Page No 162:

Question 1:

Fill in the blanks.

a. The number of molecules of water of crystallization in washing soda is .....
b. The chemical name of baking soda is ....
c. ..... is used in treatment of hyperthyroidism.
d. The chemical name of Teflon is ...

ANSWER:

a. The number of molecules of water of crystallization in washing soda is 10.
b. The chemical name of baking soda is sodium bicarbonate.
c. Iodine 123 is used in treatment of hyperthyroidism.
d. The chemical name of Teflon is polytetrafluoroethene.

Page No 162:

Question 2:

Match the pairs

Group A	Group B
1. Saturated brine	a. sodium metal freed
2. Fused salt	b. basic salt
3. $CaOCl_2$	c. crystallization of salt
4. $NaHCO_3$	d. oxidation of colour

ANSWER:

1. Saturated brine	c. crystallization of salt
2. Fused salt	a. sodium metal freed
3. $CaOCl_2$	d. oxidation of colour
4. $NaHCO_3$	b. basic salt

Write answers to the following

a. What is meant by radioactivity?
b. When is said to be the nucleus unstable?
c. Which diseases are caused by artificial food colours ?
d. Where in the industrial field is radioactivity used?
e. Write down properties of teflon.
f. What type of colours will you use to celebrate ecofriendly Rang Panchami? Why?
g. Why has the use of methods like Teflon coating become more common?

ANSWER:

a. The property of disintegration of an unstable atomic nucleus into a stable atomic nucleus, by the emission of radiations, is known as radioactivity.

b. Nucleus of certain elements such as uranium, thorium, radium have a property of spontaneously emitting invisible, highly penetrating and high energy radiation. The unstable nucleus of radioactive substances undergoes spontaneous decay by self emission of either alpha (α), beta (β), or gamma (γ) radiations to form a more stable nucleus.

c. Cosumption of food with artificial food colours can result in the development of the diseases like ADHD (Attention Deficit Hyperactivity Disorder) which can affect children.

â€‹d. Radioactivity has various industrial application:

- It is used as a fuel in nuclear reactors to generate power.
- It is used in controlling the thickness of paper, plastic and metal sheets during their manufacturing.

- It is used in the manufacturing of luminescent paints and objects which show radioluminance. For example, substances such as radium, promethium etc. are used to make objects which glow in the dark like hands of clock. Similarly, krypton-85 is used in high intensity discharge lamps.
- Radioactive substances are used in ceramics, utensils, plates etc. to obtain luminous colours.

e. Teflon has the following properties:

- it is inert to the atmosphere and chemical substances
- both water and oil do not stick to the teflon coated articles
- it has a high melting point i.e. 327^0 C which means there is no effect of high temperatures on it
- it is easier to clean teflon coated articles

f. We should use eco friendly colours for celebratind an ecio friendly Rang Panchami. These natural colours can be made from natural ingredients likebeet root, flowers of flame of forest, spinach, flame tree (gulmohar) etc. These are natural colours which do not pose any threat to our health or the environment. The synthetic/artificial colours which we use are a seriou threat to our health as they can lead to problems like blindness, skin cancer, asthma, itching of the skin, permanent blocking of sweat pores etc.

g. Teflon is a substance which is inert to chemicals, stable at higher temperatures, easy to clean and non stick. All these properties make it an ideal substance for coating.

Question 4:

Give scientific explanation

a. Bleaching powder has the odour of chlorine.
b. The hard water of a well becomes soft on adding washing soda to it.
c. Soap forms a precipitate in hard water.
d. The particles of powder are given an electric charge while spraying them to form the powder coating.
e. The aluminium article is used as an anode in the anodising process.
f. When the 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.
g A certain type of ceramic tiles are fixed on the outer layer of a space shuttle.

ANSWER:

a. When exposed to air, bleaching powder reacts with carbon dioxide in air to produce calcium carbonate and chlorine. Thus, it smells of chlorine.

$$CaOCl_2 + CO_2 \longrightarrow CaCO_3 + Cl_2$$

b. The hardness of hard water is due to the presence of chlorides and sulphates of calcium and magnesium. When washing soda ($Na_2CO_3.10H_2O$) is added to the hard water, Na_2CO_3 reacts with the chlorides and sulphates of calcium and magnesium and converts them to insoluble carbonate salts. This changes the hard water into soft water and thus makes it suitable for use.

$$MgCl_{2\,(aq)} + Na_2CO_{3(s)} \rightarrow MgCO_{3(s)} + 2\,NaCl_{(s)}$$

c. Soap does not work properly in hard water. This is primarily because hard water contains salts of calcium and magnesium. When soap is added to hard water, it reacts with these salts to form an insoluble precipitate called scum. This scum sticks to the cloth and decreases the cleansing ability of the soap. In addition, soaps do not give lather with hard water.

d. The particles of powder are given an electric charge while spraying them to form the powder coating so that a uniform layer of the powder sticks to the metal surface.

e. The aluminium article is used as an anode in the anodising process to deposit a thick layer of aluminiun oxide,on the article so as to protect the article from further rusting.

f. When the 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. These three marks represent the three kind of rays which are emitted by the radioactive substances. One type of radiation deviated slightly towards the negatively charged plate and were called alpha rays. The second type of radiation deviated substantially towards the positively charged plate and was called the beta rays. The third type of radiation did not deviate at all and was called the gamma rays.

g. Certain types of ceramic tiles are fixed on the outer layer of a shuttle because they posess properties like they can withstand high temperatures without decomposing. They are water resistant and electric insulators.

Question 5:

Write answers to the following

a. Write about artificial food colours, the substances used in them and their harmful effects.
b. What is meant by water of crystallization? Give examples of salts with water of crystallization, and their uses.
c. Write briefly about the three methods of electrolysis of sodium chloride.

ANSWER:

a. Food colours are often mixed with most of the available foodstuff in the market, such as sweets, soft drinks, cakes, ice creams, meat, spices etc. These food colours are present in the form of powders, gels and pastes. They are used in domestic as well as commercial products. These food colours can be natural as well as artificial in nature. Tartrazene and sunset yellow are extensively used artificial food colours. While natural food colours are harmless and can be consumed without worry, artificial food colours, on the other hand, do have some adverse effects. Consuming these on a regular basis is harmful

for us as they contain small quantities of lead and mercury. Excessive consumption of foods with added artificial colours can cause diseases like ADHA (Attention Deficit Hyperactivity Disorder) in children.

b. Water of crystaliization is the amount of water molecules which are present in one formula unit of salt. We can also say that the water molecules which form part of a structure of a crystal are called water of crystaliization. They give the crystals their shape and crystal.

Example:
$CuSO_4.5H_2O$- Copper sulphate- it is used as an antiseptic and as an antifungal agent for topical use.
$CaSO_4.2H_2O$- Calcium sulphate- it is used in the manufacture of Plaster of Paris and also used in tofu as a coagulant.

c. Electrolysis of sodium chloride solution with inert electrodes can be done by chemical electrolysis, producing different sets of products by providing different experimental conditions .

- Solid sodium chloride melts at just over 800^oC, and electrolysis of molten sodium chloride yields sodium metal at the cathode and chlorine gas at the anode.

- Concentrated aqueous sodium chloride solution with a mercury cathode produces a solution of sodium metal in mercury ("sodium amalgam") and chlorine at the anode.
- Dilute aqueous sodium chloride solution produces hydrogen at the cathode and oxygen at the anode.
- Concentrated aqueous sodium chloride solution produces hydrogen at the cathode and chlorine at the anode.

Sodium metal and chlorine gas can be obtained with the electrolysis of molten sodium chloride.Electrolysis of aqueous sodium chloride yields hydrogen and chlorine, with aqueous sodium hydroxide remaining in solution.The reason for the difference is that the reduction of Na^+ ($E° = -2.7$ v) is energetically more difficult than the reduction of water (−1.23 v).

Question 6:

Write the uses.

a. Anodizing
b. Powder coating
c. Radioactive substances
d. Ceramic

ANSWER:

a. Anodizing

- It is used for iron surfaces to protect them fom rusting.
- It is used in the manufacturing of anodized utensils like griddles and cookers.

b. Powder coating

- It makes painted architectural steel parts resistant to heat damage, cold damage and even corrosion.
- Most of metal products designed to be used outdoors are finished using the powder coating method.

c. Radioactive substances

- It is used as a fuel in nuclear reactors to generate power.
- It is used in controlling the thickness of paper, plastic and metal sheets during their manufacturing.
- It is used in the manufacturing of luminescent paints and objects which show radioluminance. For example, substances such as radium, promethium etc. are used to make objects which glow in the dark like hands of clock. Similarly, krypton-85 is used in high intensity discharge lamps.
- Radioactive substances are used in ceramics, utensils, plates etc. to obtain luminous colours.
- In medical science, it can be used for detection of cancer, treatment of hyperthyroidism and bone cancer.
- In agricultural field they are used in food preservation, prevention of sprouting in onions and potatoes etc.

d. Ceramics

- They are used in making roofing tiles, construction bricks, pottery, terracotta etc.
- Special type of ceramics are used in outer surfaces of ships and blades of jet engines.
- They are also used on the outer surfaces of space shuttles.

Page No 162:

Question 7:

Write the harmful effects

a. Artificial dye
b. Artificial food colour
c. Radioactive substances
d. Deodorant

ANSWER:

ANSWER:

Harmful effects of the following are:

a. Artificial dye-

- Use of dye for dyeing hair can have adverse effects like hair fall, damage to hair texture, burning of skin.
- The dyes used for dyeing hair have an equally adverse effect on eyes, etc.
- Dyes present in lipsticks are a cause of stomach disorders.

b. Artificial food colours-

- It may result in the development of the diseases like ADHD (Attention Deficit Hyperactivity Disorder) which can affect children.

c. Radioactive substances-

- Radioactive substances affect the central nervous system.
- Exposure to radioactive radiations for long periods can lead to hereditary defects.

- They can penetrate the skin, and causes diseases like skin cancer, leukemia.

d. Deodorant-

- â€‹It contains aluminium – zirconium compounds which are the most harmful chemicals in the deodorant. They can result in the development of disorders like headache, asthma, respiratory disorders, heart disease without our knowledge.
- Presence of aluminium chlorohydrates may also result in the development of various skin disorders and skin cancer.

Page No 162:

Question 8:

Write the chemical formula

Bleaching powder, common salt , baking soda, washing soda

Question 9:

Explain what you see in the following picture

ANSWER:

The above picture shows the process of powder coating.

- A polymer resin, a pigment and some more ingredients are melted, mixed, cooled and ground into a uniform powder.
- This powder is sprayed on the polished metal surface by electrostatic spray deposition (a method in which the particles of powder are given an electric charge) that makes a uniform coating on the substance.
- Once completely coated, the object is then heated, which results in the formation of long cross-linked polymeric chains.
- This coating is highly durable, hard and attractive.

- It can be done on plastic and medium density fibre board as well.