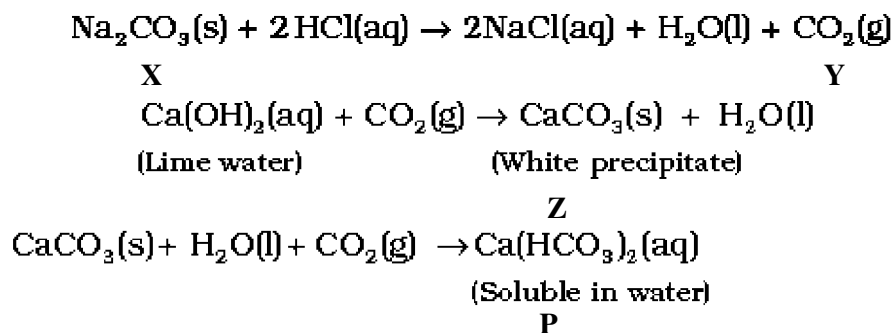


12. A few drops of phenolphthalein indicator were added to an unknown solution A. It acquired pink colour. Now another unknown solution B was added to it drop by drop and the solution becomes colorless. Predict the nature of A & B.
13. A student heated a few crystals of copper sulphate in a dry boiling tube.
- What will be the color of the copper sulphate after heating?
  - Will you notice water droplets in the boiling tube?
  - Where have these come from?
14. A substance `X` used in the kitchen for making tasty crispy pakoras and is also an ingredient of antacid. Name the substance `X`.
- How does `X` help to make cakes and bread soft and spongy.
  - Is the pH value of solution of `X` lesser than or greater than 7.0?

## ANSWERS

Ans.1 Kazi was correct. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating.

Ans.2



Ans.3 P = Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>. Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating. Using toothpastes, which are generally basic, for cleaning the teeth can neutralize the excess acid and prevent tooth decay.

Ans.4 The Metal oxide (MO) is of basic in nature. It dissolves in water to form metal hydroxide as MO + H<sub>2</sub>O → M(OH)<sub>2</sub>  
Blue litmus does not undergo any change in colour in the basic medium.

Ans 5: (i) Since vinegar (acetic acid) is used to heal or neutralize the effect of wasp stings this means that the chemical present in the stings must be some base.  
(ii)NH<sub>4</sub>OH

Ans 6: pH of A will be less than 7 and that of B will be more than 7.

Ans 7: (a) By dipping a strip of blue litmus paper in to the sample of river water. If the colour changes to red this means that some acid has gone in to the river.



## PRACTICE QUESTIONS

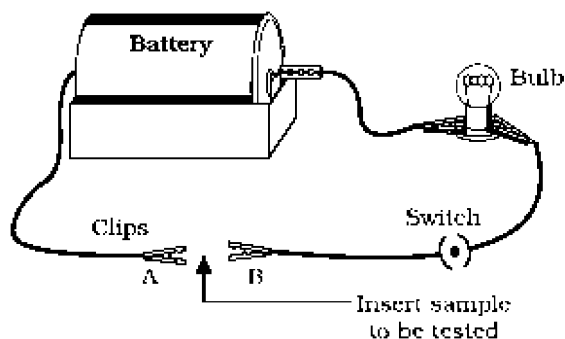
1. A substance changed its colour on heating in a closed vessel but regained it after sometime when allowed to cool and exposed to air. Name the substance. Explain the phenomenon involved.
2. What do you understand by the term Hyperacidity in a patient? What is the remedy for it?
3. A person caused burns while adding water into a concentrated acid. What was the reason behind it?
4. Why are some perishable food preserved in vinegar?
5. A doctor applied surgical bandages on fractured bones of a patient after making them wet. What changes are likely to occur?
6. Tooth enamel is one of the hardest substances in our body yet damage occurs when chocolates & sweets are eaten? Why? What will you do to prevent it?
7. An important chemical which is used in manufacture of glass, soap, paper and is also used as a cleansing agent for domestic purposes. Name it; write formula and also its chemical name.
8. Why curd or sour substance should not be kept in brass or copper container?
9. Name two synthetic indicators? What are its effects in a acidic and basic solutions?
10. Name the substance present in
  - 1) Bee sting
  - 2) Stinging hair of nettle leaves.What should be the nature of substance for its remedy?

## CHAPTER No. 3

### METALS AND NON METALS

#### HOTS: (High Order Thinking Skill) Questions with Answers:

1. A metal acts as a good reducing agent. It reduces  $\text{Fe}_2\text{O}_3$ , and  $\text{MnO}_2$ . The reaction with  $\text{Fe}_2\text{O}_3$  is used for welding broken railway tracks. Identify the metal and write all the chemical reactions
2. A yellow coloured powder 'X' is soluble in carbon disulfide. It burns with a blue flame forming suffocating smelling gas which turns moist blue litmus red. Identify 'X' and gives chemical reaction. Identify it is metal or nonmetal.
3. An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or non-metal? Explain with the help of a suitable example.
4. A student set up an electric circuit as shown in Fig. He placed the metal to be tested in the circuit between terminals A and B as shown.



- (i) Does the bulb glow? What does this indicate?
  - (ii) Why are electric wires coated with rubber like materials?
5. Royal water is prepared by mixing two acids 'A' and 'B'. It can dissolve gold and platinum. It is highly corrosive and fuming liquid. Identify 'A' and 'B'. What is the ratio in which 'A' and 'B' are mixed.
  6. Four metals A, B, C and D are, in turn, added to the following solutions one by one. The observations made are tabulated below:

Metal	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Displacement	—	—
B	Displacement	—	No reaction	—
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on above information.

- (i) Which is the most active metal and why?
- (ii) What would be observed if B is added to a solution of copper (II) sulphate and Why?
- (iii) Arrange the metals A, B, C and D in order of increasing reactivity.
- (iv) Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.

(v) Which of the above solutions can be easily stored in a container made up of any of these metals?

7. Nikita took Zn, Al, Cu, Fe, Mg, Na metals & put each metal in cold water and then hot water. She reacted the metal with steam

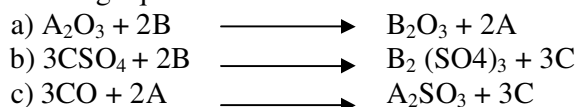
- (i) Name the metal which reacts with cold water.
- (ii) Which of the above metals react with steam?
- (iii) Name the metal which reacts with hot water.
- (iv) Arrange these metals in order of increasing reactivity.

8. A student was given Mg, Zn, Fe, and Cu metals. He put each of them in dil HCl contained in different test tubes. Identify which of them

- (i) will not displace  $H_2$  from dil HCl
- (ii) forms a pale green substance
- (iii) will give  $H_2$  with 5%  $HNO_3$
- (iv) will be displaced from its salt solution by all other metals.

9. A metal 'X' is found in the form of filings which burns vigorously when sprinkle on flame. When these filings are treated with sulphur a black colored compound 'Y' is formed which is not attracted by magnet. 'X' reacts with dil HCl to liberate hydrogen gas. 'X' reacts with steam to form 'Z' along with hydrogen gas. Identify 'X', 'Y', and 'Z'. Write the reaction involved.

10. A, B and C are 3 elements which undergo chemical reactions according to following equations:



Answer of the following:

- i) Which element is most reactive?
- ii) Which element is least reactive?

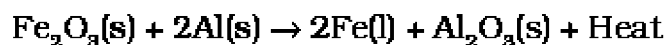
11. An element X on reacting with  $O_2$  forms  $X_2O$ . This Oxide dissolves in water and turns blue litmus paper red. Predict the nature of element whether it is a metal or a non metal.

12 An element E combines with  $O_2$  to form an oxide  $E_2O$ , which is a good conductor of electricity. Answer the following:

- i) How many electrons will be present in the outer most shell of E?
- ii) Write the formula of the compound formed when it combines with Chlorine.

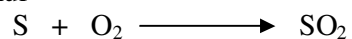
## ANSWERS

Ans 1: Aluminium



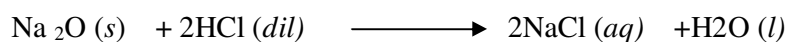
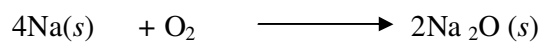
Ans 2:

`X` is sulphur



It is non metal.

Ans 3: It is metal



Ans 4: (i) Yes the bulb glows, this indicates that metal is a good conductor of electricity

(iii) Rubber like substance is a bad conductor of electricity

Ans 5:  $3\text{HCl} + \text{HNO}_3$

Ans. 6 (i) B

(ii) Displacement reaction. Because B is more reactive than Cu.

(iii)  $\text{B} > \text{A} > \text{C} > \text{D}$

(iv) D

(v)  $\text{ZnSO}_4$

Ans.7 (i) Na

(ii) Al, Zn, Fe

(iii) Mg

(iv)  $\text{Na} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Cu}$

Ans8: (i) Cu

(ii) Fe

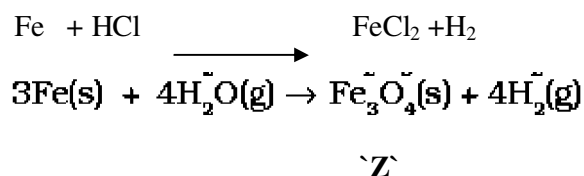
(iii) Cu

(iv) Cu

Ans 9:  $\text{Fe} + \text{S} \longrightarrow \text{FeS}$

`X`

`Y`

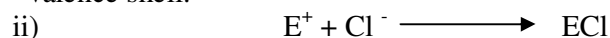


Ans.10 i) Most reactive element is B as it has replaced both A and C from their compounds.

ii) Element C is least reactive as it has been replaced both by A and B.

Ans.11 The oxide is acidic in nature as it has turned blue litmus to red. Hence X is a non metal.

Ans.12 i) Valency of the element E is 1. This means that it has only one electron in the valence shell.



Valency of Cl is 1 and Valency of E is also 1. Therefore the formula will be ECl.

### **MORE QUESTIONS FOR PRACTICE**

Q1. Name 2 metals which are neither ductile nor malleable.

Q2. What happens to the electrical conductivity of a metal when it is heated?

Q3. What is the nature of  $\text{Al}_2\text{O}_3$ ?

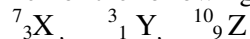
Q4. An alloy of a metal contains Mercury. What will you call it?

Q5. What is the purpose of adding C to molten Iron?

Q6. Who am I?

- a) Versatility is my name. There are more than 5 million compounds of me.
- b) Your teacher uses me, I am a metallic element found in chalk, limestone, marble etc.
- c) Shocking? In one form I am a conductor whereas in another an insulator.
- d) 'Bang'. I am the element formed when  $\text{H}_2$  bomb explodes.

Q7. Which of the following is metal and non metal?



Q8. Name one metal and one non metal element which are obtained on a large scale from sea water.

Q9. Zn is more electropositive than Fe. So it should get corroded faster than Fe. But it does not happen. Instead it is used to galvanize Iron. Explain why does it happen so?

Q10. The reaction of a metal X with  $\text{Fe}_2\text{O}_3$  is highly exothermic and is used to join railway tracks. Identify metal X. Write the chemical equation of its reaction with  $\text{Fe}_2\text{O}_3$ .

Q11. Why do metals generally not evolve  $H_2$  gas when reacted with  $HNO_3$ ? Name 2 metals which liberate  $H_2$  gas with very dil.  $HNO_3$ .

Q12. Name one metal each which is extracted by:

- reduction with heat alone
- reduction with C
- reduction with Al.
- electrolytic reduction.

Q13.a) A metal M is found in nature as  $MCO_3$ . It is used in galvanizing Fe articles. Name the Metal M.

b) How can metal M be obtained from its Carbonate Ore?

Q14. Explain how the following metals are obtained from their compounds by the reduction process.

- Metal X which is low in the reactivity series.
  - Metal Y in the middle of reactivity series.
  - Metal Z which is high in the reactivity series.
- Give an eg of each.

Q15. Write the equations for the reactions of:

- Iron with Steam
- Calcium with Water.
- Potassium with Water.

Q.16. Why Al metal cannot be obtained by the reduction of  $Al_2O_3$  with Coke.

Q17 You cannot hold a piece of Na in your hand but you can eat Na ions in NaCl. Why?

Q18. Cinnabar is an ore of metal X. It exists in the lower order of the reactivity series. Write down the reaction involved in it for the extraction of X.

Q19. Identify the acid which oxidizes  $H_2$  to  $H_2O$ .



## CHAPTER No. 4

### Carbon and its compounds

#### HOTS: (High Order Thinking Skill) Questions with Answers:

1. An organic compound X with a molecular formula  $C_2H_6O$  undergoes oxidation with in presence of alkaline  $KMnO_4$  to form a compound Y. X on heating in presence of Conc.  $H_2SO_4$  at 443K gives Z. which on reaction with  $H_2O$  in presence of  $H_2SO_4$  gives back X. Z reacts with  $Br_2$  (aq) and decolorizes it. Identify X, Y, & Z. and write the reactions involved.

2. An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula  $C_2H_2O_2$ . This compound reacts with ethanol to form a sweet smelling compound 'B'.

(i) Identify the compound 'A'

(ii) Write the chemical equation for its reaction with ethanol to form compound 'B'.

(iii) How can we get compound 'A' back from 'B'?

(iv) Name the process and write corresponding chemical equation.

(v) Which gas is produced when compound 'A' reacts with washing soda?

Write the chemical equation.

3. Hydrocarbon X and Y having molecular formulae  $C_3H_8$  and  $C_3H_6$  respectively. Both are burnt in different spatula on the bunsen flame. Indicate the color of the flame produced by X and Y. Identify X and Y. Write the structural formulae.

4. A compound X has molecular formula  $C_4H_{10}$ . It undergoes substitution reaction readily than addition reaction. It burns with blue flame and is present in LPG. Identify X and give the balanced equation for its combustion and substitution reaction with  $Cl_2$  in presence of sunlight.

5. A compound works well with hard water. It is used for making shampoos & products for cleaning clothes. A is not 100% biodegradable and causes water pollution. B does not work well with hard water. It is 100% biodegradable and does not create water pollution. Identify A & B.

6. An organic compound P with molecular formula  $C_2H_6O$  is an active ingredient of all alcoholic drinks. It is also used in medicines such as tincture iodine, cough syrups. Identify P. Drop a small piece of sodium into the test tube containing P. A new compound Q is formed with the evolution of colorless and odorless gas. Name the gas evolved and compound Q. Write the chemical reaction.

7. A cyclic compound X has molecular formula  $C_6H_6$ . It is unsaturated and burns with sooty flame. Identify X and write its structural formula. Will it decolorize bromine water or not and why?

8. An organic compound A is a constituent of antifreeze and has the molecular formula  $C_2H_6O$ . Upon reaction with alkaline  $KMnO_4$ , the compound A is oxidized to

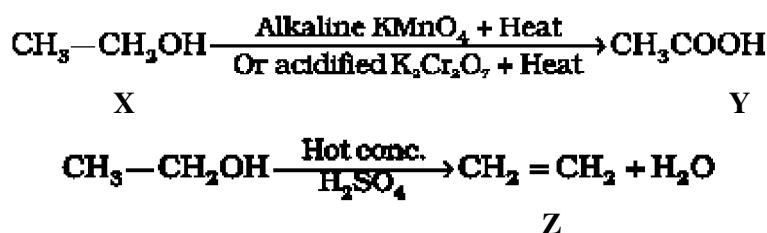
another 'B' with formula  $C_2H_6O_2$ . Identify the compound 'A' and 'B'. Write the chemical equation for the reaction which leads to the formulation of 'B'

9. Two compounds 'X' and 'Y' have the same formula  $C_2H_4O_2$ . One of them reacts with sodium metal to liberate  $H_2$  and  $CO_2$  with  $NaHCO_3$ . Second one does not react with Na metal and  $NaHCO_3$  but undergo hydrolysis with  $NaOH$  to form salt of carboxylic acid and compound 'Z' which is called wood spirit. Identify 'X', 'Y', and 'Z' and write chemical equation for the reaction involved.

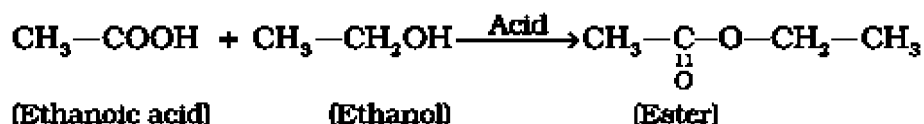
10. A compound 'X' with molecular formula  $C_2H_4$  burns with a sooty flame. It decolourise bromine water. Identify 'X'. Will it dissolve in water or not? Will it conduct electricity in aq. Solution? Will it have high melting point or low melting point ?

### Answers

Ans 1.



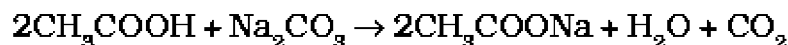
Ans 2.



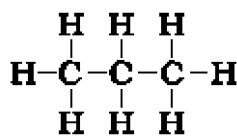
(iii) Esters react in the presence of an acid or a base to give back the alcohol and carboxylic acid.



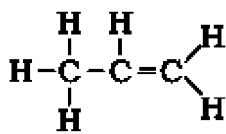
(v)  $CO_2$



Ans 3: 'Y' will burn with a sooty flame. So it is an unsaturated hydrocarbon.

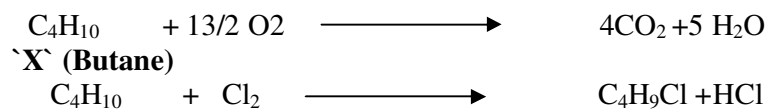


Propane (X)



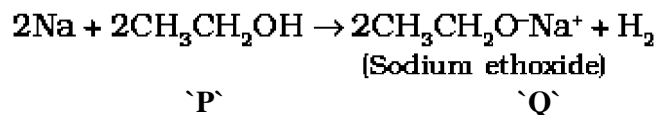
Propene (Y)

Ans 4:

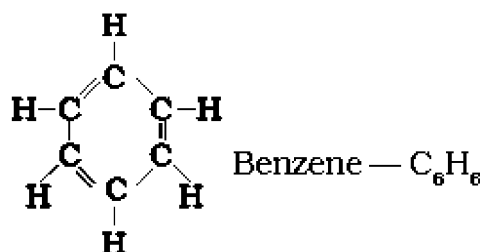


Ans 5 A is detergent & B is soap.

Ans 6:



Ans 7:

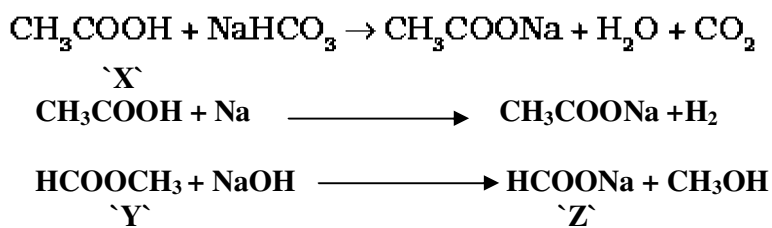


It does not decolorize bromine water because it does not undergo addition reaction.

Ans 8:



Ans 9:



Ans 10:

\`X` is ethene. It will neither dissolve in water nor conduct electricity because it is a covalent compound. It has low melting point.

### PRACTICE QUESTIONS

1. Write the formula for 'ethanoic acid' and name the functional group present in it.
2. Allotropy is a property shown by which class:-  
Substances, elements, compounds, mixture.
3. What is the use of oxyacetylene flame?

4. Name the gas which is formed by decomposition of plants and animal matter in marshy areas?
5. Mention the name of the by product of soap industry/
6. Write the molecular formula and structures of benzene.
7. Match the following:-
  1. Ethane - Used in anti freeze solution.
  2. Ethanol - fruity smell.
  3. Ester - fossil fuel.
8. Write two uses of fullerenes.
9. Complete and balance following equation:-
  - a)  $\text{CH}_2=\text{CH}_2 + \text{H}_2 \xrightarrow{\text{heat, Ni}}$
  - b)  $\text{CH}_4 + \text{O}_2 \longrightarrow$
10. Two alkanes A and B have 4 and 6 carbon atoms respectively in their molecule. In which physical state will they occur at room temp?
  - 1) Give a test that can be used to differentiate chemically between butter and cooking oil.
  - 2) How will you distinguish between ethanol and ethanoic acid by a suitable chemical test? Write chemical reactions involved.
  - 3) Complete the following reactions :-
    - 1)  $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \longrightarrow \xrightarrow{\text{conc. H}_2\text{SO}_4}$
    - 2)  $\text{HCOOH} + \text{CH}_3\text{OH} \longrightarrow$
    - 3)  $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \longrightarrow$
  - 4) Name the compound  $\text{CH}_3\text{COOC}_2\text{H}_5$ . Name the acid and alcohol from which it is made .write equation.

## CHAPTER – 5

### PERIODIC CLASSIFICATION OF ELEMENTS

#### **HOTS: (High Order Thinking Skill) Questions with Answers**

- Q-1 X, Y and Z are the elements of a Dobereiner's triad. If the atomic mass of x is 7 and that of z is 39, what should be the atomic mass of y?
- Q-2 A and B are the two elements having similar properties which obey Newland's law of octaves. How many elements are there in between A and B?
- Q-3 The following is Newland's Octave Table. Observe it and answer the following questions:

sa(do)	re(re)	ga (mi)	ma (fa)	pa(so)	da ( la)	ni(ti)
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co and Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce and La	Zr	-	-

- Which of the element in 1st column has different properties from rest of the elements?
  - Which of the elements resemble with each other in second column?
  - Pick up odd element in second last column.
  - Pick up elements which have similar properties in last column.
- Q-4 In the Periodic Table given below, Lithium, carbon, oxygen and neon are placed in their correct positions and the positions of nine other elements are represented by letters. These letters are not the symbols for the elements?

1	2	13	14	15	16	17	18
Lithium			Carbon		Oxygen	L	Neon
X			E		G	Q	
Y						R	
Z						T	

By reference to the table, answer the following questions:

- Give the letter of the most reactive metal.
- Give the letter of the most reactive non-metal.
- Name the family of elements represented by L, Q, R, and T.
- Name one element in each case occurring in groups 2, 13 and 15

Q-5 Two elements X and Y have atomic numbers 12 and 16 respectively. Write the electronic configuration for these elements. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why?

Q-6 An element X (2,8,2) combines separately with  $\text{NO}_3$  and  $(\text{SO}_4)_2^-$ ,  $(\text{PO}_4)_3^-$  radicals. Write the formulae of the three compounds so formed. To which group of the periodic table does the element 'X' belong? Will it form covalent or ionic compound? Why?

Q-7 The following table shows the position of six elements A, B, C, D, E and F in the periodic table.

Groups	1	2	3 to 12	13	14	15	16	17	18
Periods									
2.	A					B			C
3.		D			E				F

Using the above table answer the following questions :

- Which element will form only covalent compounds?
- Which element is a metal with valency 2?
- Which element is a non-metal with valency of 3?
- Out of D and E, which one has a bigger atomic radius and why?
- Write a common name for the family of elements C and F.

Q-8 The diagram below shows part of the Periodic Table

	1	2	3										4	5	6	7	
0																	
	Na															Cl	Ar

The position of three elements in the Periodic Table is shown:

- Write the atomic numbers of the elements.
- Give the electronic distribution of the elements
- Using these three elements as examples, describe the trend in chemical properties across the third period of the Periodic Table.

Q-9

Group	I	II	III	IV	V	VI	VII	VIII
Oxide	R <sub>2</sub> O	RO	R <sub>2</sub> O <sub>3</sub>	RO <sub>2</sub>	R <sub>2</sub> O <sub>5</sub>	RO <sub>3</sub>	R <sub>2</sub> O <sub>7</sub>	RO <sub>4</sub>
Hydride	RH	RH <sub>2</sub>	RH <sub>3</sub>	RH <sub>4</sub>	RH <sub>3</sub>	RH <sub>2</sub>	RH	
Periods	A B	A B	A B	A B	A B	A B	A B	
1	H							
2	Li	Be	B	C	N	O	F	
3	Na	Mg	Al	Si	P	S	Cl	
4. First Series:	K	Ca	Sc	Ti	V	Cr	Mn	Fe Co Ni
Second Series:	Cu	Zn	Ga	Ge	As	Se	Br	
5 First Series:	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru Rh Pd
Second Series:	Ag	Cd	In	Sn	Sb	Te 127.90	I 126.90	
6 First Series:	Cs	Ba	La	Hf	Ta	W		Os Ir Pt
Second Series:	Au	Hg	Tl	Pb	Bi			

- (a) Write the formula of hydride and oxide of silicon
- (b) Name the elements which is in
- II group and 4<sup>th</sup> period
  - VI group and 3<sup>rd</sup> period.
- (c) Name the elements in group I which do not resemble with alkali metals
- (d) In group VI why does Te with atomic mass 127.60 comes before I with atomic mass 126.90

Q 10. A metal M forms an oxide having the formula M<sub>2</sub>O<sub>3</sub>. It belongs to 3<sup>rd</sup> period in the modern periodic table. Write the atomic number and valency of the metal.

## Answers

Ans 1  $\frac{(7 + 39)}{2} = 46/2$

$y = 23.$

Ans 2 Six elements.

- Ans 3: (a) Co & Ni  
(b) Li, Na, K  
(c) Mn  
(d) O, S, Se

Ans 4 (a) Z, (b) L, (c) Halogen family, (d) Mg(group-2), Al (group-13), N (group-15)

Ans 5: X (Z=12): 2, 8, 2

Y (Z=16): 2, 8, 6

Both these elements are present in third period. An ionic bond is formed between X & Y as a result of transfer of two electrons from X to Y

Ans 6: X (NO<sub>3</sub>)<sub>2</sub> : XSO<sub>4</sub> X<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>

X belong to second group . X forms ionic compound because by losing two electrons X achieve the electronic configuration of Noble gas element Neon.

Ans 7:

- (a) E, (b) D, (c) B, (d) D, because the atomic size decreases along a period,  
(e) Noble Gases.

Ans 8:

(a) Na = 11

Cl = 17

Ar = 18

(b) Na ( 2,8,1) Cl ( 2,8,7) Ar ( 2,8,8,)

(c) Metallic and reducing character decreases.

Ans.9 (a) SiO<sub>2</sub>, SiH<sub>4</sub>

(b) (i) Ca,Zn

(ii) S

(c) H

(d) The sequence was inverted so that elements with similar properties could be grouped together

Ans 10. Atomic number = 13

Valency = 3



## PRACTICE QUESTIONS

- Q-1 State the modern periodic law
- Q-2 which of the two elements  
A=2,8,1      B= 2,8,8,1      is more electropositive
- Q-3 How does the atomic size vary in going from  
A) Left to right in a period  
B) Top to Bottom in a group
- Q-4 An element has atomic number 13. In which group and period it should be placed?
- Q-5 How many periods and groups are there in the long form of P.T?
- Q-6 Why does the size of the atoms progressively become smaller when we move from sodium (Na) to chlorine (Cl) in the third period of the periodic table ?
- Q-7 Give symbols for  
A. A metal of group 2.  
B. A metal of group 13.  
C. Two non metals of group 16.  
D. Most reactive non- metal of group 17.
- Q-8 Explain Why-  
1. All the elements of a group have similar chemical properties.  
2. All the elements in a period have different chemical properties.
- Q-9 The atomic number of an element X is 17. Predict -  
A. Its valency.  
B. Nature of the elements.  
C. Whether it is metal or non – metal.  
D. Name of the element.  
E. Relative size with respect to other members of its group.
- Q-10 The three elements predicted by Mendeleev from the gaps in his periodic table were known as eka- boron, eka- aluminum, eka- silicon. What names were given to these elements when they were discovered later on?
- Q-11 The atomic numbers of Nitrogen, Oxygen and fluorine are 7, 8, and 9 respectively. Write the electronic configuration of each element and answer the following:  
(a) Out of N, O and F which is most electronegative and which one is least electronegative?  
(b) What is the number of valence electrons of F?  
(c) What is the valency of each of N, O and F?

## CHAPTER-6

### LIFE PROCESSES

#### SOLVED QUESTIONS

- (1) Due to availability of less water, how does the plant cope up with lack of water in desert conditions?
- (2) After a vigorous exercise, you may experience cramps in your leg muscles. Why does this happen?
- (3) What will happen if carbon monoxide combines with haemoglobin?
- (4) Food moves down the gut by peristalsis. Which region of brain controls peristalsis?
- (5) Name the pigment present in plants, which can absorb solar energy.
- (6) Name the respiratory organs of (i) fish (ii) mosquito (iii) earthworm.
- (7) Which of the four chambers of the human heart has the thickest muscular walls?
- (8) What will be the outcome if a farmer floods his field everyday?
- (9) Which part of visible spectrum is absorbed by chlorophyll pigments?
- (10) How does respiration in plants differ from that in animals?
- (11) Name the cartilaginous flap which closes the glottis to check the entry of food into it during swallowing.
- (12) Which equipment is used to facilitate breathing during serious breathing problems?
- (13) Chloroplast are called energy convertors. Explain.
- (14) Why is the rate of breathing much faster in aquatic organisms than those of terrestrial organisms?
- (15) Why are glomeruli considered as dialysis bags?
- (16) Autotrophs synthesise food for the living world. Justify this statement in one sentence only interconnecting autotrophs and heterotrophs.
- (17) Veins and arteries carry blood. Which of these carry blood?
  - a) Away from the heart?
  - b) Back to the heart?
- (18) Which of the organs perform the following functions in humans?
  1. Absorption of food.
  2. Absorption of water
- (19) Name the areas in a woody stem through which respiratory exchange of gases take place.
- (20) Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets?
- (21) A certain tissue in a green plant somehow get blocked and the leaves wilted. What was the tissue that got blocked?
- (22) Write one feature which is common to each of the following pairs of the term/organs.
  - i) glycogen and starch
  - ii) chlorophyll and haemoglobin
  - iii) gills and lungs
  - iv) arteries and veins.
- (23) Why doesn't the lungs collapse even after forceful expiration?
- (24) The two openings of the pharynx, one leading to trachea and the other leading to oesophagus, lie very close to each other. Yet food we swallow normally does not enter into our trachea. Why?

- (25) How would it affect the digestion of proteins and carbohydrates if the duodenum of man if there is a blockade in the pancreatic duct?  
(26) What do you mean by double circulation of blood?  
(27) "If there were no algae there would be no fish in the sea". Comment.

(28) Write the functions of the following in the digestive process:

- (i) Bile
- (ii) Bicarbonate secreted by the duodenal wall.
- (iii) Pancreatic amylase.

(29) Why is the process of diffusion insufficient to meet the oxygen requirement of human beings?

(30) Draw a diagram of human alimentary canal showing duodenum, small intestine, liver and pancreas.

(31) Draw a diagram of the human urinary system and label in it.

- a. Kidney
- b. Ureter
- c. Urinary Bladder
- d. Urethra

### ANSWERS

Ans-1) They open their stomata at night and stomata remain closed during day time, to conserve moisture.

Ans-2) The sudden build up of lactic acid in our muscles during vigorous, exercise, causes muscular cramps in our leg muscles.

Ans-3) If the haemoglobin binds with carbon monoxide strongly, the oxygen will not be carried with blood leading to death of the organism.

Ans-4) Medulla of hind brain.

Ans-5) Chlorophyll.

Ans-6) Fish - gills

Mosquito – Trachea (air tubes)

Earthworm – moist skin

Ans-7) Right ventricle.

Ans-8) Respiration of plants will be affected because the oxygen present in the interspaces of the soil will be replaced by water.

Ans-9) Blue and Red light

Ans-10) In plants, all parts like the root, stem, leaves, etc., perform respiration individually., while in animals, either the general body surface or specific organs like the skin, gills, lungs, etc., are involved in respiration. The rate of respiration is much slower in plants than in animals. Unlike animals, there is little transport of gases from one part of the plant to another.

Ans-11) Epiglottis

Ans-12) Ventilator

Ans-13) Chloroplasts are called energy convertors because they trap the solar energy and convert it into chemical energy.

Ans-14) The aquatic organisms obtain oxygen dissolved in water. As compared to air, the availability of oxygen in water is fairly low. Hence, the aquatic organisms have to breathe faster as compared to the terrestrial organisms.

Ans-15) The main function performed by the glomeruli is selective filtration. They filter small molecules containing glucose, salts, urea, and liquid serum. Etc. The large molecules such as proteins remain in blood. Thus, glomeruli of the kidneys function as dialysis bags.

Ans-16) The food producers are autotrophs and all the heterotrophs consume the food produced by the autotrophs directly or indirectly.

Ans-17) a) Arteries carry blood away from the heart.

b) Veins carry blood back to the heart.

Ans-18)

1. Absorption of food takes place in small intestine.
2. Large intestine

Ans-19) In woody stem, the bark has lenticels for gaseous exchange.

Ans-20) The acid is formed in the mouth after a sugary food (chocolates and sweet) has been taken. This acid lowers the pH in the mouth. Tooth decay starts when the pH of acid formed in the mouth falls below 5.5. This is because then the acid becomes strong enough to attack the enamel of our teeth and corrode it.

Ans-21) The tissue that got blocked may be xylem. It is through the xylem that water and minerals absorbed by roots from the soil are transported to the leaves and other parts of the plant. So, if xylem is blocked, the leaves will not get the nourishment and will get wilted.

Ans-22)

- i) Carbohydrate (food)
- ii) Pigments.
- iii) Respiratory organs.
- iv) Blood vessels.

Ans-23) Even after forceful expiration to the maximum capacity, some amount of air remains in the lungs, known as residual volume. So, the lungs doesn't collapse even after forceful expiration.

Ans-24) The food does not enter into trachea because during swallowing, the aperture leading to trachea (glottis) gets covered by a cartilaginous flap called epiglottis and the food has no other passage except going into the oesophagus.

Ans-25) Duodenum is the region where the pancreatic juice secreted by the pancreas enters. The enzymes pancreatic amylase and trypsin helps in the digestion of carbohydrates and proteins. Thus, if there is a blockade, the digestion of carbohydrates and proteins gets affected.

Ans-26) Blood passes through the heart twice for each cycle of the body.

Ans-27) Algae produce  $O_2$  as a result of photosynthesis. This oxygen is utilised by the fishes in the sea for carrying out respiration. If there were no algae, no oxygen would have been produced. Thus, fishes might have died.

Ans-28)

1. Bile: It is secreted by the gall bladder and it emulsifies the fats into the smaller droplets for their easy digestion.
2. It provides alkaline medium in the duodenum which is needed for the action of pancreatic enzymes of different food components for their digestion.
3. Pancreatic amylase enzyme digests starch and changes it into maltose.

Ans-29) The process of diffusion for carrying  $O_2$  to all parts of the body is not sufficient for larger multicellular organisms like human beings. Hence, respiratory pigment haemoglobin takes up oxygen from the air and carry it to all the parts of our body through blood.

Ans-30) Textbook Page No. 99, Figure 6.6

QUESTION BANK FOR PRACTICE

1. Which fluid in the human body wets the internal organs?
2. Where does the blood absorb oxygen in the human body?
3. Name the two parts of the plant through which gaseous waste products are released into the air?
4. Why do the walls of the trachea not collapse when there is less air in it?
5. Normally a vein opens into a large vein or into the heart but does not end in capillaries. Which one or more veins in humans is/are exceptions to this rule?
6. Give reason for – The lung alveoli are covered with blood capillaries.
7. Why is blood called liquid connective tissue?
8. Structure of leaf is complementary to its functions. Explain.
9. Bile juice does not contain any digestive enzymes, yet it is essential for digestion, why so? Explain.
10. How do each of the following factors affect the productivity in the process of photosynthesis?
  1. Temperature.
  2. Water.
  3. Carbon dioxide.
11. Why is it necessary to separate oxygenated and deoxygenated blood in living organisms?
12. What substance/substances are transported in plants by
  - (1) Xylem vessels and tracheids?
  - (2) Sieve tubes (of phloem)?
13. Why is the inner wall of alimentary canal not digested although the digestive enzymes  
can digest all the materials that make cells?
14. Explain why the rate of photosynthesis in plants is low both at low and high temperatures?
15. Why is CO<sub>2</sub> mostly transported in the dissolved form in our blood than O<sub>2</sub>?
16. Small intestine is the site for complete digestion of carbohydrates, proteins and fats. Write down the changes that happen to the food in the small intestine before its absorption.
17. Plants absorb water from the soil. How does this water reach the tree tops?  
Explain in detail.
18. Where does aerobic breakdown of pyruvate take place in a living cell? What are the end products?
19. Hydrochloric acid creates an acidic medium which facilitates the action of protein-digesting enzyme in the stomach. Name the enzyme and give any three other functions served by the acid.
20. Why is anaerobic respiration produce less energy compared to aerobic respiration?
21. What is root pressure?
22. In which direction does lymph flow?
23. Name the organ system which is responsible for excretion and osmoregulation?

24. What is the composition of lymph?
25. Differentiate between afferent and efferent arterioles?
26. Name the vestigial part of human alimentary canal.
27. Name the respiratory pigment of blood in mammals.
28. How does oxygen reach the cells in insects?
29. Respiration is a vital process for all organisms. Explain.
30. What will happen if a diaphragm of a person gets ruptured in an accident?
31. What is the source of oxygen in photosynthesis?
32. How would non-secretion of hydrochloric acid in our stomach affect food digestion?
33. Why does leaf appear green?
34. What is the role of light in photosynthesis?
35. Write about the major glands associated with the alimentary canal of man and mention their functions.
36. How does the butter in your food get digested and absorbed in the body and explain.
37. Why is the rate of photosynthesis more during a bright sunny day as compared to a cloudy day?
38. If all the green plants are removed from the earth life cannot be sustained. Comment.
39. Why is digestion essential for living beings?
40. Draw a diagram to show the internal structure of human heart. Label 6 parts in all including at least three valves.

## CHAPTER-7

### CONTROL AND COORDINATION

#### HOTS: (High Order Thinking Skill) Questions with Answers:

- Q.1) On touching a hot plate, you suddenly withdraw your hand. Which category of neurons became active first and which one next?
- Q.2) Give one example of plant part.
- Which is positively hydrotropic as well as positively geotropic.
  - Which is positively phototropic but negatively geotropic.
- Q.3) What name is given to the microscopic gap between two adjacent neurons?
- Q.4) If we step on something sharp accidentally we move our foot away at once .what is this type of response known as?
- Q.5) A part of the hind brain makes possible activities like walking, skating, riding a bicycle and picking up a pencil.name this part of the hind brain.
- Q.6) The neck of a person appears to be swollen.
- Name the disease this person suffering from.
  - Name the mineral whose deficiency in the diet causes this disease.
- Q.7) Name the plant hormone:
- which inhibits growth and causes wilting of leaves.
  - which promotes cell division.
- Q.8) Taking the example of heart beat, justify the antagonistic action of the sympathetic and the parasympathetic nerves.
- Q.9) Why is abscisic acid known as stress hormone in plants?
- Q.10) Name the part of neuron
- where information is acquired.
  - through which information travels as an electrical impulse.
- Q.11) How does the plant shoot bends, when the plant is placed in a room having only one open window?
- Q.12) Who transmits nerve impulse across the synapse?
- Q.13) Give a reason to explain why
- adrenaline helps in dealing emergency situations?
  - secretions of growth hormone should be specific in the human body?
- Q.14) Why do leaves drop off seasonally?
- Q.15) Give reason why endocrine glands release their secretions into the blood?

#### ANSWERS

Ans.1) On touching a hot plate, first the sensory neurons are activated, which take the information to the brain or the spinal cord. Next, the motor neurons become active and bring the impulses from the brain to the muscles. In receiving these impulses, the muscles contract, and the hand is immediately removed from the hot plate.

Ans.2) a. roots

b. stem

Ans.3) Synapse

Ans.4) Reflex action

Ans.5) Cerebellum

Ans.6) a. Goitre

b. Iodine

Ans.7) a. Abscisic acid.

b. Cytokinins.

Ans.8) Sympathetic system increases contraction and rhythm and parasympathetic system decreases contraction and rhythm with respect to heart beat.

Ans.9) Abscisic acid in a plant hormone which inhibits growth. Its effects include wilting of leaves.

Ans.10) a. Dendrite

b. Axon

Ans.11) When the plant is placed in such a room that has only one open window, the shoot of the plant bends towards the direction of light. Plant hormone auxin is formed that diffuses towards the shady side of the shoot and stimulates the cells to live longer on the side of the shoot which is away from light. In this way the shoot bends towards the light.

Ans.12) Neurotransmitters.

Ans.13) a. Adrenaline increases the heart beat and breathing rate which results in the supply of more oxygen to muscles. It reduces the blood to the digestive system and skin, as a result the blood is further diverted to skeletal muscles. All these responses together prepare the body to deal with the emergency situations.

b. If growth hormones is secreted in excess during childhood then it leads to gigantism while the less secretion of this hormone during childhood causes dwarfism.

Ans.14) The leaves drop off seasonally as they stop producing auxins, which normally prevents the formation of abscission zone that cuts off nutrients and water supply to leaves.

Ans.15) Endocrine glands are ductless glands and their products have to act at a distant site.

Therefore, they release their secretions into the blood.

### **QUESTION BANK FOR PRACTICE**

Q1. A particular hormone requires Iodine for its synthesis .Name the endocrine gland which secretes this hormone and state it's location in the human body.

Q2. Write a term for the chemical substance which brings about control and coordination in plants?

Q3. What is the apical dominance?

Q4. Name the organ associated with the nervous system which is also part of endocrine system and secretes hormone.

Q5. Why are hormones called informational molecules?

Q6. Why do leaves of "touch me not" plant droops when we touch it?

Q7. Name the structural and functional unit of nervous system.

Q8. What is the difference between the manner in which movement in the sensitive plant and movement in our legs takes place?

Q9. Why do people in the mountainous regions get goitre?

Q10. What is a synaptic cleft?

Q11. What are the scientific names for the following receptors in humans?

a) Receptors of smell

b) Receptors of taste

Q12. Which hormone is responsible for the development of moustache and beard in men?

Q13. How do we detect the smell of an agarbatti?

Q14. Why do stem and root show unilateral growth towards light and gravity of earth respectively?



- Q15. Which part of the brain controls involuntary actions such as blood pressure, salivation and vomiting?
- Q16. Justify that the pancreas and gonads perform dual function.
- Q17. Why are some patients of diabetes treated by giving injections of insulin?
- Q18. Pituitary gland is often called as master gland. Why?
- Q19. How can thyroid activity be determined in man?
- Q20. Do the plants have nervous plants like animals? If not, how control and coordination takes place in plants?
- Q21. Nervous and hormonal systems together perform the function of control and coordination in human beings. Justify the statement.
- Q22. Which hormone is released into blood when its sugar level rises? Name the organ which produces the hormone and its effect on blood sugar level. Also name one digestive enzyme that this organ secretes and the function of this enzyme
- Q23. Describe how auxins are related with the bending of shoots towards the source of light.
- Q24. Define nerve impulse. Which structure in a neuron helps to conduct a nerve impulse:
- a. Towards the cell body.
  - b. Away from the cell body.

## CHAPTER-8

### HOW DO ORGANISMS REPRODUCE?

#### HOTS: (High Order Thinking Skill) Questions with Answers:

- Q.1) Why is variation beneficial to the species but not necessary for the individual?
- Q.2) What is the advantage of reproduction through spores in the case of Rhizopus?
- Q.3) The simple animals such as planaria can be cut into number of pieces and each piece grows into a complex organism. What is this process known as?
- Q.4) Name the unicellular organism which caused the disease known as kala-azar.
- Q.5) Which process taking place in the nucleus of a cell leads to variation in the offspring during reproduction?
- Q.6) What causes joining up of stock and scion in grafting technique of vegetative propagation in plants? Define the terms stock and scion. Name one positive trait each of the plant contributing scion and stock should have.
- Q.7) Which type of layering is done in Jasmine?
- Q.8) Where does fertilization takes place in human female?
- Q.9) Why is it said that “sexual reproduction promotes diversity of characters in the offsprings”?
- Q.10) What happens if the fallopian tubes are partially blocked and the ovulated eggs are prevented from reaching the uterus?
- Q.11) Name the causative organism of syphilis and gonorrhoea.
- Q.12) Why are variation possible in progeny of sexually reproductive individuals?

#### ANSWERS

- Ans-1) Variation is beneficial to the species as it enables a species for its survival. A favourable variation makes an organism to live better in a changed environment and an unfavourable variation will not. So it is not necessarily true that a variation is beneficial to the individual always.
- Ans-2) The spores are covered by thick walls that protect them until they come into contact with aother moist surface and can begin to grow.
- Ans-3) Regeneration
- Ans-4) Leishmania
- Ans-5) DNA copying
- Ans-6) The stock and scion unite due to cambial cavity. **Stock** is the portion on which grafting is done and it provides the roots. **Scion** is the portion of the plant which is grafted on the other plant and it contributes the stem. The plant contributing scion should have large sized fruits and the plant contributing stock should have deep root system.
- Ans-7) Air Layering (Gootee)
- Ans-8) Oviduct (fallopian tube)
- Ans-9) It is because sexual reproduction results from the fusion of two gametes coming from two different and sexually distinct individuals. This leads to variation, is necessary for evolution.
- Ans-10) Fertilization may take place but the zygote may develop in the tube instead of uterus.
- Ans-11) Treponema pallidum and Nisseria gonorrhoeae.

Ans-12) Variations are possible in progeny of sexually reproductive individuals because copy of DNA in newly formed cell is not identical to copy DNA of original cell.

### **QUESTION BANK FOR PRACTICE**

- Q1) Name those parts of the flower which serve the same function as the following do in the animals  
(1) Testes (2) Ovary (3) Eggs (4) Sperms
- Q2) 'Malarial parasite' divides into many daughter individuals simultaneously by multiple fission state an advantage the parasite gets because of this type of reproduction.
- Q3) Is copy of DNA formed identical to original cell? If yes or no, how is it beneficial to a species?
- Q4) An individual may have a good health even when the whole of reproductive system is removed. What is the function of the reproduction system then?
- Q5) Grafting is a common method of obtaining a superior plant from two different plants. Explain.
- Q6) The buds produced in the notches along the leaf margins of Bryophyllum plant fall on the soil and develop into new plants. Which type of reproduction is this?
- Q7) What is the name of the yellow powdery substance present in the anther of a flower.
- Q8) What substances are contained in oral pills used as contraceptives.
- Q9) Which life process ensures that a plant or animal species will not disappear from the earth?
- Q10) Fertilization is possible if ovulation has taken place during middle of the menstrual cycle. Give reasons.
- Q11) Why is the female reproductive system more complex than the male reproduction system?
- Q12) A potato is cut into a number of small pieces, these potato pieces are placed on wet cotton kept in a tray. After a few days, green shoots and roots appear only from some potato pieces and not from all potato pieces why?
- Q13) What is the significance of human testis being located in the scrotum?
- Q14) How the surgery methods are misused by people to prevent pregnancy?
- Q15) Why is the number of sperms produced always more than the number of eggs produced?
- Q16) DNA copies generated will be similar but may not be identical to the original. Explain.
- Q17) After fertilization, name the part in each case which develops into  
(a) the fruit (b) the seeds.
- Q18) What is meant by implantation in human reproductive system.
- Q19) Justify why the male reproductive system is called "urinogenital system".
- Q20) Justify that parthenogenesis is not the same as asexual reproduction.
- Q21) State the advantages of tissue culture in growing plants.
- Q22) What is meant by internal fertilization and external fertilization? Explain with examples.
- Q23) Mention any two functions of human ovary.
- Q24) What is the significance of syngamy and triple fusion?
- Q25) (a) Draw the diagram showing the germination of pollen on the stigma. Label style, male germ cell, ovule and female germ cell.  
(b) What happens to the following parts of a flower after fertilization:

- (i) Ovule
- (ii) Zygote
- (iii) Ovary

Q26) Name the following structures:

- a. Primary sex organs in man and women.
  - b. Reproductive parts of a flower.
  - c. A barrier method of birth control used by human.
- (Q27) What is proliferative phase during menstrual cycle?

## CHAPTER – 9

### HEREDITY AND EVOLUTION

#### HOTS: (High Order Thinking Skill) Questions with Answers:

1. How one is change adopted to perform different functions? Give one example
2. What happened when Mendel crossed two traits of a character in a pea plants?
3. Who provided experimental evidence to support theory of origin of life from inanimate matter?
4. Why are asexually reproducing organisms capable of showing hereditary features?
5. If the sperm bearing Y-chromosome fertilizes the egg, the child born will not be entirely like his father. Why is it so?
6. A normal pea plant bearing colored flowers suddenly start producing white flowers. What could be the possible cause?
7. Mention any two recessive traits of garden pea.
8. Write the characteristics on the basis of which duck-billed platypus is considered as a link between reptiles and mammals.
9. Why are the small number of surviving tigers a cause of worry from the point of view of genetics?
10. What is called phylogenetic system of classification?
11. Is it true that when a new species is emerged, the old species is eliminated and why?
12. What will be the percentage of ab gametes produced by AaBb parent?
13. Mendel crossed a pure white recessive pea plant with a dominant pure red flowered plant. What will be the first generation of hybrids?
14. In evolutionary terms, which among-bacteria, spider, fish and chimpanzee have a “better” body design? Why or why not?
15. What is an offspring?
16. Why are traits acquired during life-time of an individual not inherited?
17. Name the chemicals which were essential for origin of life.
18. Why males are called heterogametic?
19. What is the percentage possibility a couple of having daughters?
20. Name 2 organisms in which sex determination is regulated by environmental factors.
21. What are inherited traits? Give one example.
22. When Mendel crossed a Tall plant with a dwarf plant, no medium height plants were obtained in F<sub>1</sub> generation. Why?
23. The gene type of green stemmed tomato plants is denoted as GG and that of purple stemmed tomato plants as gg when these two are crossed.
  - i. What colour of stem would you expect in F<sub>1</sub> progeny?
  - ii. Give the percentage of purple stemmed plants if F<sub>1</sub> are self pollinated.
  - iii. In what ratio would you find the gene types Gg and gg in the F<sub>2</sub> progeny?
24. The human hand, cat paw and horse foot when studied in detail show the same structure of bones and point towards a common origin.
  - i. What do you conclude from this?
  - ii. What is the term given to such structures?
25. What are the causes of variations in clones?

26. How do we know how old a fossil is?

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

Parental plants cross fertilised and seeds collected	F1 First Generation offsprings	F2 Offsprings of self pollination of F1
Male parents always bare red flowers. Female parent always had white flowers.	330 seeds sown and observed. All 330 gave red flowers.	Out of 44 seeds 33 seeds gave plants with red flowers and 11 seeds gave plants with white flowers.

i. What is the term for this type of cross?

ii. What does the data of the column marked F<sub>1</sub> indicate?

iii. Express the gene type of the (a) parents (b) F<sub>1</sub> progeny and (c) F<sub>2</sub> progeny

28. Only variation that confer and advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

### ANSWERS

1. In evolution, one change occurred initially is used to perform other functions. For example, feathers were evolved for warmth, later they were adapted for flight.
2. Only dominant trait appeared in F<sub>1</sub>
3. Miller and Urey
4. Asexual reproduction tends to preserve the similarities among all the individuals belonging to a give line of descent. Therefore, asexually reproducing organisms are capable of showing hereditary features.
5. It is so because the other sex chromosome, ie the X-chromosome will also have its effects and other autosomes of the egg will also show their characteristics.
6. The appearance of white flowers is due to mutation.
7. Dwarf (height of plant), wrinkled seed
8. The characteristic resembling reptiles is laying of eggs and the characteristics resembling mammals is presence of mammary glands.
9. As the population of tigers is decreasing, there is loss of genes from the gene pool and there can't be recombinations and variations, thus no evolution.
10. Classification based on evolutionary relationships of organisms.
11. No, it is not true that when a new species is emerged, the old species is eliminated. Because when there is a change in any species, the change is only in a part or a few members of the species population. If the newly generated species after genetic change is better in any way, it will get more opportunity to survive and if the genetic change is against the environment, it will die. Thus, unchanged members of other species may also remain and tend to live in changed environment.
12. 25 percent
13. All red
14. Chimpanzee have the better body design as compared to others given. They are better adapted for locomotion, communication and thinking.
15. In sexual reproduction organisms raised are as a result of crossing over and exchange of gene segments and are known as offspring.

16. Traits acquired during life-time of an individual not inherited because change in non-reproductive tissue or somatic cells cannot be passed on to the DNA of germ cells. Thus, the acquired trait will die with the death of the individual. It is therefore non-heritable and cannot be passed on to its progeny.
17. Proteins and nucleic acid
18. Because they have dissimilar sex chromosomes.
19. 50 percent
20. Turtle, lizard
21. The characteristics which are transmitted from parents to their offsprings are called inherited traits. E.g. free and attached earlobes.
22. Because dominant genes express themselves and suppress the effect of recessive genes. So no medium sized plants were obtained.
23.
  - i. Colour of F1 progeny – Green
  - ii. Percentage of purple stemmed plants in F2 generation  $\frac{1}{4}$  or 25%.
  - iii. Ratio of genotypes GG and Gg 1:2
24. They have a common ancestry (i)Homologous organs
25.
  - i. inaccuracies during DNA copying
  - ii. Effect of environment termed acquired variation.
  - iii. Mutations are sudden stable changes which are discontinuous inheritable as produced due to changes in genetic make-up.
26. There are two methods:
  - i. Relative method when we dig into the earth, the fossils we find closer to the surface are more recent than the fossils we find in deeper layers.
  - ii. By detecting the ratios of different isotopes of the same element in the fossil material.
27.
  - i. Monohybrid cross
  - ii. Red colour of flower dominant over white flower
  - iii.
    - a. Parents – (RR) and (rr)
    - b. F1 progeny – Rr
    - c. F2 progeny – RR, Rr and rr
28. We agree with the statement.  
All the variation do not have an equal chance of surviving in the environment in which they find themselves. The chances of surviving depend on the nature of variation. Different individuals have different kind of advantages. A bacteria that can withstand heat will survive better in heat wave.

### **QUESTION BANK FOR PRACTICE**

1. What name is given to a sequence of gradual changes over millions of year in which new species are produced.
2. Which are the two processes, sexual reproduction or asexual reproduction brings about marked variations in the offspring?
3. In which gametes are present X and Y chromosomes?
4. Name two processes which change the frequency of certain genes over generation in a population.
5. Explain with examples how characteristics of a population changes over the years for the following situations.

- a. To gain survival advantage   b. due to accidental survival   c. Temporary change of characteristics
6. How will you substantiate the statement that heredity and its concepts were known to the ancient civilisations.
  7. How many autosomes are present in a human sperm?
  8. What are cross breed plants known as?
  9. What does letter F represent in heredity?
  10. How will you conclude that birds are closely related to reptiles?
  11. Where did the earliest members of human beings live?
  12. Which organ in man suggest that he is a descendent of herbivorous animals?
  13. Why is appendix in human considered as vestigial?
  14. Why offsprings differ from parents in certain characters?
  15. What is meant by expression TT and Tt in Mendelian terms?
  16. How is sex determined in human beings?
  17. Why are flippers of whales and wings of birds are considered as homologous organs?
  18. On the basis of the possibilities of combination of the sex chromosomes, what percentage probability does a couple have of having a son or a daughter. Show the same by making a cross.
  19. Explain why evolution can't be said to progress from lower forms to higher forms.
  20. How do Mendel's experiments show that traits may be dominant or recessive?
  21. Explain with an example how variation took place due to inheritance?
  22. Explain Urey and Miller's experiment showing evidence of the theory of origin of life.
  23. How does the study of fossils provide evidence in favour of organic evolution.
  24. Can the wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?
  25. What do you understand by reproductive isolation? How is this mechanism responsible for speciation?
  26. Though eyes are found in many organisms why can they not be grouped together?
  27. Why can two sub-populations of a species not reproduce with each other? State two reasons. What will be the outcome of such a situation?



## Chapter No. 10

### LIGHT- REFLECTION AND REFRACTION

#### HOTS Questions and Answers

1. Where is the image formed in a convex mirror, when the object is anywhere in front of it ?
2. A person uses concave mirror for shaving, where should he position his face in front of it ?
3. A ray of light is incident on a concave mirror along its principal axis. What will be the angle of reflection?
4. What will happen to ray of light when it travels from rarer medium to a denser medium ?
5. What does negative sign in the value of magnification of a mirror indicate?
6. Name the point inside the lens through which a ray of light goes undeviated?
7. Which of the two has a great power? A lens of short focal length or a lens of large focal length?
8. Name the lens which always gives an erect and diminished image?
9. Which mirror is used as rear view mirror in vehicles and why ?
10. Define one dioptre?
11. The size of an object is 2cm. The magnification produced by a mirror is +1. What is the size of the image?
12. When a ray of light passes from a denser medium to a rarer medium which angle is greater: angle of incidence or angle of refraction?
13. An image formed in a spherical mirror has magnification -2. Is the image real or virtual?
14. The power of a lens is -2D. Is the lens convex or concave?
15. Focal length of a convex mirror is 10cm. Find the radius of curvature of the mirror?
16. An object is placed at a distance of 50cm from a convex mirror. State two characteristics of the image formed.
17. Write two uses of concave mirror.
18. An object 1cm high produces a real image 1.5 cm high, when placed at a distance of 15 cm from concave mirror. Calculate the position of the image.
19. Find the power of a concave lens of focal length 2m.
20. Which phenomenon occurs when light falls on (a) highly polished surface (b) a transparent medium ?
21. What will happen to a ray of light when it falls normally on a surface ?
22. What is absolute refractive index ?
23. If refractive index of glass is 1.65, What is the speed of light in glass. ?
24. The magnification “ m “ for a mirror is +1 what does this signify ?

#### ANSWERS OF THE ABOVE QUESTIONS

1. Between pole and focus, behind the convex mirror.
2. Between pole and principal focus.

3. Angle of reflection = 0
4. Bends towards the normal .
5. Image is real.
6. Optical centre.
7. Lens of short focal length.
8. Concave lens.
9. Convex mirror, wider field of view.
10. One dioptre is the power of a lens of focal length one meter.
11. +2cm, because  $m=I/O$  ,  $+1=I/2 =+2$
12. Angle of refractions.
13. Real.
14. Concave lens.
15. 20cm.
16. (1) Image is virtual and erect.  
(2) Image is diminished.
17. (1) Used as reflectors for automobile headlights.  
(2) Used as shaving mirror.
18.  $-v/u = h'/h$  ,  $-v/-15 = -1.5/1$   
 $v = 15 \times 1.5 = -22.5\text{cm}.$
19.  $-p = 1/f$   
 $=1/-2 = -0.5\text{D}.$
20. (a) Reflection of light.  
(b) Refraction of light.
21. No bending of light ray occurs. It means light rays goes straight from one medium to another.
22. When first medium is taken as vaccum, the refractive index of second medium is called as absolute refractive index.
23. Refractive Index of glass =  $\frac{\text{Speed of Light in vaccum}}{\text{Speed of Light in glass}}$   
 $1.65 = \frac{3 \times 10^8}{V_g}$        $V_g = \frac{3 \times 10^8}{1.65}$   
 $1.8 \times 10^8 \text{ m/s}$
24. (a) Image is of same size as the object.  
(b) Image is virtual and erect .

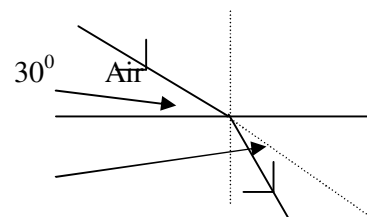
### More Questions for Practice

1. What is angle of incidence?
2. A ray of light passing through centre of curvature of a concave mirror retraces its path on reflection, Why?
3. An object is placed at the focus of a concave mirror, Where is the image formed?
4. What is meant by refraction of light?
5. Define principal focus of a concave mirror?
6. State Snell's law of refraction?
7. Will the lateral displacement increase/decrease if glass block is made more thicker?

8. Why convex lens is called converging lens?
9. Printed letters appear diminished, when viewed through a lens. What is the nature of lens?
10. At what angle a ray of light should strike the surface of glass, so that it does not suffer any refraction?
11. Does the value of speed of light change with medium?
12. What is the cause of refraction of light?
13. Which lens is used as a magnifying glass?
14. What is an optically denser medium of light?
15. What is the difference between reflection and refraction?
16. If a ray of light traveling in air is incident on the water surface obliquely, Draw a ray diagram and show the change in its path in water?
17. Define refractive index in terms of a speed of light in two media. What is the unit of refractive index?
18. A ray of light strikes the mirror at  $15^\circ$ , What is the angle of reflection?
19. What is refractive index of air? Why the refractive index of other medium is taken with respect to air?
20. Distinguish between real and virtual images?
21. For what position of an object, a virtual image is formed by a convex lens? Give ray diagram?
22. Find the position and nature of image formed in a concave mirror for the following position of an object. (a) At infinity (b) Beyond C.
23. An object is placed at a distance of 10cm from convex mirror of focal length 15cm; find the position and nature of image?
24. A thin lens has a focal length of -25cm. What is the power of the lens? Is it convex or concave?
25. Calculate the distance at which an object should be placed in front of convex lens of focal length 10cm to obtain an image double its size?
26. Why a mirror does not have one principal focus while a lens has two principal foci?
27. Focal length of the lens in a photographic camera is 5cm. What is the power and nature of the lens?
28. Define linear magnification. Does it have any unit?
29. Why a concave mirror has a real principal focus, while convex mirror has a virtual principal focus?
30. Which of the following lenses would you prefer to use while reading the small letters found in dictionary.
  - a. A convex lens of focal length 30 cm.
  - b. A concave lens of focal length 30 cm.
  - c. A concave lens of focal length 5 cm.
  - d. A convex lens of focal length 5 cm.

31. Show that the refractive index of a medium 1 with respect to medium 2 is reciprocal to the refractive index of medium 2 with respect to 1 i.e.  $n_{12} = 1 / n_{21}$

32. From the diagram given below calculate
  - a) angle of incidence
  - b) angle of refraction .



c) the refractive index of the substance X.  $30^0$

X

33. A man standing in front of special mirror finds his image having a small face, big tummy and legs of normal size. what are the shapes three parts of mirror?

34. A diverging lens of focal length 15cm forms an image of 10cm from the lens. Draw a scale diagram for the formation of image.

## Chapter No. : 11

### Human Eye and Colourful World

#### HOTS Questions and Answers

1. What is the least distance of distinct vision of a normal human eye ?
2. Name the muscle responsible for bringing change in the focal length of the eye lens ?
3. Name one defect of vision which cannot be corrected by any type of spectacle lenses ?
4. State one effect produced by the scattering of light by the atmosphere ?
5. What is the nature of image formed on the retina of the eye ?
6. What type of lens is used for correcting hypermetropia ?
7. Who was the first person to obtain the spectrum of sunlight ?
8. What is the function of optic nerve in human eye ?
9. What is range of vision ?
10. Why do different colours deviate through different angles on passing through a prism?
11. As light rays pass from air into glass prism, are they refracted towards or away from the normal ?
12. Which color has largest wavelength ?
13. Which defect of vision can be rectified using a concave lens ?
14. What phenomenon causes twinkling of star on a clear night ?
15. What is meant by scattering of light ?
16. Why does the sky appear black instead of blue to an astronaut?
17. What is the basic cause of atmospheric refraction?
18. Why does clear sky look blue?
19. Can visible light be scattered by atoms/molecules in earth's atmosphere?
20. What is a spectrum?
21. Name the defect of vision in person
  - a. Whose near point is more than 25cm away?.
  - b. Whose far point is less than infinity.

#### ANSWERS OF THE ABOVE QUESTIONS :

Ans 1. 25cm.

Ans.2 Ciliary muscle.

Ans 3. Cataract.

Ans 4. Tyndall effect.

Ans.5 Real and inverted.

Ans.6 Convex lens.

Ans.7 Sir Isaac Newton.

Ans 8 Optic nerve carries the image formed on the retina to the brain in the form of electrical signals.

- Ans 9 Range of vision of a normal human eye is between its near point and far point i.e,  
from 25cm to infinity.
- Ans 10 This is because different colours travel through glass with different speeds and glass has different refractive index for different colours.
- Ans 11. Towards the normal.
- Ans. 12 Red color.
- Ans. 13 Myopia.
- Ans. 14 Atmospheric refraction.
- Ans. 15 Change of direction of light on striking a scatterer.
- Ans. 16 The upper atmosphere does not have particle or dust etc. as a result there is no scattering  
of light and hence the sky appear dark in stead of blue to an astronaut.
- Ans. 17 The basic cause of refraction is variation in optical density of different layers of earth's  
atmosphere. The sun passes through earth's atmosphere.
- Ans. 18 Because blue color having smallest wavelength is scattered most, Amount of scattering is directly proportional to  $1/\lambda^4$ .
- Ans. 19 Yes, as size of molecules/atoms is much less then wavelength of light
- Ans. 20 The band of seven colours obtained by dispersion of white light is called spectrum.
- Ans. 21
- Hypermetropia
  - Myopia

### More Questions for Practice

- A person can see only objects beyond 1m. From his eyes. Name the defect of the eye.
- Out of light of blue and red colours which one is scattered most?
- What is the function of crystalline lens in the human eye?
- Which phenomenon is responsible for increasing the apparent length of the day by 4 minute?
- What is the far point of a person suffering from Myopia.
- What name is given to front transparent part of human eye?
- Where do we see :(1) Concave and (2) Convex lens in bifocal lenses.
- What is the nature of image formed by our eye?
- Name the liquid which is present between eye lens and cornea.
- Where does most of the refraction of light in an eye occurs?
- Which kind of lens is an eye lens?
- What is the cause of dispersion of light?
- Under very dim light, we are able to see the objects but can not distinguish between colours  
why ?
- What is the range of vision for normal human eye ?
- How is the amount of light entering the eye controlled ?

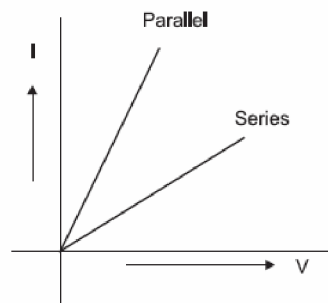
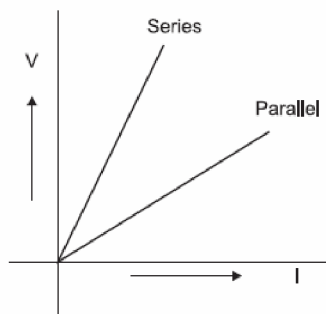
16. What is the colour of danger signal? Why?
17. What is rainbow? How is rainbow formed?
18. State two causes of myopic vision.
19. How an uncorrected myopic eye sees far off objects.
20. What is presbyopia? Name the type of lens which can be used to correct presbyopia.
21. Explain why planet do not twinkle at night?
22. Explain about the colour of the sun at sunrise and sunset.
23. Define the term (1) Near point (2) Far point
24. Why is a normal eye not able to see clearly the object closer than 25 cm.
25. Draw a ray diagram to show the refraction of light through a glass prism on the diagram mark.  
(a) Incident ray (b) Emergent ray and (c) Angle of deviation
26. How is the dispersed white light recomposed ?
- 27 The near point of a hypermetropic eye is at 75 cm from the eye. What is the power of the lens required to enable him to read clearly a book held at 25 cm from the eye.

## CHAPTER -12

## ELECTRICITY

### HOTS Questions and Answers

- Q.1 What is represented by joule/coulomb?
- Q.2 A charge of 2C moves between two plates, maintained at a p.d of 1V. What is the energy acquired by the charge?
- Q.3 Why are copper wires used as connecting wires?
- Q.4 A wire of resistivity  $\rho$  is stretched to double its length. What is its new resistivity?
- Q.5 What is the resistance of connecting wire?
- Q.6 What is the resistance of an ammeter?
- Q.7 What is the resistance of a Voltmeter?
- Q.8 Which has more resistance: 100W bulb or 60W bulb?
- Q.9 How will you join three resistances, each of  $2\Omega$  so that the effective resistance is  $3\Omega$ ?
- Q.10 What happens to the current in a circuit if its resistance is doubled?
- Q.11 What happens to the resistance of a circuit if the current through it is doubled?
- Q.12 How does the resistance of a wire depend upon its radius?
- Q.13 Two wires are of the same length, same radius, but one of them is of copper and the other is of iron. Which will have more resistance?
- Q.14 Two wires of same material and same length have radii  $r_1$  and  $r_2$ . Compare their resistances.
- Q.15 Given a resistors each of resistors R. How will you combine them to get the (i) maximum and (ii) minimum effective resistance? What is the ratio of the maximum to minimum resistance?
- Q.16 A wire of length L and resistance R is stretched so that its length its doubled. How will its (a) Resistance change (b) Resistively change ?
- Q.17 Two students perform the experiments on series and parallel combinations of two given resistors R1 and R2 and plot the following V-I graphs.





Which of the graphs is (are) correctly labelled in terms of the words 'series' and parallel' Justify your answer.

Q.18 A household uses the following electric appliances :

- (i) Refrigerator of rating 400W for ten hours each day.
- (ii) Two electric fans of rating 80W each for twelve hours each day.
- (iii) Six electric tubes of rating 18W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

Q.19 Ammeter burns out when connected in parallel. Give reasons.

### Answers of questions no 1-19

A.1 It represents potential difference.

A.2  $W=QV=2 \times 1=2J$

A.3 The electrical resistivity of copper is low.

A.4 It remains same because resistivity depends on nature of material.

A.5 The resistance of a connecting wire, which is made of good conductor, is negligible.

A.6 The resistance of an ammeter is very small and for an ideal ammeter, its value is zero.

A.7 The resistance of a voltmeter is very high and for an ideal voltmeter, its value is infinity.

A.8 As  $R \propto 1/P$ . Thus, the resistance of 60W bulb is more.

A.9 A parallel combination of two resistances (which will be  $1\Omega$ ) joined in series with the third resistance ( $2\Omega$ )

A.10 As  $I \propto 1/R$ , the current is reduced to half of its previous value.

A.11 The resistance of the circuit does not depend on the current through it.

A.12 As  $R \propto 1/A$ ,  $R \propto 1/\pi r^2$  i.e.  $R \propto 1/r^2$ .

A.13 As  $R = \rho l/A$ , but A and l are same it depends only on resistivity and it is more for iron so iron has more resistance.

A.14 If  $R_1$  and  $R_2$  are resistances, then  $R_1/R_2 = r_2^2/r_1^2$  because  $\rho$  and l are same.

A.15 for maximum resistance  $R_s = nr$  (Equivalent of series combination)

for minimum resistance  $R_p = r/n$  (Equivalent of parallel combination)

$$R_s/R_p = n^2$$

A.16 (a) If the original length of the wire is l and its cross-sectional area is A, then  $R = \rho l/A$ . When length becomes 2l, cross-sectional area reduces to A/2 because volume does not change. The new resistance  $= \rho (2l)/A/2 = 4 \rho l/A = 4R$

(b) Resistivity does not change.

A.17 Both are correct because  $\Delta V/\Delta I = \text{resistance}(R)$  and  $\Delta I/\Delta V = 1/R$   
Series means high resistance and parallel means low resistance.

A.18 Electrical energy consumed per day =  $400 \times 10 + 2 \times 80 \times 12 + 6 \times 18 \times 6$   
 $= 4000 + 1920 + 648$   
 $= 6568 \text{ Wh}$   
 $= 6.568 \text{ kWh}$

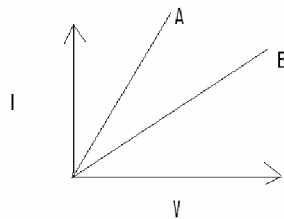
Electrical energy consumed in 30 days =  $6.568 \times 30$   
 $= 197 \text{ kWh (units)}$

Electric Bill =  $197 \times 3$   
 $= \text{Rs } 591.$

A.19 Ammeter consists of a wire of low resistance when connected in parallel, a large amount of current passes through it hence gets burnt i.e. short circuited.

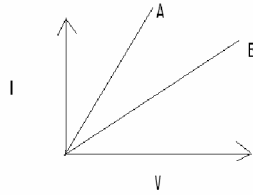
### More Questions for Practice

- Q.1 Name a substance whose resistance almost remains unchanged by increase of temperature.
- Q.2 Name two special characteristics of heater coil.
- Q.3 A wire of resistance  $4\Omega$  is bent to form a circle. What is the resistance between two diametrically opposite ends ?
- Q.4 How does the resistance of a conductor change if its temperature is increased?
- Q.5 A current of  $4A$  flows in a wire of resistance  $60\Omega$ . Calculate electrical energy consumed in 2 minutes.
- Q.6 V-I graph for two resistors is given. Which of the two has minimum resistance?

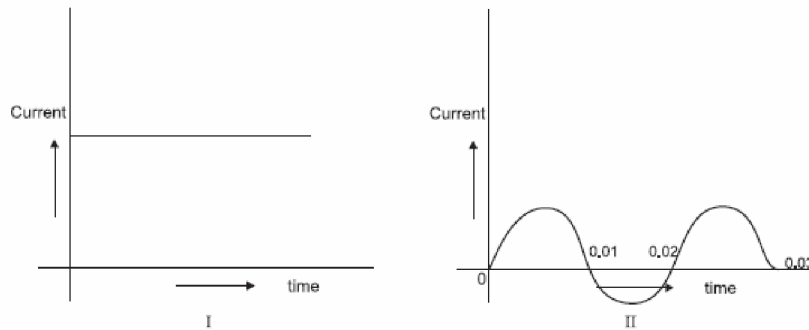


- Q.7 Alloys are used in electrical heating devices rather than pure metals. Give one reason.
- Q.8 An electric geyser has the ratings  $2000W$ ,  $220V$  marked on it. What should be the minimum rating, in whole number of a fuse wire that may be required for safe use with this geyser?
- Q.9 The electrical resistivity of few materials is given below in ohm-meter. Which of these materials can be used for making element of a heating device?
- A  $6.84 \times 10^{-8}$
  - B  $1.60 \times 10^{-8}$
  - C  $1.00 \times 10^{-4}$
  - D  $2.50 \times 10^{12}$
  - E  $4.40 \times 10^{-5}$
  - F  $2.30 \times 10^{17}$
- Q.10 Where do we connect a fuse: with live wire or with neutral wire?
- Q.11 What is the resistance of an air gap?
- Q.12 Name two safety measures commonly used in electric circuits and appliances.
- Q.13 Two metallic wires A and B are connected in parallel. Wire A has length  $l$  and radius  $r$ , wire B has a length  $2l$  and radius  $2r$ . Compute the ratio of the total resistance of parallel combination and the resistance of wire A.
- Q.14 What is the meaning of the term 'frequency' of an alternating current? What is its value in India? Why is an alternating current considered to be advantageous over direct current for long-range transmission of electric energy?
- Q.15 A TV set picture tube shoots out a beam of electrons. The current due to this beam is  $10\text{ mA}$ . How many electrons will strike the TV screen every second?

- Q. 16 An electric wire is stretched to increase its length by 25%. By what % will the resistance be increased and what will be increase in its resistivity?
- Q.17 An electric iron of resistance  $20\Omega$  takes a current of 5 A. Calculate the heat developed in 30 sec.
- Q.18 A 60 W electric lamp gives off energy in the form of light at the rate of 7.5 J/s. What percentage of energy does the lamp transform into light?
- Q.19 The voltage-current variation of two metallic wires A and B at constant temperature are shown in fig. Assuming that the wires have the same length and same diameter, explain which of the two wires will have larger resistivity.



- Q.20 You are given following current-time graphs from two different sources:



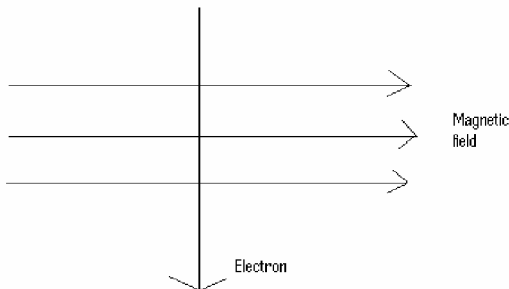
- Name the type of current in two cases.
  - Identify any one source for each type of these currents.
  - What is the frequency of current in case II in India?
- Q.21 The electric power consumed by a device may be calculated by using either of the two expressions  $P = I^2R$  or  $P = V^2/R$ . The first expression indicates that it is directly proportional to  $R$  whereas the second expression indicates inverse proportionality. How can the seemingly different dependence of  $P$  on  $R$  in these expressions be explained.
- Q.22. Draw a schematic diagram of a circuit containing the following electrical components:(a) a resistance (b) a voltmeter (c) an electric bulb (d) a cell (e) an ammeter and (f) plug key

## CHAPTER -13

### MAGNETIC EFFECTS OF ELECTRIC CURRENT

#### HOTS Questions and Answers

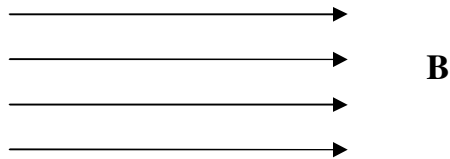
- Q.1 A straight wire carrying electric current is moving out of plane of paper and is perpendicular to it. What is the direction and type of induced magnetic field?
- Q.2 How can it be shown that magnetic field exist around a wire carrying current?
- Q.3 How can a solenoid be used to magnetise a steel bar.
- Q.4 Why can't two magnetic field lines ever intersect?
- Q.5 Can a 5 A fuse be used in wire carrying 15 A current? Why?
- Q.6 Give the factors that affect strength of magnetic field at a point due to a straight conductor carrying current.
- Q.7 Where do we connect a fuse: with live wire or with neutral wire?
- Q.8 Give two uses of electromagnets.
- Q.9 Name any two devices which use permanent magnets.
- Q.10 Draw the magnetic field lines representing uniform magnetic field.
- Q.11 A current-carrying straight conductor is placed in the east-west direction. What will be the direction of the force experienced by this conductor due to earth's magnetic field? How will this force get affected on? (a) reversing the direction of flow of current (b) doubling the magnitude of current.
- Q.12 An electron enters a magnetic field at right angles to it as shown in fig. The direction of the force acting on the electron will be:  
(a) to the right      (b) to the left      (c) out of the page      (d) into the page



- Q.13 Why is the earth pin thicker and longer than the live and the neutral pins?
- Q.14 A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is
- Pushed into the coil?
  - Withdrawn from inside the coil?
  - Held stationary inside the coil?

## ANSWERS OF THE ABOVE QUESTIONS

- A.1 Induced magnetic field will be in the form of concentric circles in the plane of paper.
- A.2 By using magnetic compass which, shows deflection.
- A.3 By inserting the steel bar inside the solenoid and switching on electric current.
- A.4 If so then at the point of intersection there will be two different directions of magnetic field which is not possible.
- A.5 No, because both of them would then be ineffective in controlling the amount of current flowing.
- A.6 Magnitude of electric current, perpendicular distance between that point and conductor.
- A.7 It is always connected with live wire.
- A.8 (i) It is used in cranes for lifting heavy loads.  
(ii) used in electric bells.
- A.9 Loudspeakers, Galvanometer, voltmeter.
- A.10



- A.11 The direction of earth's magnetic field is from G-south to G-north. Let current is from west to east. Therefore force is vertically upwards.
- (a) By reversing the direction of current, the direction of will be reversed i.e. vertically downwards.
- (b) The magnitude of the force is doubled.
- A.12 When a conductor carrying current is placed perpendicular to the direction of magnetic field, the acting on it is given by Fleming's left hand rule. Since the direction of current is the same as that of the motion of a positive charge, the direction of force acting on it when moving perpendicular to the direction of magnetic field is the same as that acting on a current-carrying conductor placed perpendicular to the direction of magnetic field. Obviously, the force acting on an electron is opposite to that. Therefore in this case it is into the page.
- A.13 It is thicker so that it does not enter into the live or neutral sockets. It is made longer so that it gets connected to the earth terminal earlier than the live and neutral pins. This ensures the safety of the user.
- A.14 (i) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards right).
- (ii) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards left opposite to that in case one).
- (iii) As it is stationary no change in magnetic flux linked with coil, so galvanometer shows no deflection.

## More Questions for Practice

- Q.1 The magnetic field inside a long straight solenoid carrying current:
- (a) is zero
  - (b) decreases as we move towards its end
  - (c) is same at all points.
  - (d) Increases as we move towards its end
- Q.2 Which of the following properties of proton can change while it moves freely in a magnetic field?
- (a) mass
  - (b) speed
  - (c) velocity
  - (d) momentum.
- Q.3 How do we think the displacement of rod AB will be affected if
- (i) current in a rod AB is increased
  - (ii) a stronger horse-shoe magnet is used
  - (iii) length of rod AB is increased ?(Figure 13.12 Page number 230).
- Q.4 A positively-charged particle (alpha particle) projected towards west is deflected towards north by magnetic field. The direction of magnetic field is :
- (a) towards south
  - (b) towards east
  - (c) downward
  - (d) upward
- Q.5 What is the role of the split-ring in an electric motor?
- Q.6 What will be the frequency of an A.C if its direction changes after every .01 s?
- Q.7 An A.C has a frequency of 50 Hz. How many times does it change its direction in one second?
- Q.8 A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that
- (i) The direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are inter changed.
  - (ii) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.
- Which of the above observations of the student is incorrect and why?
- Q.9 Draw the pattern of magnetic field lines of a current carrying solenoid. What does the pattern of field lines inside the solenoid indicate? Write one application of magnetic field of current carrying solenoid.
- Q.10 Sketch magnetic field lines around a current carrying straight conductor.
- Q.11 Why does a current carrying conductor kept in a magnetic field experience force?
- On what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.
- Q.5 Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason.
- Q.6 Explain what is short-circuiting and overloading in an electric supply?
- Q.7 What is the function of an earth wire? Why is it necessary to earth the metallic appliances?
- Q.8 (a) What is an electromagnet? What does it consist of?

- (b) Name one material in each case which is used to make a (i) permanent magnet  
(ii) Temporary magnet.
- Q.9 Draw a sketch of the pattern of field lines due to a (i) current flowing in a circular coil (ii) current carrying solenoid.
- Q.10 A circuit has a fuse of 5A. What is the maximum number of 100W, 220V bulbs that can be safely used in the circuit.

## Chapter No. : 14

### SOURCES OF ENERGY

#### HOTS Questions and Answers

- Q.1. The cost of production of electricity in a thermal power station located in Bihar/Jharkhand/Orissa is less than in Gujarat/Maharashtra. Do you agree? Justify your answer.
- Q.2 Which of the following sources of electricity involves more running expenses and why? Thermal power station, Hydro power station, solar cells or Geothermal source.
- Q.3 Why is there so much emphasis on changing over from petrol/diesel driven automobiles to CNG-driven vehicles?
- Q.4 Which of the following is not an example of the biomass energy source?  
(a) Wood, (b) gobar gas, (c) atomic energy, (d) coal.
- Q.5 How is the supply of electricity maintained in a windmill when there is no wind?  
In a solar panel when there is no sun?
- Q.6 Can any source of energy be pollution-free? Why or why not?
- Q.7 Why is biogas a better fuel than animal dung-cakes?
- Q.8 Though a hot iron emits radiation, yet it is not visible in the dark, why?
- Q.9 Define: OTE (ocean thermal energy).
- Q.10  $H_2$  has been used as a rocket fuel. Would you consider it as a cleaner fuel than CNG? Why or why not?

#### ANSWERS OF THE ABOVE QUESTIONS

- Ans.1 It is because coal is available in Bihar/Jharkhand/Orissa locally, whereas it has to be transported for any thermal power plant in Gujarat/Maharashtra.
- Ans.2 Thermal power stations involve more running cost due to continuous use of coal.
- Ans. 3 CNG on burning produces only carbon dioxide and water  
-It does not produce smoke.  
-It does not leave unburnt hydrocarbons, lead particulates etc.
- Ans.4 Atomic energy is not an example of biomass energy source.
- Ans.5 In both the cases, the electricity generated is stored in a battery. This battery provides electricity when there is no wind in the case of a windmill and no sun in the case of a solar panel.
- Ans. 6 No source of energy can be called pollution-free, because the use of any source of energy disturbs the environment in one way or the other. The actual source of energy may be pollution-free, but the assembly of the device might have caused some damage to the environment. So, in absolute sense, no source of energy can be called pollution-free.
- Ans. 7 Biogas is a better fuel than animal dung-cakes because-  
(a) Burning of animal dung-cakes produces lot of pollution whereas biogas is a smokeless fuel.



- (b) The calorific value of Biogas is much higher than that of animal dung-cakes.  
(c) Animal dung cakes leaves residue after burning whereas biogas leaves no residue.

Ans. 8 Hot iron emits infra-red rays and these are not visible to our eyes.

Ans. 9 The energy available due to the difference in the temperature of water at the surface of the ocean and at deeper levels is called OTE.

Ans. 10  $H_2$  when burnt in presence of  $O_2$  produces  $H_2O$  as the only product with release of lot of heat energy. Water does not cause any damage to environment while CNG during burning produces  $CO_2$  and water.  $CO_2$  is not a pollutant yet it leads to rise in the temperature (global warming), this rise is called green house effect and this will affect polar ice, and life on the earth is at risk. Thus,  $H_2$  is a cleaner fuel than CNG.

### More Questions for Practice

Q1. Name the components of bio-gas.

Q2. What are hot spots?

Q3. What is the product obtained when wood is burnt without much supply of oxygen?

Q4. List problems associated with construction of dam?

Q5. What is the basis of nuclear energy? Explain briefly.

Q6. "It was believed nuclear energy is only destructive" do you agree? Justify your answer.

Q7. List the criteria for selecting a good fuel.

Q8. What is bio-mass?

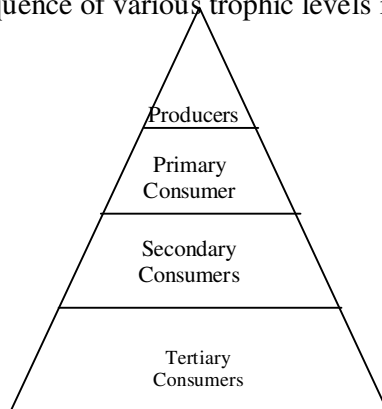
Q9. Name the process that converts solar energy into chemical energy in nature.

Q10. Biogas is considered to be a boon to the farmers. Give reason.

**CHAPTER – 15**  
**OUR ENVIRONMENT**

**HOTS Questions and Answers**

- Q.1 Why some substances are degraded and others not?  
Q2. What limits the number of trophic levels in a food chain.  
Q3. What will happen if decomposers are not there in the environment?  
Q4. What is the harm of clay cups?  
Q5. What will happen if all the carnivores are removed from the earth?  
Q6. What will happen to grasslands if all the grazers are removed from there?  
Q7. The number of malarial patients in a village increase tremendously, when a large number of frogs were exported from the village. What could be the cause for it?  
Explain the help of food chain?  
Q8. State one reason to justify the position of man at the apex of most food chains?  
Q9. Which food chains are advantageous in terms of energy?  
Q10. Construct a food chain composing the following Snake, Hawk, Rats, Plants.  
Q11. Name the process that is a direct outcome of excessive burning of fossil fuels?  
Q12. If all the wastes we generate is bio-degradable what impact may this have on the environment?  
Q13. Write the harmful effect of ozone depletion.  
Q14. Why food chains consists of three or four steps only?  
Q15. Which of the following will have the maximum concentration of harmful chemicals in its body?  
Peacock, Frog, Grass, Snake, Grasshopper  
Q16. Why energy of herbivores never come back to the autotrophs?  
Q17. What are decomposers and what is the importance of them in the ecosystem?  
Q18. Give the correct sequence of various trophic levels in a food chain.



- Q19. What is biological magnification and give its causes?  
Q20. Are plants actually producers of energy?

**ANSWERS**

Ans-1. Different components of food are changed to simpler substances by digestive enzymes and these enzymes are very much specific in nature and action. Similarly, substances are broken down by bacteria and saprophytes. They are also very specific

in action and break down of the particular substance. Therefore, some substances are biodegradable and other are non-biodegradable.

Ans-2. There is a loss of energy as we go from one trophic level to the next, this limits the number of trophic levels in a food chain.

Ans-3. If decomposers are not there in the environment, the breakdown of the complex organic substances into simple substances will not take place and natural replenishment of the soil will not take place. So, presence of decomposers is essential for the replenishment of soil and biogeochemical cycle of elements or substances.

Ans-4. Clay cups cause depletion of top fertile soil as they are formed from the same.

Ans-5. If all the carnivores are removed from the earth, the population of herbivores will increase. Large population of herbivores will overgraze. As a result, all plants will disappear from the earth surface and ultimately the earth may become a desert. The biosphere will get disturbed which will lead to end of life on earth.

Ans-6. If all the grazers are removed from grassland, grass will grow unchecked. It may help the growth of some organisms harmful to the animals and the animals which feed on the grazers will die of starvation. The biogeochemical cycle will stop and the whole biosphere will get disturbed.

Ans-7. Phytoplankton → Zooplankton → Mosquito larva → Frog

In the absence of frog, more mosquito larva survive, giving rise to large number of mosquitoes which cause increase incidence of malaria.

Ans-8. The position of man is at the apex of most food chains as he is an intelligent organism and can take any advantageous position by manipulation.

Ans-9. The two step chains in which man is close to producer are advantageous. For example, Producer → Man

Ans-10. Plants → Rats → Snake → Hawks

Ans-11. Global warming is a direct outcome of excessive burning of fossil fuels.

Ans-12. Cleaner environment without any pollution, more nutrients will be released into the nutrient pool, will help to maintain ecological balance.

- Ans-13.1. Cause the skin cancer  
2. Damage to eyes  
3. Immune system

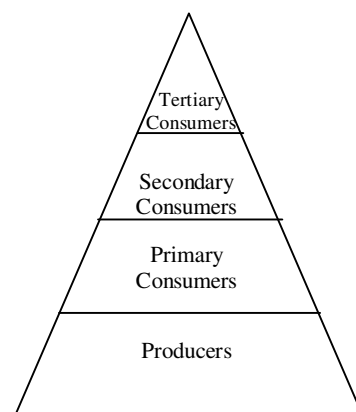
Ans-14. Since so little energy is available for the next level of consumers and for this reason food generally consists of three or four steps. The loss of energy at the each step is so great that very little usable energy remains after four trophic levels.

Ans-15. Grass → Grasshopper → Frog → Peacock  
Peacock will have maximum conc.

Ans-16. Energy of herbivorous never comes back to autotrophs as flow of energy is always unidirectional. So once it passes the trophic level it is no longer available to the previous level.

Ans-17. The micro-organisms which break down the complex organic substances into simple inorganic substances e.g. bacteria, fungi. Decomposers decompose the complex substances into simple ones so that plants can use it again

Ans-18.



Ans-19. The increased concentration of chemicals at any trophic level is called biological magnification. It occurs due to the excessive use of pesticides which enter our food chain.

Ans- 20. No, plants are not actually producers of energy, they can trap the energy of sun and can convert solar energy into chemical energy in the form of carbohydrates and other food materials so they are called transducers.

### **QUESTION BANK FOR PRACTICE**

Q1. During heavy rains in a village, the rain water carried excessive nitrogen compounds to a pond. How will it affect the growth of fish in the pond in the long run?

Q2. Which of the following materials are non-biodegradable? Aluminum wire, tea leaves, synthetic fibres, wool

Q3. In comparing the two ecosystems A & B it is observed that A has only first and second order consumers while B has third, fourth and fifth order consumers. Which of the two could be more stable?

Q4. What name has been given to those organisms which breakdown the complex organic compounds present in dead animals and plants?

Q5. Which of the following constitutes a food chain?

- a) Grass, wheat and mango
- b) Grass, goat and human
- c) Goat, cow and elephant
- d) Grass, fish and goat

Q6. Vegetarian food habit can sustain a larger number of people. Justify the statement in terms of food chain.

Q7. Which of the following belong to the same trophic level?

Tree, Frog, Snake, Grass, Lizard

Q8. Give any two ways in which non-biodegradable substances would affect the environment.

Q9. How does study of food chain in an area or habitat help us.

Q10. What percentage of energy, available at the producer level is transferred at successive trophic levels in a food chain?

Q11. A non-biodegradable toxic chemical has entered into a food chain. Which type of food habit will you suggest to a man? Vegetarian or Non-vegetarian.

Q12. Name two waste materials, which can be recycled?

Q13. Explain why, the practice of serving tea in Kulhads (disposable cups made of clay) on trains has been discontinued?

Q14. Explain why there are greater chances of accumulation of harmful chemicals in the body of human being.

Q15. The use of pesticide DDT is discouraged since this chemical is found in human body. How does this chemical enter our body?

Q16. What will happen if we kill all the organisms in one trophic level?

Q17. Consider the following food chains:

- 1. Plants → Mice → Snake → Hawks
- 2. Plants → Mice → Hawks

If energy available at the producer level in both the food chains is 100 J in which case will hawks get more energy as food and by how much? Justify your answer.

Q18. How much energy will be available to hawks in the food chain comprising hawk, snake, paddy and mice, if 10,000 J of energy is available to paddy from the sun?

Q19. Calculate the amount of energy available to lion in the following food chain if plants have 20000 J of energy available from the sun.

Plant → Deer → Lion.

Q20. In the food chain Grass → Deer → Lion, operating in a forest, what will happen,

- 1) If all the lions are removed?
- 2) If all the deer are removed?
- 3) If all the grass is removed?

Q21. What are the various methods of waste disposal practiced in your school? Describe any 2 methods briefly.

Q22. All the flesh of a carnivore is from grass. Justify the statement.

Q23. Explain the following terms

- 1) Acid Rain
- 2) Ozone depletion
- 3) Green house effect.

## CHAPTER-16

### MANAGEMENT OF NATURAL RESOURCES

#### HOTS Questions and Answers

1. What does the high level of total coliform count in river Ganga indicates?
2. What are “biodiversity hot spots”? What is the measure of the biodiversity?
3. Which programme was started to replenish forests?
4. Why scarcity of water is there in our country inspite of nature’s monsoon bounty?
5. What is the effect of continuous depletion of ground water along coastal region?
6. Why is dependence of man on nature greater than that of any other organism?
7. In addition to low rainfall, what are the other reasons for non-availability of water in arid and semi-arid zones of our country?
8. Why is mining a big source of pollution?
9. Write two points to be kept in mind while storing water in tanks.
10. Write any two alternatives to dams.
11. Why do you think there should be equitable distribution of resources?
12. Which canal has brought greenery to considerable areas of Rajasthan?
13. What were the two main problems as a result of Tawa Irrigation Project?
14. Write the advantages of giving the control of water management to the residents of the area?
15. State benefits of water harvesting.
16. How did Chipko Andolan ultimately benefit the local population? Give any three benefits?
17. Quote three instances where human intervention saved the forests from destruction.
18. Why are environmentalists insisting upon sustainable natural resource management? Give any four reasons.

#### ANSWERS

1. It indicates that water is contaminated by disease causing micro-organisms.
2. Forests are “biodiversity hot spots”. One measure of the biodiversity of an area is the number of species found here.
3. Silviculture
4. It has taken place due to the following reasons:
  - (a) Failure to sustain water availability underground which has resulted largely from the loss of vegetation cover.
  - (b) Diversion for high water demanding crops.
  - (c) Pollution from industrial effluents and urban wastes.
5. The effect of continuous depletion of ground water along coastal region will lead to movement of saline sea water into freshwater wells then spoiling their quality.
6. Man’s dependence on the environment is greater than that of other organisms because man:
  - (a) Develops curiosity for more comforts and security.
  - (b) Consumes large amount of material and energy.

- (c) Develops a new kind of socio-economic environment which consists of things developed by man through his tools and techniques.
7. (a) Flowing of rain water and lack of management to harvest it.  
(b) Ground water is pumped out for high water demanding crops.  
(c) Water becomes unsafe and unusable due to mixing of urban wastes and effluents from the industries.
  8. Mining causes pollution because large amount of slag is discarded for every tonne of metal extracted.
  9. Storage tank should not be located close to the source of contamination and should be accessible for cleaning.
  10. Adopting water harvesting techniques and reducing the scale of floods through better catchment management.
  11. We think that there should be equitable distribution of resources because not only a handful of rich and powerful people, but all the people may get benefit from the development of these resources.
  12. Indira Gandhi Canal.
  13. Water logging and increasing salinity
  14. Water harvesting techniques are highly locality specific and the benefits are localised. Thus, giving people the control over their local water resources ensures that mismanagement and overexploitation of these resources is reduced.
  15.
    - a. Provides self-sufficiency to water supply
    - b. Conserves valuable ground water
    - c. Reduces cost for pumping ground water
    - d. Reduces local flooding and drainage problems
  16.
    - a. The locals benefitted from forest produces
    - b. The wild life and nature were conserved
    - c. The quality of air and soil was preserved
  17.
    - a. Contribution of Bishnoi movement
    - b. Building national parks
    - c. Encouraging wildlife sanctuaries
  28.
    - a. Non-renewable resources are limited, we should use them judiciously
    - b. We should encourage the use of renewable resources
    - c. We should preserve the environment for future generation
    - d. The benefits of the controlled exploitation should go to local people

### **QUESTION BANK FOR PRACTICE**

1. Construction of a dam on a river often results in the reduction of fish catch. Why is it so?
2. Name one National Park and a bird sanctuary developed in our country to protect wild life, rare animals and birds.
3. Write another term for petroleum
4. What are Kulhs?
5. How would the setting of a factory on the bank of a river affect the population down stream?

6. Why the management of the forest and wildlife resources considered as a challenging task?
7. Industrialisation is one main cause of deterioration of environment. Discuss
8. What are the main factors responsible for causing ecological crisis in nature?
9. State one limitation of rain water harvesting.
10. Write two points for sustainable forest management.
11. How can you say that water is a basic natural resource?
12. Economic growth and ecological consideration should grow hand in hand. Explain why?
13. How can you make balance between environment and development?
14. What is Narmada Bachao Andolan?
15. Why is the re- use of material is better than recycling in saving the environment?
16. In what way industry is affecting the forest?
17. Explain various steps of rooftop rain water harvesting.
18. How can we make wise use of rains?
19. What are the various remedial measures to conserve wild life?
20. What steps do you take at your home in order to be environmental friendly?
21. Judicious use of oil and petroleum is very important. How can this be achieved?
22. Rainfall, soil conservation and depleting forest resources are interlinked with one another. Explain how they are related to one another.
23. Government is sole responsible for the protection of environment and individuals are not to be bothered about it. Give your comments on the statement.
24. What are the advantages of ground water over surface water?