

Question bank – Class – VIII – Chemistry

Chapter – 1 - Matter

1. Define:
- Matter – Anything which has mass, occupies space and can be perceived by our senses is called matter.
 - Sublimation – The change of state directly from solid to gaseous state is called....
 - Condensation – The process by which a gas changes to its liquid state is
 - Deposition – The process by which a gas turns to its solid state directly is called....
2. Name the following:
- Fixed temperature at which a solid turns to liquid – Melting point
 - Fixed temperature at which a liquid turns to gas – Boiling point
 - Fixed temperature at which a liquid turns to solid – Freezing point
 - Fixed temperature at which a gas turns to liquid – Condensation point
3. State the law of conservation of mass: - Matter can neither be created nor can be destroyed but can be converted from one form to another in which the total mass of the reactants remain equal to the total mass of the product.
4. Mention the characteristics of matter:
- Particles of matter are very small
 - Particles of matter have inter particle space
 - Particles of matter are in constant random motion
 - Particles of matter attract each other
5. Mention the conditions for the change of state:
- Heat energy
 - Pressure
6. What would you observe when solutions of barium chloride and sodium sulphate are mixed: - A white precipitate of barium sulphate is formed.
$$\text{BaCl}_2 + \text{Na}_2 \text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$$
7. What would you observe when vinegar is added to baking soda : - A strong effervescence is seen along with the evolution of a colourless gas.
$$\text{NaHCO}_3 + \text{CH}_3 \text{COOH} \rightarrow \text{CH}_3 \text{COONa} + \text{H}_2 \text{O} + \text{CO}_2$$
8. Why magnesium gains weight on burning? – During the burning of magnesium, oxygen is added to it to form magnesium oxide.
9. Mention the differences between solid and liquid with respect to floe, number of free surfaces, shape, cohesive force:

Solid

Do not flow
Many
Fixed shape
Very high

Liquid

Flows downward
One
No fixed shape
Moderate

Chapter – 2 – Physical and chemical change

1. Define ;

- (i) Physical change – The change in which the colour and state of matter may change but the composition does not change is called.....
- (ii) Chemical change – The change in which the composition of matter changes along with the change in its chemical properties is called.....

2. Mention the differences between physical and chemical change:

Physical change

- (i) Temporary change
- (ii) Composition does not change
- (iii) Components retain their properties
- (iv) Energy exchange is quite less
- (v) Reversible change

Chemical change

- Permanent change
- Composition changes
- Components acquire new properties
- Energy exchange more
- Irreversible change

3. Identify the following to be physical or chemical change; -

- (i) Bursting of cracker – Chemical change
- (ii) Bursting of balloon – Physical change
- (iii) Clotting of blood – Chemical change
- (iv) Burning of candle – Chemical change
- (v) Melting of wax – Physical change

4. Why respiration is considered as both physical and chemical change? :- During respiration oxygen gets converted to carbon dioxide which is a chemical change and the nitrogen which was inhaled becomes warm without getting converted to any new compound which is a physical change.

The characteristics of physical change and chemical change are to be followed from their differences.

Chapter – 3 – Elements, Compounds and Mixtures

1. Mention the different types of elements : Metal, Non metal, Metalloid and Noble gases

2. What happens to the elements while combining to form compound? – The elements lose their individual properties and acquire new properties.

Ex – Sodium is a poisonous and highly active metal and chlorine is a poisonous gas. When the two react to combine, they form sodium chloride which is edible.

3. Differentiate between the mixture of iron and sulphur, and the compound of iron and sulphur: -

	<u>Iron, sulphur (mixture)Fe+S</u>	<u>Iron, sulphur(compound)/FeS</u>
(i)	Grey black and yellow particles	Uniformly black solid
(ii)	Iron gets attracted by magnet	Magnet has no effect
(iii)	Carbon disulphide dissolves sulphur	Carbon disulphide has no effect
(iv)	Cannot be represented by formula	Has a molecular formula (FeS)

4. Mention the different kinds of separation techniques for the following : -

- (i) Sand and water – Filtration
- (ii) Sugar from sugar solution – Evaporation
- (iii) Iron from sulphur – Magnetic picking
- (iv) Iodine from sand – Sublimation
- (v) Copper sulphate from its saturated solution – Crystallisation
- (vi) Kerosene from petroleum – Fractional distillation
- (vii) Sodium chloride and potassium nitrate – fractional crystallization
- (viii) Water from a solution – Distillation
- (ix) Oil and water – Using separation funnel
- (x) Colour pigments from ink – Chromatography
- (xi) Cream from milk – Centrifugation
- (xii) Common salt from ammonium chloride – Sublimation
- (xiii) Chaff from rice grain – Hand picking
- (xiv) Ammonia and carbon dioxide – Diffusion
- (xv) Saw dust and sand – Gravitational method

5. Why components of a mixture are separated: - To obtain the components in a pure state.

Chapter – 4 – Atomic Structure

1. Mention the reasons

- (i) Alpha particles get deflected by a gold foil – Alpha particles are positively charged and nucleus has protons (positively charged particles) for which they get repelled hence deflected.
- (ii) Atom is neutral: - Atom has equal number of electrons and protons which neutralize each other.
- (iii) Atoms combine to form molecules: - Atoms are unstable due to unstable configuration. They combine to form molecules to attain duplet or octet state and to become stable.
- (iv) Atoms react but ions do not :- Atoms have incomplete configuration where as ions have complete configuration with duplet or octet state.

- (v) Some elements have variable valency :- Some elements have incomplete valence shell and incomplete penultimate shell for which they have variable valency.
- (vi) Atomic shells are called energy level :- Electrons revolve around the nucleus in different shells with specific amount of energy for which the shells are called energy levels.

2. Name the elements with variable valency :-

Ans: - Iron, Lead, Copper, Mercury, Tin.

3. Write the electronic configuration of the following: -

- (i) ${}_{11}\text{Na} \rightarrow 2,8,1$
(ii) ${}_{6}\text{C} \rightarrow 2,4$
(iii) ${}_{17}\text{Cl} \rightarrow 2,8,7$
(iv) ${}_{7}\text{N} \rightarrow 2,5$
(v) ${}_{18}\text{Ar} \rightarrow 2,8,8$
(vi) ${}_{8}\text{O} \rightarrow 2,6$
(vii) ${}_{12}\text{Mg} \rightarrow 2,8,2$
(viii) ${}_{16}\text{S} \rightarrow 2,8,6$
(ix) ${}_{20}\text{Ca} \rightarrow 2,8,8,2$
(x) ${}_{13}\text{Al} \rightarrow 2,8,3$

Chapter – 5 – Language of Chemistry

1. Define :-

- (i) Atom – Smallest particle of an element that may or may not have an independent existence and takes part in a chemical reaction is called....
- (ii) Molecule – Smallest part of a pure substance that has an independent existence is called....
- (iii) Molecular formula – The alphabetical representation of a compound that depicts the number of atoms of each element present in one molecule of a pure substance.
- (iv) Basic radical – The positively charged ion is called...
- (v) Acid radical – The negatively charged ion is called...
- (vi) Reactant – Substances used as starting materials to react with each other are called...
- (vii) Products – Substances which are produced as a result of the reaction are called...

2. Write the molecular formula of the following compounds: -

- (i) Magnesium chloride – MgCl_2
(ii) Sodium nitrate – NaNO_3
(iii) Ammonium sulphate – $(\text{NH}_4)_2\text{SO}_4$
(iv) Ferric carbonate – Fe_2CO_3
(v) Zinc nitride – Zn_3N_2

- (vi) Cupric hydroxide – $\text{Cu}(\text{OH})_2$
- (vii) Calcium bicarbonate – $\text{Ca}(\text{HCO}_3)_2$
- (viii) Aluminium sulphite – $\text{Al}_2(\text{SO}_3)_3$
- (ix) Lead(II) nitrate – $\text{Pb}(\text{NO}_3)_2$
- (x) Potassium bisulphate – KHSO_4
- (xi) Ferrous manganate – FeMnO_4
- (xii) Lead acetate – $(\text{CH}_3\text{COO})_2\text{Pb}$
- (xiii) Sodium phosphate – Na_3PO_4
- (xiv) Stannous oxide – SnO
- (xv) Chromic sulphide – Cr_2S_3

3. Write the names of the compounds :-

- (i) CaCO_3 – Calcium carbonate
- (ii) HNO_3 – Nitric acid
- (iii) NH_3 – Ammonia
- (iv) H_2SO_4 – Sulphuric acid
- (v) AgNO_3 – Silver nitrate
- (vi) $\text{C}_6\text{H}_{12}\text{O}_6$ – Glucose
- (vii) CuSO_4 – Cupric Sulphate
- (viii) SiO_2 – silicon dioxide
- (ix) K_2CO_3 – potassium carbonate
- (x) P_2O_5 – Phosphorus pentoxide
- (xi) H_2S – Hydrogen sulphide
- (xii) $(\text{NH}_4)_2\text{CO}_3$ – Ammonium carbonate
- (xiii) FeCl_3 – Ferric chloride
- (xiv) AlN – Aluminium nitride
- (xv) $\text{K}_2\text{Cr}_2\text{O}_7$ – Potassium dichromate

4. Why a chemical reaction has to be balanced?

Ans – To comply with the law conservation of mass which states that matter can neither be created nor can be destroyed but can be converted from one form to another during which the total mass of the reactants is equal to the total mass of the products.

SECOND TERM – CLASS – VIII – CHEMISTRY

CHAPTER – 6 – CHEMICAL REACTIONS

1. Define:-

- (i) **Chemical reaction** – The conversion of matter into one or more substances with entirely different properties is called chemical reaction.
- (ii) **Effervescence** – The evolution of gas bubbles in a liquid medium during a reaction is called....
- (iii) **Catalyst** – The substance which increases the rate of a chemical reaction is called...
- (iv) **Inhibitor** – The substance which decreases the rate of a chemical reaction is called....
- (v) **Enzyme** – The biological catalyst which controls the rate of the metabolic activities in a living being is called....
- (vi) **Exothermic reaction** – Chemical reaction in which heat is given out is called....
- (vii) **Endothermic reaction** - Chemical reaction in which heat is absorbed is called....
- (viii) **Basic oxide** – Metallic oxide which reacts with an acid to form salt and water only is called...
- (ix) **Acidic oxide** – Non-metallic oxide which dissolves in water to form the respective acid is called...
- (x) **Amphoteric oxide** – Metallic oxide which reacts with an acid as a base and reacts with a base as an acid to form salt and water only is called....

#The above questions can be asked in the form of: Fill in the blanks/True or false/Matching.

2. Mention the characteristics of chemical reaction

– Answer:-

- (i) There may be evolution of gas
- (ii) There may be change in colour
- (iii) There may be formation of precipitate
- (iv) There may be change of state
- (v) There is evolution or absorption of energy

3. Mention the conditions for a chemical

reaction Answer:-

- (i) Close contact – the reactants should be in contact with each other
- (ii) Solution – in some reactions, solution state is required to initiate the reaction
- (iii) Heat energy – heat activates the molecules to react
- (iv) Light energy – some photochemical reactions need light to react
- (v) Electricity – some electrochemical reactions need electrical energy
- (vi) Pressure – some reactions of gases need high pressure

(vii) Catalyst/Inhibitor – catalyst or promoter are used to increase or decrease the rate of chemical reaction

4. Name the following :-

- (i) Colourless gas evolves by heating lead nitrate – Oxygen
- (ii) Black precipitate form by passing hydrogen gas through copper sulphate solution – Copper sulphide
- (iii) White precipitate form by reacting silver nitrate with sodium chloride – Silver chloride
- (iv) A black precipitate form by heating copper nitrate – Copper oxide
- (v) Acid form by dissolving sulphur dioxide in water – Sulphurous acid
- (vi) Gas evolve by putting sodium in water – Hydrogen
- (vii) Acid contained in bee sting – Formic acid
- (viii) Chemical contained in antacid – Magnesium hydroxide
- (ix) Most reactive element of the activity series – Potassium
- (x) A mixed anhydride – Nitrogen dioxide
- (xi) Reaction in which only salt and water are formed – Neutralisation
- (xii) Substances used to identify acidic or alkaline nature of a solution – Indicators
- (xiii) Substance added to neutralize the acidity of soil – Quick lime/slaked lime/chalk
- (xiv) Substance used to decrease the rate of decomposition of hydrogen peroxide – Phosphoric acid
- (xv) Catalyst used to manufacture ammonia – Iron

The above questions can be asked in the form of: Fill in the blanks/True or false/Matching.

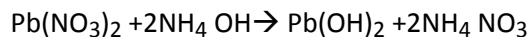
5. Identify the type of reaction:-

<u>Equation</u>	<u>Type</u>
(i) $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$	(simple displacement)
(ii) $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$	(decomposition)
(iii) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$	(neutralization)
(iv) $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$	(double displacement/precipitation)
(v) $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	(decomposition)

#Similar types of equations can be asked relating to the above format.

6. Mention your observation for the following:

- (i) A piece of sodium is dropped in water – Sodium skates on the surface of water forming a silvery globule, vigorous reaction takes place, effervescence takes place, sodium catches fire and burns with golden yellow flame.
 $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$
- (ii) A piece of zinc is dropped in copper sulphate solution – The blue solution of copper sulphate turns colourless, a brown solid is formed. $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- (iii) Ammonium hydroxide is added to lead nitrate solution – A white precipitate of lead hydroxide is formed.



- (iv) Copper carbonate is heated in a dry test tube – Green powder of copper carbonate leaves a black residue at the bottom of the test tube, a colourless gas evolves that turns lime water turbid.
 $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$
- (v) Dilute nitric is added to zinc oxide – White zinc oxide forms a colourless solution of zinc nitrate. $\text{ZnO} + 2\text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2 \text{O}$

While writing the answers for the observation question; mention the initial colour and state, changes during the reaction and final colour and state after the end of the reaction, mention the test for the gas evolved if any.

ADDITIONAL QUESTIONS

A. MULTIPLE CHOICE QUESTIONS Tick the most appropriate answer.

1. Which one of the following alters the rate of the chemical reaction without itself undergoing any change?

- a. Temperature and Pressure
- b. Concentration of reactants
- c. **Presence of catalyst**
- d. None of these

2. Heat energy is evolved in these reactions

- a. Thermal decomposition reactions
- b. **Exothermic reactions**
- c. Endothermic reactions
- d. None of these

3. Thermal decomposition of a substance is brought about with the help of

- a. Reactants

b. Water

c. Wind

d. **Heat**

4. Acids turn blue litmus

to a. **red**

b. yellow

c. green

d. none of the above

5. A metal that do not react with oxygen even on strong heating.

a. Na

b. **Pt**

c. Ca

d. Zn

6. An amphoteric

metal a. K

b. **Zn**

c. Fe

d. Mg

7. A non-metal that can form both acidic as well as neutral

oxide a. **Carbon**

b. Sulphur

c. Phosphorus

d. Chlorine

8. A catalyst used in manufacturing

ammonia a. Manganese

b. Copper

c. **Iron**

d. Nickel

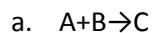
B. Fill IN THE BLANKS:

1. In an ----- reaction heat energy is absorbed. (endothermic)
2. In a double decomposition precipitation reaction both the reactants must be ----- soluble.(water)
3. In a neutralization reaction, an acid reacts with a ----- to form salt and water as the only products.(base)
4. On reaction with ----- acid solution, barium chloride forms a white precipitate of barium sulphate.(sulphuric)
5. In a ----- change, new substances are formed.(chemical)
6. The new substances formed during a chemical reaction are called the -----.(products)

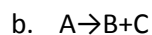
C. MATCH THE COLUMNS

COLUMN A

COLUMN B



(i) Double displacement reaction



(ii) Decomposition reaction



(iii) Thermal dissociation



(iv) Synthesis reaction

Δ



(v) Displacement reaction

Sol. a. (iv)

b. (ii)

c. (v)

d. (i)

e. (iii)

D. State whether the following statements are TRUE \ FALSE. Rewrite the false statements correctly.

1. A precipitation reaction takes place only in a solution.

True.

2. Copper can displace iron from iron sulphate. False.

Copper cannot displace iron from iron sulphate

3. Evaporation of water is a physical change. True or false ?

True.

4. Amylase breaks proteins into amino acids.

False. Amylase breaks starch into simple sugars. / Pepsin breaks proteins into amino acids.

5. Soluble bases are called alkalis.

True.

E. State your observations in the following reactions.

1. When hydrogen sulphide gas is passed through copper sulphate solution ?

2. When hydrogen sulphide and chlorine gas react together

? Ans. A yellow solid is formed.

3. When iron filings are heated with molten sulphur ?

Ans. A greyish black solid is formed.

4. When mercuric oxide is heated in a test tube ?

Ans. On gentle heating the red powder (mercuric oxide) will become black and on strong heating a silver mirror is formed in the cooler parts of the test tube.

5. When copper hydroxide is heated ?

Ans. The pale blue solid (copper hydroxide) changes to black solid.

6. When copper carbonate is heated

? Ans. The green solid becomes black.

7. When lead nitrate solution is mixed with ammonium hydroxide ?

Ans. A white precipitate is formed.

8. When copper sulphate solution is mixed with sodium hydroxide solution

? Ans. A pale blue precipitate is formed.

9. When calcium chloride solution is treated with sodium hydroxide solution

? Ans. A white precipitate is formed.

10. When a piece of copper metal is dipped in silver nitrate solution for a long time

? Ans. A deep blue solution is formed.

F. Write balanced chemical equation for the following reactions:

1. Formation of a sodium salt by neutralisation.
2. Precipitation of a silver salt.
3. Thermal decomposition of a green carbonate.
4. Displacement reaction in which a neutral gas is formed.
5. Thermal decomposition of a pale blue solid.

Answer:

1. $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
2. $\text{AgNO}_3 + \text{HCl} \rightarrow \text{AgCl} \downarrow + \text{HNO}_3$
3. $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$
4. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
5. $\text{Cu}(\text{OH})_2 \rightarrow \text{CuO} + \text{H}_2\text{O}$

G. Name the following :

1. A greenish yellow gas—chlorine
2. The formation of gas bubbles in a liquid during a reaction—effervescence.
3. The new substance formed during a chemical reaction—products.

4. The insoluble solid formed when two substances react together in their aqueous state ---- precipitate.
5. An amphoteric oxide—zinc oxide / lead oxide/ aluminium oxide.
6. A weak alkali which does not contain any metal ion---ammonium hydroxide.
7. The acid anhydride of sulphuric acid---sulphur oxide.
8. A neutral oxide of nitrogen—nitric oxide/ nitrous oxide.
9. The complex protein molecules which act as catalysts in biochemical reactions—enzymes
10. The most active metal in the metal activity series—potassium.

H. WRITE SHORT ANSWERS

Question 1.

What are chemical reactions?

Answer:

Chemical reactions are defined as changes in which substances undergo an irreversible change, resulting in the formation of a new substances. Question 2.

What are biocatalysts ?

Answer:

Biocatalysts are enzymes which help our body to perform various metabolic functions, e.g. amylase, lipase etc.

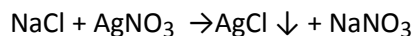
Question 3.

How is precipitate formation in a chemical reaction indicated?

Answer:

A precipitate is an insoluble substance formed when two substances or chemicals react in solution form. The precipitate formed is indicated by writing an arrow

pointing downwards (\downarrow) beside the precipitate.



Question 4.

Name the type of reaction which is governed by the position of a metal in the metal activity series ?

Answer:

Displacement reaction.

Chapter – 7 – Hydrogen

1. Name the following:
 - (i) Metal that can produce hydrogen gas from steam, alkali and dilute acid – Aluminium
 - (ii) Metal that undergoes reversible reaction with steam – Iron
 - (iii) Scientist who prepared hydrogen for the first time – Robert Boyle
 - (iv) Metal that produces hydrogen from very dilute nitric acid – Magnesium/Manganese
 - (v) Metal that does not produce hydrogen from acid or alkali or water – Copper/name any metal below hydrogen in the activity series
 - (vi) Drying agent used for hydrogen – Anhydrous calcium chloride
 - (vii) Metal oxide reduced by hydrogen – copper oxide/ lead oxide
 - (viii) Catalyst used during hydrogenation of oil – Nickel / platinum
 - (ix) Gas produced by passing steam over white hot coke – Water gas
 - (x) Explosive mixture formed by mixing hydrogen and oxygen – detonation mixture

2. With respect to the preparation of hydrogen in the laboratory; answer the following questions:
 - (i) Name the reactants – Granulated Zinc and dilute sulphuric / hydrochloric acid.
 - (ii) Why granulated zinc is used? – Granulated zinc contains copper as impurity which acts as catalyst.
 - (iii) How hydrogen gas is collected? – By downward displacement of water
 - (iv) Why zinc is chosen for the purpose? – Metals above zinc are highly reactive and metals below zinc are very slow to react or unreactive but zinc reacts steadily with dilute acid.
 - (v) Write the equation – $\text{Zn} + \text{H}_2 \text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$

3. Write balanced molecular equations for the following:

- (i) Magnesium + sulphuric acid :- $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$
- (ii) Aluminium + water (steam) :- $2\text{Al} + 3\text{H}_2\text{O} \rightarrow \text{Al}_2\text{O}_3 + 3\text{H}_2$
- (iii) Manganese + nitric acid :- $\text{Mn} + 2\text{HNO}_3 \rightarrow \text{Mn}(\text{NO}_3)_2 + \text{H}_2$
- (iv) All the reactions of Bosch process :- $\text{C} + \text{H}_2\text{O} \rightarrow \text{CO} + \text{H}_2$
 $\text{CO} + \text{H}_2 + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2$
- (v) Copper oxide + hydrogen :- $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 (black) (brown)
- (vi) Sodium + hydrogen :- $2\text{Na} + \text{H}_2 \rightarrow 2\text{NaH}$
- (vii) Triferric tetroxide + hydrogen :- $\text{Fe}_3\text{O}_4 + 4\text{H}_2 \rightarrow 3\text{Fe} + 4\text{H}_2\text{O}$
- (viii) Reaction of Haber process :- $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

4. With respect to the electrolysis of acidulated water; answer the following questions –

- (i) Name the acid used – Dilute sulphuric acid
- (ii) Name the gases evolved at cathode and anode respectively – Hydrogen , oxygen
- (iii) Name the material of the electrodes – Platinum
- (iv) Why acid is added to water? – To ionize water to make it a conductor of electricity as water is a bad conductor of electricity.
- (v) Mention the ratio of the gases collected at cathode and anode – Hydrogen : Oxygen = 2:1

5. Mention the reasons for the following :

- (i) Hydrogen is used as fuel – Hydrogen has low ignition temperature and very high calorific value.
- (ii) Hydrogen is not reacted with chlorine in direct sunlight – The reaction would explode in direct sunlight, to keep the reaction under control, direct sunlight is avoided.
- (iii) Hydrogen is not collected by the displacement of air – Hydrogen forms an explosive mixture with air, for safety precaution it is not collected over air.
- (iv) Copper is not used to prepare hydrogen from acid – Copper is less reactive than hydrogen, it cannot displace hydrogen from the acid and the very purpose would be defeated.

6. Define the following:

- (i) Redox reaction – The reaction in which both reduction and oxidation take place simultaneously is called redox reaction.
- (ii) Electrode – The electrical conductor through which electric current enters / leaves the electrolyte during the process of electrolysis.

ADDITIONAL QUESTIONS

A MULTIPLE CHOICE QUESTIONS Tick the most appropriate answer.

(i). The name hydrogen was given by

1. Cavendish
2. **Lavoisier**
3. Haber
4. none of these

(ii). Which is the lightest of all elements?

1. **hydrogen**
2. helium
3. lithium
4. none of these

(iii). Hydrogen burns in oxygen to form

1. hydrogen sulphide
2. nitrates
3. **water**
4. ammonia

(iv). The process of adding oxygen to a substance is called

1. **oxidation.**
2. reduction.
3. displacement.

4. hydrogenation.

B.FILL IN THE BLANKS:

1. In nature, hydrogen occurs as a diatomic molecule represented as H_2 .
2. Sodium liberates hydrogen when treated with cold water.
3. Granulated zinc is preferred over pure zinc in the laboratory preparation of hydrogen.
4. The compounds of carbon and hydrogen are called hydrocarbon.
5. In electrolysis of water, dilute sulphuric acid is added to increase conductivity current of water.
6. Sodium and potassium are stored in kerosene oil.
7. Hydrogen-oxygen mixture is called detonating mixture
8. The substance that gets reduced acts as an oxidising agent.

C. Write true or false for each statement. Rewrite the false statements correctly.

1. Lead reacts briskly with dilute hydrochloric acid to form hydrogen. False.

Lead reacts very slowly with dilute hydrochloric acid to form hydrogen.

2. Hydrogen does not combine with nitrogen under ordinary conditions.

True.

3. Copper reacts with hot water to form copper oxide and hydrogen.

4. Hydrogen is a good oxidizing agent.

False. Hydrogen is a reducing agent.

D. WRITE SHORT ANSWERS

Question 1.

Why is granulated zinc preferred in the laboratory preparation of hydrogen?

Answer:

Granulated zinc contains traces of copper as an impurity which acts as a catalyst. It also prevents the deposition of the gas on zinc.

Question 2.

Give a test to identify hydrogen gas.

Answer:

Hydrogen is a highly inflammable gas which burns with a 'pop' sound and blue flame and forms water.

Question 3.
Hydrogen gas is collected by the downward displacement of water. Give reason.

Answer:

Hydrogen gas is collected by the downward displacement of water because hydrogen gas is practically insoluble in water.

Question 4.

Write two physical properties of hydrogen.

Answer:

Physical properties of hydrogen gas

1. It is a colourless, odourless and tasteless gas.
2. It is highly inflammable and burns with a blue flame.

Question 5.
What is hydrogenation?

Answer:

Hydrogenation is a process in which vegetable oils are converted into fats on treating with hydrogen.

E.ANSWER IN DETAIL

Question 1.

Discuss the occurrence of hydrogen in the universe and on the earth.

Answer:

Hydrogen is the most abundant element on Earth. It is present in large amounts in stars and sun. In our atmosphere and Earth's crust, it is found in very small amount.

Hydrogen compounds are found abundantly e.g. acids, bases and hydrocarbons. Nearly three fourth of earth's surface is covered with water which is formed from hydrogen itself.

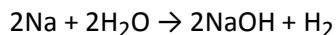
Question 2.

How do different metals displace hydrogen from water? Explain with the help of equations.

Answer:

Almost all metals react with water but with different intensities.

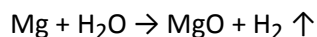
1. Sodium and potassium react violently with cold water to an extent that hydrogen gas so produced catches fire.



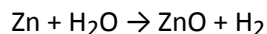
2. Calcium reacts less violently with water.



3. Magnesium reacts with hot water to form magnesium oxide and hydrogen.



4. Metals like aluminium zinc and iron reacts only with steam.



5. Metals like gold, silver and copper do not react with water.

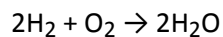
Question 3.

Describe two chemical properties of hydrogen with equations.

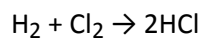
Answer:

Chemical properties of hydrogen gas:

1. Reaction with oxygen: Hydrogen burns with a pale blue flame in air or oxygen forming water. This reaction is highly explosive.



2. Reaction with chlorine: Hydrogen reacts with chlorine in diffused sunlight to form hydrogen chloride.

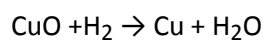


Question 4.

Why is hydrogen called a reducing agent? Give chemical equation to support your answer.

Answer:

Hydrogen has the capacity to remove oxygen from a number of metal oxide. Therefore hydrogen is a good reducing agent.



Question 5.

Discuss the use of hydrogen as a fuel.

Answer:

Liquid hydrogen is used as a fuel in rockets and guided missiles. Hydrogen can also be used as a fuel in automobiles. Researches are being done to discover use of hydrogen as an alternative source of energy in future since this would cut down pollution also.

F. Choose the odd one out giving reasons:

1. Acetic acid, nitric acid, hydrochloric acid, sulphuric acid
2. Aluminium, zinc, iron, copper
3. Calcium oxide, zinc oxide, lead oxide, aluminium oxide
4. Carbonate, nitrate, ammonium, chloride

Ans. 1. Acetic acid- it's a weak electrolyte and rest are strong electrolytes.

2. Copper- it is below hydrogen in the metal activity series and rest are above hydrogen.

3. Calcium oxide is not amphoteric and rest are amphoteric oxides.

4. Ammonium- it is a cation and rest are anions.

G. Name the following:

1. A catalyst used in hydrogenation of oils- platinum/palladium/nickel
2. A metal which can produce hydrogen with very dilute nitric acid.-Magnesium/ Manganese
3. The method of collection of hydrogen in laboratory- Downward displacement of water.
4. The gas collected at cathode during electrolysis of acidified water-Hydrogen
5. The electrode at which anions get discharged during electrolysis-Anode
6. A container in which electrolysis take place-Electrolytic cell
7. A catalyst used in the manufacture of ammonia-Iron
8. The gas produced when hydrogen is passed through boiling sulphur-Hydrogen sulphide.
9. A gas having rotten egg smell-Hydrogen sulphide
10. A metal that can produce hydrogen with steam as well as boiling water-Magnesium.

H. Write balanced chemical equations for the following reactions:

1. Reduction of copper oxide
2. Preparation of hydrogen from water using a monovalent metal.
3. Laboratory preparation of hydrogen
4. Preparation of hydrogen using nitric acid.

acid. Answer.

1. $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
2. $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$
3. $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
4. $\text{Mg} + 2\text{HNO}_3 \rightarrow \text{Mg}(\text{NO}_3)_2 + \text{H}_2$

Chapter – 8 – Water

1. Why water is called a compound? – Water comprises hydrogen; an explosive gas and oxygen; a supporter of combustion, but water extinguishes fire. The property of water is completely different from the property of the constituent elements.
2. Mention the physical properties of water: -
 - (i) Colourless, odourless and tasteless liquid.
 - (ii) Boiling point is 100°C at stp.

- (iii) Freezing point is 0°C at stp.
 - (iv) Density is 1g/cm^3 (1000kg/m^3) at 4°C
 - (v) Has high specific capacity ($4.2\text{Joules/g}^{\circ}\text{C}$)
3. Why water is used as a cooling agent? – Water has high specific capacity for which it absorbs a large amount of heat from the surrounding, hence used as a cooling agent.
 4. What is triple point? – Water exist in all the three states, solid, liquid and gas at 0° centigrade. Therefore 0° centigrade is called triple point of water.
 5. Why water is called a universal solvent? – Water dissolves almost all kinds of solid, liquid and gases in it for which it is called a universal solvent.
 6. What are the effects of temperature and pressure on solubility of (i) solid and (ii) gas? Solid – Increase in temperature increases the solubility,
Pressure has no effect
Gas – Increase in temperature decreases the solubility,
Increase in pressure increases the solubility
 7. What is the effect of impurity on boiling point and melting point of water? Presence of impurity increases the boiling point and decreases the melting point.
 8. Why pressure cooker cooks the food faster? – Pressure cooker increases the pressure inside the cooking space hence the boiling point increases, as a result cooking becomes faster.
 9. Name the following:-
 - (i) Homogeneous mixture of two or more substances – Solution
 - (ii) Solution made with water – Aqueous
 - (iii) Solution made without water – Non-aqueous
 - (iv) Substance that dissolves in the solvent to form a solution – Solute
 - (v) Substance that dissolves the solute in it – Solvent
 - (vi) Liquids which dissolve in each other – Miscible liquids
 - (vii) Liquids which do not dissolve in each other – Immiscible liquids
 - (viii) Substance used to lower the melting point of matter – Freezing mixture
 - (ix) Purest form of water – Distil water
 - (x) Purest form of natural water – Rain water
 - (xi) Solution which cannot dissolve more solute in it at a given temperature – saturated solution
 - (xii) Solution which can dissolve more solute in it at a given temperature – Unsaturated solution
 - (xiii) Solution that holds more solute than it can hold at room temperature – Super saturated solution
 - (xiv) Homogeneous solid of fixed geometrical shape – Crystal
 - (xv) Fixed amount of water included within the structure of a crystal by a loose chemical combination – Water of crystallization
 - (xvi) The phenomenon due to which a crystal loses its water of crystallization partially or completely on exposure to air – Efflorescence

- (xvii) The phenomenon due to which a crystal a crystal absorbs moisture from the atmosphere on exposure and turns to a saturated solution – Deliquescence
- (xviii) The phenomenon due to which a substance absorbs moisture from the atmosphere without dissolving in it – Hygroscopy
- (xix) Type of oxides form by metals – Basic oxide and amphoteric oxide
- (xx) Type of oxides form by non metals – Acidic oxide and neutral oxide
- (xxi) Hardness of water which can be removed by boiling – Temporary hardness
- (xxii) Hardness of water which cannot be removed by boiling – Permanent hardness
- (xxiii) Water that does not form lather with soap – Hard water
- (xxiv) Water that forms lather with soap easily – Soft water
- (xxv) Process of obtaining crystals from hot saturated solution by cooling - Crystallisation

The above format can be altered into: - definition, fill in the blanks, matching, true/false and multiple choice questions.

10. Write balanced equations of the reaction of sodium oxide, calcium oxide, sulphur dioxide sulphur trioxide and carbon dioxide with water: -
- $$\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{NaOH}$$
- $$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$$
- $$\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$$
- $$\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$$
- $$\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$$

11. Mention the reasons why the following substances are stored in airtight containers: (i) Ferric chloride, (ii) Glauber's salt (iii) Concentrated sulphuric acid

- (i) Ferric chloride is a deliquescent substance; it absorbs moisture on exposure and becomes a solution. To prevent the phenomenon it is stored in airtight container.
- (ii) Glauber's salt is an efflorescent substance; it loses its water of crystallization on exposure. To prevent the phenomenon it is stored in airtight container.
- (iii) Concentrated sulphuric acid is hygroscopic substance; it absorbs moisture on exposure and turns dilute. To prevent the phenomenon it is stored in airtight container.

ADDITIONAL QUESTIONS

Question 1 .Discuss the importance of water as a solvent for (a) our body (b) plants.

Answer:

(a) Our body— Our body cannot absorb food substances unless they are soluble in water. In this process of digestion, food is reduced to simple substances that are soluble in water. They can then be dissolved in water and absorbed by the body. Excrements are defecated from our body by dissolving in water. Chemical reactions occur inside our body through water.

(b) Plants— In plants, mineral-salts are transported to the upper parts of the plants from the soil by means of water through roots. As a solvent, water helps the plants in preparing their food through photosynthesis process.

Question 2. Give any three important uses of water.

Answer: Water is indispensable for all the living-organisms. 70% of human body consists of water. Water sustains several life processes in humans and animals. Water helps in controlling our body temperature. Water also generates electricity. Water keeps the environment and atmosphere mild when it is too hot.

Question 3. Explain how the peculiar variation of density of water with temperature can (a) protect marine-life (b) cause water— pipes to burst in very cold places.

Answer: (a) Due to steep fall in the temperature in coastal regions, the density of water in the sea varies and the top layer of the sea water turns into ice and floats on the surface of sea-water because of lesser density than that of water. Whereas, the bottom denser layers of water remain as usual, thus the marine-life gets protected from freezing.

(b) The peculiar variation of density of water with temperature causes water—pipes to burst in very cold places, it happens due to expansion of water on freezing. The water inside the pipes gets frozen and expands, pressing the inner walls of the water-pipes, causing them to burst.

Question 4. A captain of ship will tell you that an iceberg is much bigger than it looks. Why is it so ?

Answer: Icebergs are the huge formation of water turned into ice, floating in the sea-water in the Arctic and Antarctic oceans. Merely, 1/9th of the iceberg is visible above the water. The rest of the 8/9th is below the surface. Hence, an iceberg is very much bigger than it seems to be.

Question 5. Why is water used in hot-water bottles ?

Answer: Water takes a long time to cool down, so water is used in hot water bottles to prolong the warming-effect inside the hot- water bottle.

Question 6. What do you mean by a saturated solution ?

Answer: When a solute stops dissolving into a solvent beyond a particular limit, the formed solution is said to be a saturated solution.

Question 7. What do you mean by water pollution ? What are its causes and how can water pollution be controlled ?

Answer: Water pollution— The water present in rivers, ponds, lakes and streams, comes from rain and the melted snow of the mountains. As it flows the down the plains, it picks up many dissolved and suspended impurities and gets polluted

Causes of water pollution:

Industrial and agricultural processes— Fertilizers, pesticides, insecticides and other chemicals used in cultivated fields, get dissolved in water when it flows over these fields. They make the water unfit for consumption.

Nuclear and thermal power plants— Power plants discharge the hot water often containing chemicals into water streams. It is harmful for aquatic life.

The discharge of sewage and garbage— The discharge of sewage and garbage into river water is one of the major causes of water pollution.

Prevention of water pollution—

Make people aware of pollution.

Make sanitary facilities available is rural areas and city slums.

Domestic sewage should be treated before being discharged into rivers.

The solid matter separated from sewage can be used to generate biogas.

The waste products of industries should be treated before they are discharged into rivers and other water bodies.

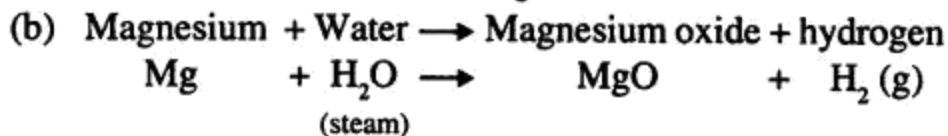
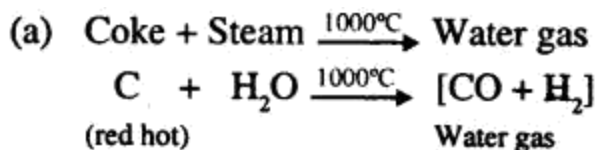
We should stop using substances like detergents, pesticides, polythene etc.

Question 8. Give balanced chemical equations to show the reaction between:

(a) Coke and steam

(b) Magnesium and

water Answer:



9. What do you mean by the specific heat of a substance ?

Ans. The specific heat of a substance is the amount of heat required to raise the temperature of a unit mass of that substance by one degree centigrade.

10. Name some solvents other than water:

Ans. Alcohol, vinegar, fruit juice, carbon tetrachloride, carbon disulphide .

11. Compare the properties of solution, suspension and colloids on the basis of :

- a. particle size
- b. transparency
- c. visibility
- d. filtrability

Ans.

PROPERTY	SOLUTION	SUSPENSION	COLLOIDS
a. particle size	Less than 10^{-10}	Greater than 10^{-7}	Between 10^{-10} - 10^{-7}
b. transparency	Transparent	Opaque	Translucent
c. visibility	Invisible	Visible	Can be seen under powerful microscope.
d. filtrability	Cannot be filtered through a filter paper	Can be filtered through a filter paper	Particles pass through ordinary filter paper but not through ultra filters.

12. Write the common names of the following compounds:

- a. Copper sulphate pentahydrate
- b. Iron(II) sulphate heptahydrate
- c. Zinc sulphate heptahydrate
- d. Sodium carbonate decahydrate
- e. Sodium sulphate decahydrate

Answer:

- a. Blue vitriol
- b. Green vitriol
- c. White vitriol
- d. Washing soda
- e. Glauber's salt

13. Write two chemical tests for water :

Ans .a. It turns anhydrous copper sulphate from white to blue.

b. It turns anhydrous cobalt chloride from blue to pink.

14. Write balanced chemical equations for the following reactions:

- a. Removal of temporary hardness of by boiling
- b. Removal of permanent hardness by washing soda
- c. Exposure of chlorine water to sunlight
- d. Reaction of red hot iron with steam

Ans.

- a. $\text{Ca}(\text{HCO}_3)_2 \rightarrow \text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
- b. $\text{Na}_2\text{CO}_3 + \text{CaSO}_4 \rightarrow \text{CaCO}_3 + \text{Na}_2\text{SO}_4$
- c. $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow 2\text{HCl} + \text{O}_2$
- d. $3\text{Fe} + 4\text{H}_2\text{O} \leftrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$

15 Which of the following substances will show

- a. increase in mass
- b. decrease in mass
- c. No change in mass
on exposure to air for some time ?

NaCl, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, MgCl_2 , NaOH, KNO_3

Ans. a. MgCl_2 , NaOH

b. $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$

c. NaCl , KNO_3

Chapter – 9 – Carbon and its Compounds

1. Name the following: -

- (i) Allotrope of carbon that conducts electricity – Graphite
- (ii) Hardest form of carbon – Diamond
- (iii) Allotrope of carbon used to make kajal – Lamp black
- (iv) Allotrope of carbon used as adsorber – wood charcoal
- (v) Allotrope of carbon used as decolouriser – Bone charcoal
- (vi) Product of destructive distillation of coal – Gas carbon/coke
- (vii) Allotrope of carbon used as electrode – Gas carbon
- (viii) Allotrope of carbon used as fuel – Wood charcoal
- (ix) Coal used as domestic fuel – Bituminous
- (x) Coal with maximum carbon content – Anthracite
- (xi) Allotrope of carbon used to make shoe polish – Lamp black(soot)
- (xii) Three crystalline forms of carbon – Graphite/ Diamond/Fullerene
- (xiii) Allotrope of carbon with hexagonal arrangement – Graphite
- (xiv) Products of destructive distillation of coal – Coke, Coal gas, Coal tar and ammoniacal liquor
- (xv) Products of destructive distillation of wood – Wood tar, wood gas, wood charcoal and pyroligneous acid.
- (xvi) Gas produced by the incomplete combustion of carbon – Carbon monoxide
- (xvii) Gas produced by the complete combustion of carbon – Carbon dioxide
- (xviii) Natural process by which coal is formed from plant body – Carbonization
- (xix) Poorest variety of coal – Peat
- (xx) Allotrope of carbon used to make artificial diamond – Sugar charcoal

The above questions can be altered to: fill in the blank/matching/true or false/multiple choice.

2. Mention the reasons for the following:-

- (i) Diamond is hard but graphite is soft – In case of diamond all the four valence electrons of the carbon atoms undergo sharing to form a rigid tetrahedral structure; for which it is hard, but in case of

graphite, the three out of the four valence electrons undergo sharing to form hexagonal structure and the layers are held by weak force of attraction; for which it is soft.

- (ii) Graphite conducts electricity but diamond does not – Due to the availability of one free electron in the structure of graphite; it conducts electricity but the structure of diamond does not have any free electron for which it does not conduct electricity.
 - (iii) Activated charcoal is used as an adsorbent – Activated charcoal is porous with more surface area for which it is used as an adsorber.
 - (iv) Soda-acid and foam-type fire extinguisher are not used to fight electrical fire – Due to the presence of acid and salt, the flush would carry ions and conduct electricity that cause short-circuit which results in aggravating the fire.
 - (v) Blue flame is seen at the top of a coal fire – At the bottom zone carbon dioxide is formed which get reduced to carbon monoxide in the middle zone that burns with a blue flame at the top of the coal fire.
 - (vi) Inhaling carbon monoxide is dangerous – Carbon monoxide combines with haemoglobin of the blood and forms a stable compound carboxyl-haemoglobin that ceases the supply of oxygen to the different parts of the body and causes death.
3. With respect to the preparation of carbon dioxide gas; answer the following questions:-
- (i) Name the chemicals needed – Calcium carbonate (marble chips) and dilute hydrochloric acid.
 - (ii) How the gas is collected – By upward displacement of air.
 - (iii) Why marble chips is preferred – It is cheap and easily available.
 - (iv) Why the gas is collected by upward displacement of air – As it is denser than air.
 - (v) Why dilute sulphuric acid is not used – Dilute sulphuric acid forms insoluble calcium sulphate which ceases further reaction.
 - (vi) Why carbon dioxide is not collected over water – Carbon dioxide dissolves in water to form carbonic acid. To prevent the formation of the acid, it is not collected over water.
4. Mention your observation for the following:-
- (i) Carbon dioxide is passed through lime water slowly then in excess – Initially it forms a white precipitate due to the formation of insoluble calcium carbonate and by passing excess of the gas the turbidity disappears due to the formation of soluble calcium bicarbonate. $\text{Ca (OH)}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$
 $\text{CaCO}_3 + \text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{Ca (HCO}_3)_2$
 - (ii) Copper carbonate is heated strongly – Green powder of copper carbonate leaves a black residue of copper oxide on heating and releases colourless carbon dioxide gas.
 - (iii) A piece of charcoal is dropped in blue/black/red ink solution – The blue/black/red colour of the solution slowly fades away.
 - (iv) Concentrated sulphuric acid is added to sugar crystal – The white crystalline sugar turns into black spongy mass of sugar charcoal.
5. Define green house effect – The trapping of the earth's radiated energy by carbon dioxide of the air, to keep the earth warm, is called green house effect.

6. Name the green house gases – Carbon dioxide, Methane, chloroflouro carbon and nitrous oxide

ADDITIONAL QUESTIONS

(I).MULTIPLE CHOICE QUESTIONS

Tick the most appropriate answer.

1. Diamond and graphite are

- a. metals.
- b. organic compounds,
- c. alkenes.
- d. **allotropes.**

2. Which of the following is an amorphous form of carbon? a. graphite

- b. fullerenes
- c. diamond
- d. **coal**

3. Which form of carbon is a good conductor of electricity? a. **graphite**

- b. diamond
- c. coke
- d. amorphous carbon

4. Carbon has a great affinity for a. sulphur

- b. nitrogen
- c. **oxygen**

d. none of these

6. Fuel gases like water gas and producer gas are manufactured

from a. bone charcoal

b. wood

charcoal c. **coke**

d. none of these

B. FILL IN THE BLANKS

1. Carbon atom has four electrons in its valence shell.

2. Graphite is used to make carbon brushes in dynamos.

3. Lamp black is used as a pigment and colouring matter in ink and shoe polish.

4. Carbon when heated in limited supply of air forms carbon monoxide.

5. Organic compounds have low boiling and melting points.

6. Hydrocarbons are the compounds of hydrogen and carbon only.

7. Natural gas is an important fossil fuel.

8. Graphite is a good conductor of electricity.

C.State whether the following statements are TRUE \ FALSE and rewrite the false statements correctly

1. Synthetic diamonds are used for cutting glass and drilling rocks.

True

2. Graphite is a poor conductor of electricity.

3. Coal can be converted to coke by destructive distillation.

True

4. Buckyball is a yellow amorphous solid.

False. Buckyball is a yellow crystalline solid.

5. Organic compounds are soluble in water.

6. Pure diamond can occur in several colours.

False. In its purest form a diamond is colourless.

7. Carbon forms innumerable compounds by combining with other elements. True or false

? True.

8. Most of our food contains compounds of carbon. True or false ?

True.

D.WRITE SHORT ANSWERS

Question 1. Name the crystalline forms of carbon.

Answer: Diamond and graphite are the crystalline forms of carbon.

Question 2.Name the simplest organic compound.

Answer: Methane is the simplest organic compound.

Question 3.What are hydrocarbons ? Name the two different forms of hydrocarbons.

Answer: Hydrocarbons are the compounds of hydrogen and carbon. They are the simplest of all the organic compounds.

Hydrocarbons are of two types: (i) Organic (ii) Inorganic

Question 4.What is the function of activated charcoal ?

Answer: Function of activated charcoal:

It is used as a catalyst in various chemical reactions e.g. reaction of hydrogen with chlorine.

It is used to separate a mixture of noble gases, like helium, argon, neon, krypton etc.

It adsorbs different gases at different temperatures.

Question 5. What is water gas used for ?

Answer: Uses of water gas:

It is used in industry to prepare large number of organic compounds.

It is used as an industrial fuel.

It is used for the synthesis of ammonia.

Question 6. What is the atomic number of carbon ?

Answer: The atomic number of carbon is 6.

Question 7. What is the name of the famous diamond that was found in Wajrakarur in Andhra Pradesh ?

Answer: Kohinoor

E. ANSWER IN DETAIL

Question 1. Why does diamond sparkle?

Answer: Diamond has a very high refractive index. It is because of this property that diamond sparkles. When light enters the diamond crystal, it suffers multiple total internal reflections and due to this, it sparkles.

Question 2. Define catenation.

Answer: Carbon possesses a unique property of combining with other carbon atoms to form long chains. This property is called catenation. The chains can be straight, branched or closed.

Question 3. State one use of each of the following: Diamond, Graphite, Coke, Bone charcoal Answer:

Diamond: It is used in making jewellery items. Graphite: It is used to make pencil lead and electrodes. Coke: It is used as an industrial and household fuel.

Bone charcoal: It is used as a decolouring agent in sugar cane industries.

Question 4. How is gas carbon produced?

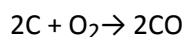
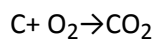
Answer: Gas carbon is produced by the destructive distillation of coal or heating of hydrocarbons at high temperature. During this process decomposition takes place and carbon particles are collected to form gas carbon.

Question 6.

Write three chemical properties of carbon.

Answer: CHEMICAL PROPERTIES OF CARBON

- (i) Reaction with oxygen: Carbon has a great affinity for oxygen. In excess supply of oxygen, it forms carbon dioxide. In limited supply of oxygen it forms carbon monoxide, which is a poisonous gas.



(ii) Reaction with hydrogen: Carbon reacts with hydrogen at 500°C and 250 atmospheric pressure to form a mixture of hydrocarbons like ethane, methane etc.

(iii) Carbon as reducing agent:

Carbon reduces metal oxides to form metal and carbon monoxide. $ZnO + C \rightarrow Zn + CO$

Question 7.

How is wood charcoal a better fuel than wood?

Answer: Wood charcoal is a better fuel than wood because of the following reasons:

Its calorific value is higher than wood.

Its ignition temperature is lower than wood.

It causes less air pollution.

F. Write balanced chemical equations for the following reactions:

a. Reducing action of carbon monoxide.

- b. Reaction taking place in soda acid fire extinguisher
- c. Burning of magnesium in an atmosphere of carbon dioxide
- d. Reaction of lime water with carbon dioxide

Ans.

- a. $\text{CuO} + \text{CO} \rightarrow \text{Cu} + \text{CO}_2$
- b. $2\text{NaHCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O} + 2\text{CO}_2$
- c. $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$
- d. $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$

G. State two effects of global warming :

Ans. a. According to the scientists the average temperature of the earth has risen by 0.5°C in the past 100 years.

b. Ice in polar regions will melt at alarming rate causing floods in coastal regions and islands

c. Many species of plants and animals will extinct.