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Solution 54
(a) Milk is made slightly alkaline so that it may not become sour easily due to the formation of lactic acid in it.
(b) The alkaline milk takes a longer time to set into curd because the lactic acid being formed has to first neutralise the alkali present in it.
Solution 55
Carbon and Sulphur being non-metals form acidic oxides.
Solution 56
(i) Weakly alkaline: D (pH = 11)
(ii) Neutral : C (pH = 7)
(iii) Strongly acidic: A (pH = 1)
(iv) Strongly alkaline: E (pH = 13)
(v) Weakly acidic : B (pH = 5)
Solution 57
(a) Potatoes grow better in acidic soil having pH = 5.5
(b) Broccoli grows better in a lkaline soil since adding a lot of lime to acidic soil will make it basic in nature.
Solution 58
Sulphuric acid < car battery acid < washing up liquid < milk of magnesia < metal polish < oven cleaner since:
Red : pH = 1
Pink : pH = 3-4
Yellow: pH = 5-6
Light blue : pH = 9
Dark blue : pH = 10
Purple: pH = 11
Solution 59
(a) Solution A turns universal indicator blue to purple so it is basic in nature and will turn litmus blue.
(b) Solution B turns universal indicator orange to red so it is acidic in nature and will turn litmus red.
(c) Milk of magnesia and sodium hydroxide solution are bases like solution A.
(d) Lemon juice and hydrochloric acid are acids like solution B.
(e) Neutralisation reaction.
Solution 60
(a) Wasp stings are alkaline in nature since they are treated using acids like vinegar.
(b) Bee stings are acidic in nature since they are treated using bases like baking soda.
Solution 61
(a) T he pH in a person's mouth becomes lower after each meal because bacteria present in the mouth breaks down the sugar to form acids.
(b) If the pH is low, the tooth starts decaying.
(c) A person can lessen the chances of suffering from tooth decay by changing his eating habits such as eating less of sugary foods like ice-creams, candies, sweets etc.
Solution 62
(a) Universal indicator paper is used to measure the pH.
(b) Lemon juice with pH = 2.5 is the most acidic.
(c) Household ammonia with pH = 12 is the most alkaline.

(d) Salt solution and sugar solution with pH = 7 are neutral.
(e) Vinegar (acid) can be used to treat wasp stings since it injects an alkaline liquid into the skin.
(f) Baking soda can be used to treat bee stings since it injects methanoic acid into the skin.

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Solution 63

(a) X is zinc metal; Gas Y is hydrogen gas.
(b) (i)

$$\underset{\text{Zinc (Metal)}}{Zn(s)} + \underset{\text{Hydrochloric acid (Dilute)}}{2HCl} \rightarrow \underset{\text{Zinc chloride (Salt)}}{ZnCl_2} + \underset{\text{Hydrogen}}{H_2(g)}$$

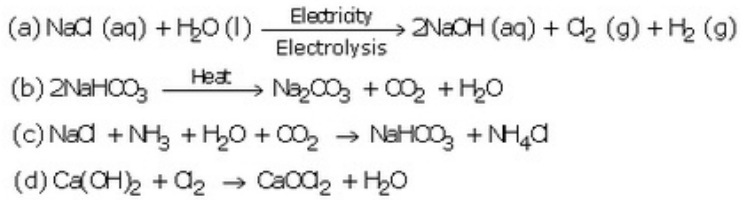
(ii)

$$\underset{\text{Sodium Hydroxide (Base)}}{2NaOH(aq)} + \underset{\text{Zinc}}{Zn(s)} \xrightarrow{\text{Heat}} \underset{\text{Sodium Zincate (Salt)}}{Na_2ZnO_2(aq)} + \underset{\text{Hydrogen}}{H_2(g)}$$

Page No 96:

Solution 1
(a) $NaHCO_3$.
(b) Na_2CO_3.
Solution 2
(i) Na_2CO_3.
(ii) $Na_2CO_3.10H_2O$.
Solution 3
False.
Solution 4
$CuSO_4.5H_2O$
has blue colour due to the presence of water of crystallization.
Solution 5
Blue.
Solution 6
The common name is Gypsum and the chemical name is calcium sulphate dihydrate.
Solution 7
Calcium hydroxide.
Solution 8
Plaster of Paris.
Page No 97:
Solution 9
Hydrochloric acid.
Solution 10
Plaster of Paris
Solution 11
Sodium carbonate.
Solution 12
Sodium carbonate.
Solution 13
Tartaric acid.
Solution 14
Sodium.
Solution 15
$NaHCO_3$.
Solution 16
(a) Baking soda.
(b) Washing soda.
Solution 17
(a) Sodium chloride- NaCl.
(b) Sodium hydroxide- NaOH.
Solution 18
Common salt occurs naturally in sea water and as rock salt.

Solution 19
Sodium chloride.
Solution 20
Common salt is obtained from sea water by the process of evaporation.
Solution 21
Sodium chloride is required in our body for the working of nervous system, the movement of muscles, and the production of hydrochloric acid in the stomach.
Solution 22
Sodium hydroxide, sodium carbonate and sodium hydrogencarbonate.
Solution 23
(a) It is used in the manufacture of soap.
(b) It is used in cooking food.
Solution 24
Rock salt. It is mined from the underground deposits just like coal.
Solution 25
Sodium chloride.
Solution 26
Sodium chloride.
Solution 27
Sodium hydroxide, chlorine and hydrogen.
Solution 28
(a) Anode.
(b) Cathode.
(c) Near the
cathode.
Solution 29
(a) Evaporation.
(b) Coal.
(c) $Na_2CO_3.10H_2O$.
(d) Baking; washing.
(e) $CaSO_4$. $?H_2O$
Solution 30



Solution 31
Washing soda is sodium carbonate decahydrate.
Properties:
(i) It is transparent crystalline solid.
(ii) It is soluble in water.
Uses:
(i) It is used for removing permanent hardness of water.
(ii) It is used in the manufacture of glass, soap and paper.
Solution 32
Sodium chloride - NaCl.
Sodium carbonate - Na_2CO_3.
The aqueous solution of sodium chloride is neutral because it is formed from a strong acid and a strong base. The aqueous solution of sodium carbonate is basic because it gets hydrolysed to some extent and forms sodium hydroxide which is a strong base and carbonic acid which is a weak acid.
Solution 33
The chemical formula of ammonium chloride is NH_4Cl. Since, ammonium chloride is the salt of a strong acid HCl and a weak base NH_4OH, so an aqueous solution of ammonium chloride is acidic in nature.
When dissolved in water, it gets hydrolysed to some extent to form

HCl and NH_4OH. HCl being a strong acid is fully ionised and gives a large amount of hydrogen ions whereas NH_4OH is only slightly ionised. So, NH_4Cl contains more of hydrogen ions than hydroxide ions and is hence acidic in nature.

$$NH_4Cl\ (s) + H_2O\ (l) \xrightarrow{\text{Hydrolysis}} NH_4OH\ (aq) + HCl\ (aq)$$

Solution 34
Baking soda is a substance added to food for its faster cooking. Its chemical name is sodium hydrogen carbonate.
Uses:
(i) It is used as an antacid to remove acidity of stomach.
(ii) It is used in fire extinguishers.
Baking soda is sodium hydrogencarbonate whereas washing soda is sodium carbonate decahydrate.
Solution 35
Sodium hydrogencarbonate is produced on large scale by reacting a cold and concentrated solution of sodium chloride with ammonia and carbon dioxide.

$$NaCl + NH_3 + H_2O + CO_2 \rightarrow NaHCO_3 + NH_4Cl$$

Solution 36
When a cold and concentrated solution of sodium chloride reacts with ammonia and carbon dioxide, sodium hydrogencarbonate and ammonium chloride are formed.

$$NaCl + NH_3 + H_2O + CO_2 \rightarrow NaHCO_3 + NH_4Cl$$

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Solution 37
(a) The water molecules which form part of the structure of a crystal are called water of crystallization.
Example: $CuSO_4.5H_2O$
(b) The blue copper sulphate crystals contain water of crystallization as it is blue in colour.
(c) Anhydrous copper sulphate turns blue on adding water. This property of anhydrous copper sulphate is used to detect the presence of moisture in a liquid.
Solution 38
(a) Baking soda.
(b) When a solution of sodium hydrogencarbonate is heated, then it decomposes to give sodium carbonate with the evolution of carbon dioxide gas.

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

(c) Sodium hydrogencarbonate is used as an antacid because it neutralises the excess acid present in the stomach and relieves indigestion.
Solution 39
(a) If heating is not controlled while preparing POP, then all the water of crystallisation of gypsum is eliminated and it turns into a dead burnt plaster.

(b) $CaSO_4.½H_2O + 1½H_2O \rightarrow CaSO_4.2H_2O$

Solution 40
(a) On strong heating, blue copper sulphate crystals turn white.

$$CuSO_4.5H_2O \xrightarrow{\text{Heat}} CuSO_4 + 5H_2O$$

(b) When water is added to anhydrous copper sulphate, it gets hydrated and turns blue.

$$CuSO_4 + 5H_2O \rightarrow CuSO_4.5H_2O$$

Solution 41
(a) Sodium hydrogencarbonate and tartaric acid.
(b) Baking powder is a mixture of baking soda and tartaric acid whereas baking soda is only sodium hydrogencarbonate.

(c) When baking powder mixes with water, then sodium hydrogencarbonate reacts with tartaric acid to evolve carbon dioxide gas which gets trapped in the wet dough and bubbles out slowly making the cake soft and spongy.

Solution 42

(a) Calcium oxychloride.

(b) $CaOCl_2$

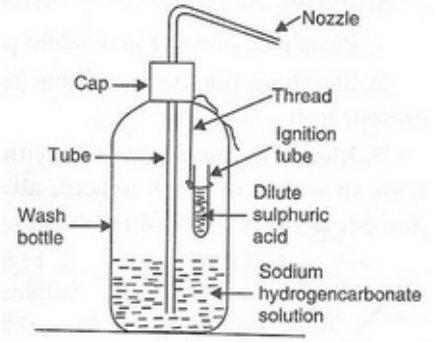
(c) Calcium hydroxide and chlorine.

(d) It is used for disinfecting drinking water supply.

Solution 43

Working:

A soda-acid type fire extinguisher contains a solution of sodium hydrogencarbonate and sulphuric acid in separate containers in separate containers inside them. When the knob of the fire extinguisher is pressed, then sulphuric acid mixes with sodium hydrogencarbonate solution to produce carbon dioxide gas which forms a blanket around the burning substance and cuts off the supply of air to burning substance; this stops the process of burning and fire gets extinguished.



Making a soda-acid fire extinguisher.

Solution 44

(a) Sodium carbonate.

(b) Bleaching powder.

(c) Sodium carbonate.

(d) Bleaching powder.

(e) It sets into a hard mass on mixing with proper quantity of water.

(f) Bleaching powder.

Solution 45

(a) Gypsum is calcium sulphate dihydrate, $CaSO_4.2H_2O$. When gypsum is heated to a temperature of 100°C, it loses 3/4th of its water of crystallisation and forms plaster of Paris.

(b) Sodium carbonate.

(c) Plaster of Paris.

(d) Chlorine.

Solution 46

(a) Baking powder is a mixture of baking soda and tartaric acid. When baking powder mixes with water, then sodium hydrogencarbonate reacts with tartaric acid to evolve carbon dioxide gas which gets trapped in the wet dough and bubbles out slowly making the cake soft and spongy.

(b) Substance X is tartaric acid. It can react with any sodium carbonate formed and neutralise it otherwise cakes and bread will taste bitter.

Solution 47

(a) Sodium hydroxide:

(i) It is used for making soaps and detergents.

(ii) It is used in the manufacture of paper.

(b) Chlorine:

(i) It is used in the production of bleaching powder.

(ii) It is used in the production of hydrochloric acid.

(c) Hydrogen:

(i) It is used in the production of hydrochloric acid.

(ii) It is used in the hydrogenation of oils.

(d) Hydrochloric acid:
(i) It is used in medicines and cosmetics.
(ii) It is used in textile/dyeing and tanning industries.
Solution 48
(a) Bleaching powder.
(b) Gypsum.
(c) It sets into a hard mass in about 30 mins.
(d) Chlorine is used for sterilising drinking water supply because it is a disinfectant which kills germs or bacteria.
Solution 49
(a) When a concentrated solution of sodium chloride is electrolysed, it decomposes to form sodium hydroxide, chlorine and hydrogen.

$$2NaCl(aq) + 2H_2O(l) \xrightarrow[\text{(Electrolysis)}]{\text{Electricity}} 2NaOH(aq) + Cl_2(g) + H_2(g)$$

Sodium chloride (Brine) | Water | Sodium hydroxide (Caustic soda) | Chlorine | Hydrogen

(b) Because of the products formed: Chlor for chlorine and alkali for sodium hydroxide.
(c) Sodium hydroxide, chlorine and hydrogen.
Uses of Sodium hydroxide:
(i) It is used for making soaps and detergents.
(ii) It is used inthe manufacture of paper.
Uses of chlorine:
(i) It is used in the production of bleaching powder.
(ii) It is used in the production of hydrochloric acid.
Uses of hydrogen:
(i) It is used in the production of hydrochloric acid.
(ii) It is used in the hydrogenation of oils.
Solution 50
(a) Production of washing soda: Washing soda is produced from sodium chloride (or common salt) in the following three steps:
(i) A cold and concentrated solution of sodium chloride (called brine) is reacted with ammonia and carbon dioxide to obtain sodium hydrogencarbonate :

$$NaCl + NH_3 + H_2O + CO_2 \rightarrow NaHCO_3 + NH_4Cl$$

Sodium chloride (Common salt) | Ammonia | Water | Carbon dioxide | Sodium hydrogen-carbonate | Ammonium chloride

Sodium hydrogencarbonate formed is only slightly soluble in water, so it precipitates out as a solid.
(ii) Sodium hydrogencarbonate is separated by filtration, dried and heated. On heating, sodium hydrogencarbonate decomposes to form sodium carbonate:

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

Sodium hydrogen – carbonate | Sodium carbonate (Soda ash) | Carbon dioxide | Water

The anhydrous sodium carbonate obtained here is called soda ash.
(iii) Anhydrous sodium carbonate (soda ash) is dissolved in water and recrystallised to get washing soda crystals containing 10 molecules of water of crystallisation :

$$Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3.10H_2O$$

Anhydrous sodium carbonate (Soda ash) | Water | Sodium carbonate decahydrate (Washing soda)

(b) An aqueous solution of washing soda is alkaline because it turns red litmus to blue.
(c) Washing soda has detergent properties because it can remove dirt and grease from dirty clothes.
(d) (i) It is used as cleansing agent for domestic purposes.
(ii) It is used for removing permanent hardness of water.

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Solution 51

(a) Bleaching powder is Calcium oxychloride ($CaOCl_2$). It is prepared by passing chlorine gas over dry slaked lime.

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$

(b) When bleaching powder reacts with dilute sulphuric acid , it produces chlorine gas.

$$CaOCl_2 + H_2SO_4 \rightarrow CaSO_4 + Cl_2 + H_2O$$

(c) (i) It is used for disinfecting drinking water supply.

(ii) It is used in the manufacture of chloroform.

Solution 52

(a) Plaster of paris is calcium sulphate hemihydrate. Its chemical formula is: $CaSO_4.1/2H_2O$.

(b) It is prepared by heating gypsum to a temperature of 100°C in a kiln; it loses 3/4th of its water of crystallisation and forms plaster of paris.

$$\underset{\text{Gypsum}}{CaSO_4.2H_2O} \xrightarrow[(373K)]{\text{Heat to 100°C}} \underset{\text{Plaster of paris}}{CaSO_4.½H_2O} + \underset{\text{Water}}{1½H_2O}$$

(c) This is because the presence of moisture can cause the slow setting of plaster of Paris by bringing about its hydration.

(d) Uses of plaster of Paris:

(i) It is used as a fire proofing material.

(ii) it is used in hospitals for setting fractured bones in the right position to ensure correct healing.

Solution 53

(a) A salt is a compound formed from an acid by the replacement of the hydrogen in the acid by a metal.

Example: Sodium chloride - NaCl; It is obtained from hydrochloric acid and sodium metal.

Ammonium chloride - NH_4Cl; It is obtained from ammonia and hydrochloric acid.

(b) The salts having the same positive ions are said to belong to a family of salts.

Example: Sodium chloride and sodium sulphate belong to the same family of salts called sodium salts.

(c) The salts which contain water of crystallisation are called hydrated salts.

Example: Copper sulphate crystals contain 5 molecules of water of crystallisation.

The salts which have lost their water of crystallisation are called anhydrous salts.

Example: On strong heating, copper sulphate crystals lose all the water of crystallisation and form anhydrous copper sulphate.

(d) Copper sulphate pentahydrate salt - Its chemical formula is $CuSO_4.5H_2O$. It is blue in colour.

Iron sulphate heptahydrate salt - Its chemical formula is $FeSO_4.7H_2O$. It is green in colour.

(e) The aqueous solution of ammonium chloride salt turns blue litmus red.

********** END **********