

Chapter: 14

Q.1 Fill in the blank and rewrite the completed statements

4

1 The chemical name of Teflon is

Ans The chemical name of Teflon is **Polytetra fluroethene**.

2 The number of molecules of water of crystallization in washing soda is

Ans The number of molecules of water of crystallization in washing soda is **10**.

3 is used in the treatment of hyperthyroidism.

Ans **Iodine - 123** Is used in the treatment of hyperthyroidism.

4 The chemical name of baking soda is

Ans The chemical name of baking soda is **Sodium bicarbonate**.

Q.2 Match the pair

2

1

| Column 'A' | Column 'B' |
|--------------------|----------------------------|
| i. Saturated brine | a. Sodium metal freed |
| ii. Fused salt | b. Crystallization of salt |
| | c. Oxidation of colour |

Ans

| | |
|--------------------|--------------------------------|
| i. Saturated brine | Crystallization of salt |
| ii. Fused salt | Sodium metal freed |

2

| Column 'A' | Column 'B' |
|----------------------|------------------------|
| i. CaOCl_2 | a. Basic salt |
| ii. NaHCO_3 | b. Sodium metal freed |
| | c. Oxidation of colour |

Ans

| | |
|----------------------|----------------------------|
| i. CaOCl_2 | Oxidation of colour |
| ii. NaHCO_3 | Basic salt |

Q.3 Name the following

1

1 Name the disease caused due to over consumption of artificial food colors.

Ans Attention Deficit Hyperactivity Disorder (ADHD).

Q.4 Answer the following.

22

1 Write the harmful effects of deodorants.

Ans i. Aluminium – Zirconium compounds are the most harmful chemicals in the deodorant. Disorders like headache, asthma, respiratory disorders, heart disease are likely to occur without our knowledge.
ii. There is a possibility of various skin disorders and skin cancer due to aluminium chlorohydrates.

2 Write down the properties of Teflon.

- Ans**
- The atmosphere and chemical substances have no effect on Teflon.
 - Neither water nor oil will stick to Teflon coated articles.
 - High temperatures do not affect Teflon as its melting point is 327°C .
 - Teflon coated articles are easy to clean.

3 Write uses of Radioactive substances.

- Ans**
- Radioactive elements are used for making atom bomb.
 - Radioactive isotopes are used in various fields such as scientific research, agriculture, industry, medicine, etc.
 - The radioactive substances radium, promethium, tritium with some phosphor are used to make certain objects visible in the dark.

4 Define radioactivity.

- Ans**
- Elements with a high atomic number such as uranium, thorium, radium have a property of spontaneously emitting invisible, highly penetrating and high energy radiations.
 - This property is called radioactivity.
 - A substance having this property is called radioactive substance.

5 Write uses of Ceramic

- Ans**
- Mangalore roofing tiles, terracotta articles, construction bricks, pottery, etc. are various ceramic articles that are commonly used.
 - Ceramics are used in electrical instruments, for coating the interior of a kiln, the outer surfaces of ships and blades of jet engines.
 - A certain type of ceramic tiles are fixed on the outer layer of a space shuttle.
 - Certain types of ceramics are also used as superconductors.

6 Write the harmful effects of radioactive substance.

- Ans**
- The central nervous system is affected by radioactive radiations.
 - Hereditary disorders are caused by bombardment of radiation on DNA in the body.
 - Radiations can penetrate the skin and cause diseases like skin cancer, leukemia.
 - The radioactive pollutants released in sea enter the bodies of fishes and through them enter the human body.
 - The radioactive paint on the watch can cause cancer.
 - The radioactive isotopes strontium-90 can enter the body through plants, fruits, flowers, cereals, milk, etc., and cause diseases like bone cancer, leukemia.

7 Write the harmful effects of Artificial dye.

- Ans**
- Dyeing hair can have adverse effects like hair fall, damage to hair texture, burning of skin, adverse effect on eyes, etc.
 - Lipstick contains a dye named carmine. It does not affect lips but causes stomach disorders.
 - Excessive use of plants for making natural dyes results in deterioration of the environment.

8 Write uses of Anodizing.

- Ans**
- Anodizing is most common for improving corrosion resistance on certain alloys.
 - It's been **used** for dyeing metals.
 - It can also be **used** for electrical insulation.

9 Write uses of Powder coating

- Ans**
- Powder coating is done on Iron objects to prevent rusting.
 - Powder coating is done on plastic and medium density fibre (MDF) board to make them highly durable, hard and attractive.

10 Write the harmful effects of artificial food colors.

- Ans**
- Food colors are added to pickles, jam and sauce contain small quantities of lead and mercury.
 - Over- consumption of artificial food colors can be harmful to health.
 - Diseases like ADHD(Attention Deficit Hyperactive Disorder) can affect children due to excessive

consumption of foods with added food colors.

11 Write the chemical formula of bleaching powder, common salt, baking soda and washing soda.

- Ans**
- Bleaching powder** - CaOCl_2
 - Common salt** - NaCl
 - Baking soda** - NaHCO_3
 - Washing soda** - $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Q.5 Give scientific reasons

10

1 The aluminium article is used as an anode in the anodizing process.

- Ans**
- A protective layer is formed naturally on the surface of aluminium metal by reaction with oxygen in the air. In the anodizing process, this layer is made of the desired thickness by electrolysis.
 - Dilute sulphuric acid is taken in the electrolytic cell and the aluminium article is dipped in it as anode.
 - When an electric current is passed, hydrogen gas is released at cathode and oxygen gas at the anode.
 - A reaction with oxygen occurs and a layer of hydrated aluminum oxide is formed on the anode.
 - Therefore aluminium article is used as an anode in the anodizing process.

2 A certain type of ceramic tiles are fixed on the outer layer of a space shuttle.

- Ans**
- Ceramic is brittle, water resistant and an electric insulator.
 - Ceramics can withstand high temperatures without decomposition.
 - Space shuttle is covered by advanced ceramic tiles.
 - Most of the tiles are made of silica fibers, which are produced from high grade sand.
 - Silica is an excellent insulator as it transports heat slowly.
 - When the outer portion of a tile gets hot, the heat takes along time to work its way down through the rest of the tile to the shuttle's skin.

3 Bleaching powder has the odour of chlorine gas.

- Ans**
- Bleaching powder is chemically called as Calcium oxychloride.
 - Bleaching powder undergoes slow decomposition due to the carbon dioxide in air and continuously chlorine gas is released.
$$\text{CaOCl}_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{Cl}_2$$
 - | | | | |
|-----------|---------|-----------|----------|
| Bleaching | Carbon | Calcium | Chlorine |
| Powder | Dioxide | Carbonate | Gas |
 - Bleaching powder gets its property because of this release of chlorine gas.

4 Soap forms a precipitate in hard water.

- Ans**
- When oil or animal fat is boiled with an aqueous solution of sodium or potassium hydroxide, sodium or potassium salts of carboxylic acids are formed. These salts are called soap.
 - When soap is mixed with hard water, calcium and magnesium salts of fatty acids are formed.
 - These salts being insoluble in water, form a precipitate and hence lather formation does not take place.

5 The hard water of a well becomes soft on adding washing soda to it.

- Ans**
- The hardness of water is due to the presence of chlorides and sulphates of calcium and magnesium in it.
 - Sodium carbonate (washing soda) is added to this hard water to make it soft with formation of lather and also suitable for use.
 - When washing soda is added to hard water, it leads to the formation of insoluble carbonate salts of calcium and magnesium.
 - $\text{MgCl}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{MgCO}_3 + 2\text{NaCl}$

Q.6 Give examples

2

1 Give 4 examples of Diseases caused by artificial food colours.

- Ans**
- ADHD (Attention Deficit Hyperactivity Disorder)
 - Cancer
 - Allergies
 - Asthma

Q.7 Give explanation using the given statement:

6

1 The particles of powder are given an electric charge while spraying them to form the powder coating. Explain

- Ans**
- Powder coating is a method of applying a layer harder than paint on the surface of an iron objects to prevent rusting.
 - In this method, a polymer resin, a pigment and some other ingredients are melted, mixed, cooled and ground into a uniform powder.
 - This powder is sprayed on the polished metal surface by electrostatic spray deposition(ESD).
 - In this method, the particles of the powder are given electrostatic charges due to which a uniform layer of the powder sticks to the metal surface.
 - Then the object is heated in the oven along with the coating. A chemical reaction occurs in the layer, resulting in the formation of long cross-linked polymer chains.
 - This powder coating is highly durable, hard and attractive.

2 When radiation coming out from certain radioactive substance is passed through an electric field, marks are found at three places on the photographic plate placed in its path. Explain

- Ans**
- When radiation coming out from certain radioactive substance is passed through an electric field, marks are found at three places on the photographic plate placed in its path. This is because the radiation coming out of the radioactive substance is of three types Alpha rays, Beta rays and Gamma rays.
 - The rays which get deviated slightly towards negatively charged plate are called alpha rays as they are made of positively charged.
 - The rays which get deviated substantially toward the positively charged plate are called beta rays as they are negatively charged.
 - The rays which do not deviate at all are called gamma rays. They are uncharged electromagnetic radiation,
 - Hence, marks are found at the three places on the photographic plate.

Q.8 Write answers based on given diagram

3

1 Explain the process shown in the following picture.



- Ans**
- The above picture shows powder coating being done on an object.
 - Powder coating is a method of applying a layer harder than paint on the surface of an iron object to prevent rusting.
 - In this method, a polymer resin, a pigment, and some other ingredients are melt mixed, cooled, and ground into a uniform powder.
 - This powder is then sprayed on a polished metal surface by electrostatic spray deposition (ESD).
 - The particles of the powder are given an electrostatic charge due to which a uniform layer of the powder sticks to the metal surface.
 - Then, the object, along with the coating, is heated in an oven where a chemical reaction occurs due to which long, cross-linked polymeric chains are formed.
 - This powder coating is highly durable, hard, and attractive.

Q.9 Answer the following

12

1 Write briefly about the method of electrolysis of sodium chloride.

Ans When an electrical current is passed through a saturated solution of sodium chloride(brine), it is electrolyzed and hydrogen gas is released at the cathode while chlorine gas is released at the anode along with formation of sodium hydroxide in the cell.



ii. Sodium Chloride Water Sodium Hydroxide Chlorine Gas Hydrogen Gas

iii. When the salt is heated to a high temperature (about 800⁰C), it melts. This is called the fused state of the salt.

iv. When fused salt is electrolyzed, chlorine gas is released at the anode and the liquid sodium metal, at the cathode.

2 When is the nucleus said to be unstable?

Ans i. In atom, of an element, the balance of protons and neutrons in the nucleus determines whether a nucleus will be stable or unstable.
ii. Too many protons or neutrons upset this balance disrupting the binding energy from the strong nuclear forces making the nucleus unstable.
iii. Generally the elements with atomic numbers from 82-92 are found to be radioactive in nature.

3 What type of colors will you use to celebrate eco-friendly Rang Panchami? Why?

Ans i. Artificial colors are prepared from chemicals/dyes which are very dangerous.
ii. The red color in the dye contains high proportion of mercury in it.
iii. This poses risks like blindness, skin cancer, asthma, itching of the skin, permanent blocking of sweat pores etc.
iv. Therefore it is necessary to use eco-friendly colors prepared from natural resources such as beet root, flowers of fame of forest, spinach, gulmohar.

4 Why has the use of methods like Teflon coating become more common?

Ans Teflon coating became more common because of following properties of Teflon.

- i. The atmosphere and chemical substances have no effect on Teflon.
- ii. Neither water nor oil will stick to Teflon coated articles.
- iii. High temperatures do not affect Teflon as its melting point is 327⁰C.
- iv. Teflon coated articles are easy to clean.

Q.10 Answer the following in detail

15

1 Write about artificial food colors, the substance used in them and their harmful effects.

Ans i. Food colors are substances that are added to make the food more attractive.
ii. Food colors are mixed in most soft drinks and foodstuffs available in the market. These food colors are in the form of gels, powder and pastes.
iii. Food colors are used in domestic as well as commercial products.
iv. Food colors are found added to packaged meat, chilli powder, turmeric, sweets and other similar substances so as to give them a good color.
v. Food colors are added to pickles, jam and sauce contain small quantities of lead and mercury.
vi. Over- consumption of artificial food colors can be harmful to health.
vii. Diseases like ADHD(Attention Deficit Hyperactive Disorder) can affect children due to excessive consumption of foods with added food colors.

2 Where in the industrial field is the radioactivity used?

Ans i. **Radiography:**

Internal cracks and voids in cast iron articles and iron solder can be detected with the help of gamma rays. For this purpose, isotopes like cobalt-60, iridium-192 are used in the radiography cameras. This technique is used for detecting flaws in the metal.

ii. **Measurement of thickness, density and level:**

It is necessary to maintain the required thickness in the manufacture of aluminium, plastic, iron sheets of differing thickness. In the manufacturing process, a radioactive substance is placed on one side and an instrument to measure radiation on the other. The radiation read by the measuring instrument varies with the thickness of the sheet. Material inside a packing can also be examined by the same technique.

iii. **Luminescent paint and Radio luminescence:**

Radioactive substances like radium, promethium, tritium with some phosphor are used to make certain objects visible in the dark (for example – hands of the clock). Krypton-85 is used in HID (high intensity discharge) lamps.

iv. Use in Ceramic tiles:

Luminous colors are used to decorate ceramic tiles, utensils, plates, etc.

3 What is meant by water of crystallization? Give examples of salts with water of crystallization and their uses.

Ans i. The exact number of water molecules which are chemically bonded to a molecule of a salt within a hydrated crystalline compound is called as water of crystallization.

ii. Some substances in our daily use which contain water of crystallization are

iii. Alum (Potash alum) - $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$

a. It is used in the process of water purification because of the property of coagulation, the solid impurities in water come together, become heavy and settle to the bottom. As a result, water above become clear

iv. Epsom salt (Magnesium sulphate $MgSO_4 \cdot 7H_2O$)

a. To grow better vegetables, a tablespoon of Epsom salt is added to the soil below to boost growth.

v. Barium chloride ($BaCl_2 \cdot 2H_2O$)

a. It is used in hardening of steel

b. it is used in the manufacture of pigments.

vi. Sodium sulphate (Glauber's salt $Na_2SO_4 \cdot 10 H_2O$)

a. It is used as a laxative

vii. Blue Vitriol (Copper sulphate- $CuSO_4 \cdot 5H_2O$)

a. It is used in blood test for diagnosing anaemia.

b. In the Bordeaux mixture, slaked lime along with blue vitriol is used as a fungicide on fruits like grapes and water melon

