6. What is neutralization reaction? Give two examples.
2010/2011/2013/2014/2016 [3 Marks]

Acid reacts with a base to produce salt and water then it is a neutralization reaction.

(i) $NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$
Name of the salt obtained: Sodium chloride.

(ii) $Mg(OH)_2 + H_2SO_4 \rightarrow MgSO_4 + 2H_2O$
Name of the salt obtained: Magnesium sulphate.

7. What is observed when carbon dioxide gas is passed through limewater
(a) for a short duration?
(b) for a long duration?
Also write the chemical equations for the reactions involved.
2010/2011/2012/2015 [5 Marks]

When pieces of marbles are dropped in dil. hydrochloric acid then calcium chloride (salt), water, and carbon dioxide gas are formed.

$$CaCO_3 + HCl \rightarrow CaCl_2 + H_2O + CO_2$$

When the evolved gas CO_2 is passed through lime water, the lime water turns milky. It happens due to the formation of insoluble precipitate of calcium carbonate.

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

(Insoluble calcium carbonate)

If excess carbon dioxide is passed through lime water then the solution becomes colourless again, *i.e.*, milkiness of the solution disappears due to the formation of soluble calcium bicarbonate.

$$CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$$

(Soluble calcium bicarbonate)

8. While diluting an acid, why is it recommended that acid should be added to water and not water to the acid?
2010/2011/2012 [2 Marks]

Dilution of concentrated acid is an exothermic process. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns whereas the acid is added to water slowly, with constant stirring, the mixture will not splash out.

9. What is universal indicator? State the purpose for which this indicator is used.
[2 Marks]

A universal indicator is a mixture of several indicators. It shows different colours at different concentrations of hydrogen ions (H^+) in a solution. This is used to identify whether the given solut

ion is an acid or base and what is its concentration.

10. How does the enamel of the teeth undergo damage due to the eating of chocolates and sweets? What should be done to prevent it?

2014/2015/2016 [2 Marks]

(a) Tooth enamel is made up of calcium phosphate [$Ca_3(PO_4)_2$].
(b) Tooth decay starts when the pH of the mouth is lower than 5.5.
(c) Bacteria present in the mouth produce acids by degradation of sugar and food particles which is left remaining in the mouth after eating.
(d) The best way to prevent tooth decay is to clean the mouth after eating food using toothpastes, which are generally basic in nature and neutralize the excess acid formed in the mouth.

---

1. Differentiate between strong electrolytes and weak electrolytes. Mention two examples.

2014/2015/2016 [3 Marks]

Strong electrolytes: The substances which dissociates completely in aqueous solution to give large number of ions, *i.e.*, NaCl, HCl, etc are called strong electrolytes.
Weak electrolytes: The substances which dissociates incompletely and give less number of ions in aqueous solution, *i.e.*, CH_3COOH, NH_4OH, etc are called weak electrolytes. 1

---

12. (a) In a tabular form write the colours of the following indicators in presence of acid and base:
Litmus solution, phenolphthalein solution, methyl orange solution.
(b) Classify the following given solution A and B in acidic and basic, giving reason.
Solution A: $[H^+] < [OH^-]$
Solution B: $[H^+] > [OH^-]$

2015/2016 [5 Marks]

(a)

Indicator	Colour	
	In presence of acid	In presence of base
Litmus solution	Red	Blue
Phenolphthalein solution	Orange	Pink
Methyl orange solution	Red	Yellow

(b)

$\Rightarrow$ Solution A is basic in nature since the concentration of H^+ ions in the solution is less than that of OH^- ions.
Solution B is acidic as the concentration of H^+ ion in the solution is more than that of OH^- ions.

---

13. Give the formula of bleaching powder and write two applications of it.

2012/2013/2016 [2 Marks]

(i) Bleaching powder - Calcium oxychloride ($CaOCl_2$).
(ii) Bleaching powder is produced by the action of chlorine on dry slaked lime [$Ca(OH)_2$]. In other words, when chlorine is passed over dry slaked lime, bleaching powder is formed.

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

(iii) Bleaching powder is used for:
(a) Bleaching cotton and linen in textile industry.
(b) Bleaching wood pulp in paper factories.
(c) Bleaching washed clothes in laundry.
(d) Disinfecting drinking water to make it germ free.

---

14. How is Plaster of Paris chemically different from gypsum? How can they be interconverted? Write any two uses of Plaster of Paris.

2014/2015/2016 [3 Marks]

Plaster of Paris is calcium sulphate hemihydrate ($CaSO_4 \cdot \frac{1}{2} H_2O$) or two formula units of $CaSO_4$ sharing one molecule of water whereas gypsum has two water molecules with one formula unit of $CaSO_4$ *i.e.*, $CaSO_4 \cdot 2H_2O$.

These both are interconvertible:

$$\underset{\text{(Gypsum)}}{CaSO_4 \cdot 2H_2O} \overset{373\ K}{\rightleftharpoons} \underset{\text{(Plaster of Paris)}}{CaSO_4 \cdot \tfrac{1}{2} H_2O} + 1\tfrac{1}{2} H_2O$$

Uses of Plaster of Paris:
(a) Used as plaster for supporting fractured bones in the right position.
(b) Used for making toys and materials for decoration.

---

15. What is chlor-alkali process? Write its chemical equation. Which gas is evolved at cathode and anode? Write any two uses of hydrochloric acid and bleach so formed as products.

2013/2015/2016 [5 Marks]

When electricity is passed through an aqueous solution of sodium chloride (called brine), it decomposes to form sodium hydroxide. This process is called chlor-alkali process.

$$2NaCl_{(aq)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + Cl_{2(g)} + H_{2(g)}$$

Chlorine gas is evolved at cathode and hydrogen gas at anode.

Uses of hydrochloric acid:
(i) It is used for cleaning steel.
(ii) It is also used to prepare ammonium chloride, medicines, etc.

Uses of bleach:
(i) It is used to bleach fabric.
(ii) It is also used as household bleaches.
