Std VII.

Science

ACIDS BASES AND SALTS

* pH SCALE:

IT IS A SCALE OF NUMBERS STARTING FROM 0 TO 14, WHICH HELPS US TO IDENTIFY ACIDS, BASES, AND NEUTRAL SUBSTANCES.

*THE ph OF WATER 7 AND IT IS NEUTRAL.

*ACIDS**

*THEY GIVE H+ IONS IN AQUEOS SOLUTIONS.

THEIR pH VALUE IS LESS THAN 7.

*THEY ARE SOUR TO TASTE.

(Eg. Lemon contains citric acid.)

*THEY ARE CORROSIVE,

*THEY REACT WITH MOST OF THE METALS.

(That is why sour things like pickles are not kept in metal pots.)

*THEY TURN BLUE LITMUS RED.

*THEY REACT WITH BASES TO GIVE SALT AND WATER.

*THEY REACT WITH CARBONATES AND BICARBONATES TO LIBERATE CO2 WITH

EFFERVESCENCE.(Gas bubbles with a hissing sound.Try squeezing lemon on baking soda. It will cause brisk effervescence.).

*IN ATMOSPHERE, ACIDIC GASES i.e. OXIDES OF SULPHUR , NITROGEN & CARBON IN

THE AIR , CAN CAUSE ACID RAIN WHICH CAN CAUSE HARM TO THE SOIL FERTILITY,

CORRODE THE MONUMENTS (THE WHITE MARBLE OF TAJ MAHAL TURNING YELLOW),

AS;

$CaCO_3$(marble) + H_2SO_4(sulphuric acid)--> caso4 +H_2O + CO_2

*MINERAL ACIDS

THEY ARE SOLUBLE IN WATER AND INSOLUBLE IN ORGANIC SOLVENTS. THEY MAY VERY IN RANGES IN ACIDIC STRENGTH, FROM VERY STRONG ACIDS TO VERY WEAK ACIDS.

USES OF ACIDS

MINERAL ACIDS-

BATHROOM CLEANERS.,(hcl)

MANUFACTURE OF FERTILISERS AND EXPLOSIVES (HNO_3)

IN LEAD STORAGE BATTERIES (H_2SO_4).

NATURAL ACIDS ARE USED AS FLAVOURING AGENTS (VINEGAR) AND FOOD PRESERVATIVES (CITRIC ACID ,FOUND IN LEMON,ORANGES).

TARTARIC ACID IS USES IN BAKING POWDER.

BASES

*THEY GIVE HYDROXYL IONS (OH-) IN WATER.

THEIR ph GREATER THAN 7.

*THEY ARE BITTER TO TASTE.

*THEY ARE SOAPY TO TOUCH.

*THEY TURN RED LITMUS BLUE

*THEY GIVE PINK COLOUR WITH PHENOLPHTHALEIN

*THEY REACT WITH ACIDS TO GIVE SALT AND WATER .

USES OF BASES

THEY ARE USED FOR NEUTRALISING ACID (in hyperacidity, people are advised to take antacid, Mg(OH)2 ; to neutralise the excess acid).

AMMONIA IS USED TO MAKE FERTILISERS.

CAUSTIC ALKALIS (NaOH and KOH)USED IN MAKING SOAPS FROM OILS AND FATS.
LIME[Ca(OH)2] IS USED AS WHITEWASH

NEUTRALISATION REACTIONS

CERTAIN REACTIONS IN WHICH ACIDS REACTS WITH BASES TO GIVE SALT AND WATER ARE CALLED NEAUTRALISATION REACTIONS.

*NaOH (Base)+ HCl(Acid) -NaCl(Salt) +H2O(water)

QUESTION AND ANSWERS--

Q1. HOW ARE ACIDS FORMED?

A1. ACIDS ARE FORMED WHEN NON-METALLIC OXIDES REACT WITH WATER.

Eg.

$SO_3 + H_2O \rightarrow H_2SO_4$ (sulphuric acid)

$SO_2 + H_2O \rightarrow H_2SO_3$ (sulphurous acid).

Q2. WHAT ARE CONCENTRATED AND DILUTE ACIDS?

A2. *CONCENTRATED ACID

The solution that is saturated or contains large amount of acid.

*DILUTE ACID

The solution that contains a small amount of acid in a large amount of water.

Q3. WHAT IS ACID RAIN?

A3. THE RAIN WHICH HAS A FAIR AMOUNT OF ACIDIC CONTENT IN IT, IS CALLED ACID RAIN.

Q.4. HOW IS ACID RAIN FORMED?.

A4. THE ACIDIC GASES PRESENT IN THE ATMOSPHERE,DUE TO POLLUTION ,

COMBINE WITH THE WATER VAPOUR IN THE ATMOSPHERE TO FORM ACIDS WHICH ARE BROUGHT DOWN TO THE EARTH BY RAIN,KNOWN AS THE ACID RAIN.

THE FIRST SHOWER OF RAIN IF SLIGHTLY ACIDIC.

*NO_2 +H_2O -> HNO_3 (nitric acid)

*SO_3+H_2O -> H_2SO_4 (sulphuric acid).

Q4. ELABORATE HOW ACID RAIN CAN BE HAZARDOUS?

A4. *IT MAKES THE SOIL ACIDIC AND UNFIT FOR CULTIVATION.

*IT HARMS AQUATIC LIFE.

*IT MIGHT ALSO BURN A PARTICULAR FOREST COVER,IF IT FALLS ON IT.

*IT CORRODES MONUMENTS MADE OF Marble.

Q5. WHAT ARE ALKALIS?

A1. ALKALIS ARE THOSE BASES WHICH ARE SOLUBLE IN WATER. Q.2 GIVE 2 EXAMPLES OF ALKALIS.

A2. SODIUM HYDROXIDE (CAUSTIC SODA)--NaOH.

POTASSIUM HYDROXIDE (CAUSTIC POTASH)--KOH.

MAGNESIUM HYDROXIDE (MILK OF MAGNESIA)--Mg (OH)2.

CALCIUM HYDROXIDE (SLAKED LIME)--Ca (OH)2.

Q3. WHAT IS AN ANTACID?

A3. IT IS A BASE THAT NEUTRALISES ACID.FOR Eg. IN ACIDITY, ANTACIDS ARE

RECOMMENDED TO NEUTRALISE THE ACID IN STOMACH.(MILK OF MAGNESIA,ENO).

Q4. WHAT HAPPENS WHEN-

1. SODIUM BICARBONATE REACTS WITH HYDROCHLORIC ACID-

Nahco3 + Dil.HCl-- NaCl2 + NaCl +CO2+H2O.

2. ZINC REACTS WITH H2SO4.

Zn + H2SO4 -- ZnSO4+ H2

*(Any reactive metal like zinc would react with acids to liberate hydrogen that burns with a pop sound.).

Do IT BY YOURSELF--

Q1. YOU ARE GIVEN THREE SOLUTIONS AND PHENOPHTHALEIN..HOW WILL YOU DECIDE WHICH IS ACID OR BASE OR NEUTRAL.WRITE THE PROCESS.

Q2. HAVE A LOOK AROUND YOUR HOUSE AND A MAKE A CHART OF 5 SUBSTANCES THAT YOU SEE CLASSIFYING THEM AS ACID AND BASE.(EG.lemon-acid, toothpastebase).

Q3. WHY IS IT SAID TO FIRST WASH AFFECTED AREA WITH A SOAP AFTER A HONEYBEE STINGS?

Q4. GIVE TWO EXAMPLES OF NEUTRALISATION REACTIONS.