

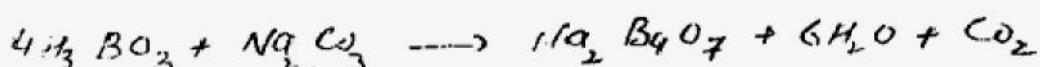
Fsc Part II – Chemistry Ch # 03

Q#1:- How Boron Shows peculiar behaviour ?

- Ans:-
1. Boron is a non metal while others are metals.
 2. Boron doesn't form ionic compounds while others form.
 3. Boron shows +3 and -3 oxidation state while others shows only -3 oxidation state.

Q#2 How borax is prepared from boric acid and Colemanite ?

Ans:- When a hot solution of boric acid is treated with Soda ash borax is obtained.



ii. finely powdered Colemanite is boiled with Na_2CO_3 solution, when CaCO_3 precipitates out and a mixture of borax and Sodium metaborate is formed. The clear solution from the top is taken out and is allowed to crystallize and thus borax separate out.



Q#3 What happened when CO_2 is passed through Sodium metaborate solution ?

Ans:- Sodium metaborate is decomposed into borax which separate out in the form of fine crystals.



Q#4:- What is the action of an aqueous solution of borax on litmus?

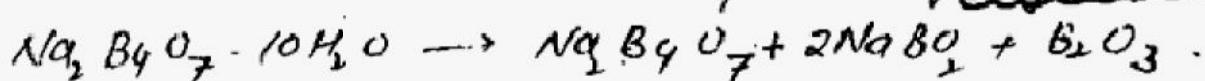
Ans:- Red litmus becomes blue in aqueous solution of

borax. Borax on hydrolysis changes to alkali and weak ortho-boric acid.



Q#5 :- What is the effect of heat on borax?

Ans :- Borax on heating loses its water of crystallization and swells up into a white porous mass due to expulsion of water. On further heating it melts into a clear transparent glassy mass.



Glassy mass.

Q#6 :- What is Borax bead Test? how it is performed?

Ans :- prepare a loop at the end of platinum wire. Heat the loop on flame and touch with a borax powder. Again borax swells up and then melts into colourless glassy bead. Now put a few grain of the substance under examination on the bead and re-heat it first in the oxidizing flame and then on reducing flame and observe the colour of bead.

Q#7 :- what is the chemistry of borax bead Test

Ans :- Bead is combination of sodium meta borate and coloured ions, meta borates. Borax on heating changes to sodium meta borate and boron oxide B_2O_3 . B_2O_3 reacts with metal oxide to form metal meta-borates.



With cupric oxide, the bead is coloured blue.

Q#8:- Write some uses of borax?

Ans:- 1. It is used to prepare borate glass which is heat resistant.

2. It is used in softening of water.

3. It is used in metallurgical operation.

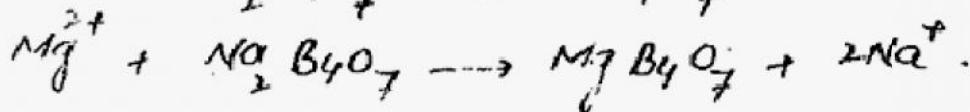
4. Used as a flux in welding.

5. It is used in leather industry for dying.

6. It is used in making washing powder.

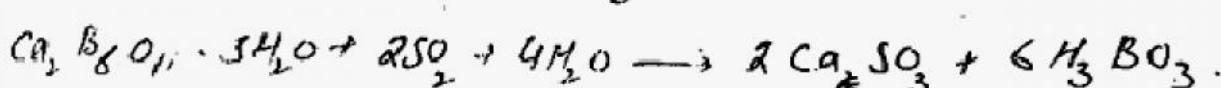
Q#9 How does borax serve as a water softening agent?

Ans:- Borax can be used to remove Ca^{2+} & Mg^{2+} from hard water. These ions reacts with water and settle down as a precipitates.



Q#10 How boric acid is prepared from colemanite?

Ans:- boric acid is prepared by suspending colemanite in boiled water and SO_2 is passed through it. Boric acid crystallize out from the solution while CaSO_3 remain in solution.

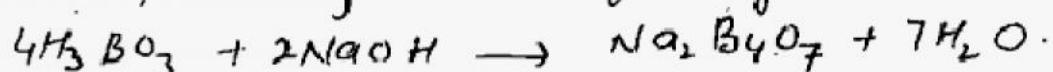


Q #11 How boric acid react with ethyl alcohol and NaOH?

Ans:- It react with ethyl alcohol and forming ethyl borate.

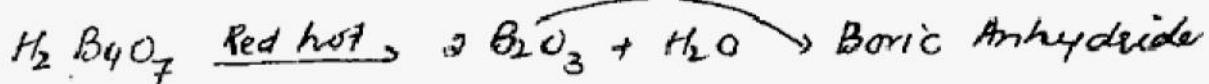
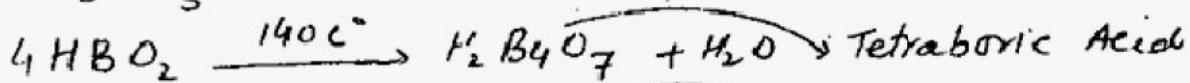
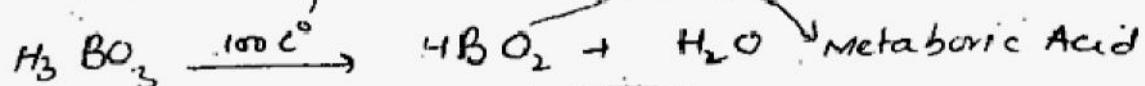


(ii) It is partially neutralized by caustic soda



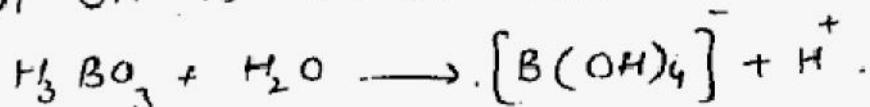
Q #12 How boric acid is converted into boric anhydride?

Ans:- When it is heated strongly and it swells and losing water molecules.



Q #13 :- How boric Acid acts as an acid?

Ans:- Substance which donates H^+ is called acid and donate OH^- called base. In the same way a substance accept H^+ is called base and accept OH^- is called acid.



Q #14 Write name & formulas of diff acids of boron.

Ans:- Ortho boric acid H_3BO_3

Metaboric Acid H_2BO_2

Tetraboric Acid $H_2B_4O_7$

Pyroboric Acid $H_6B_6O_9$

Q #15:- What is meant by anodizing of Aluminium?

Ans :- Aluminium is coated with a layer of Al_2O_3 in moist air. This layer is very useful. This layer acts as a protective layer and keeps it away from corrosion. This layer is deposited electrolytically on the surface of Aluminium in a process known as Anodizing.

Q #16 why conc. HNO_3 does not react with Aluminium?

Ans :- Conc. HNO_3 oxidizes to Aluminium and a protective layer of Al_2O_3 is formed which prevents the attack of HNO_3 on the metal.

Q #17:- what is passivity of metal?

Ans :- Some metals react with acids and form a protective layer. This layer prevents them from further attack. This phenomenon is called passivity of metal. Al, Cr, & Fe shows such behaviour.

Q #18:- why carbon shows peculiar behaviour?

Ans :- Carbon shows peculiar behaviour in the following manner.

1. carbon is a non-metal while other members are metalloid.
2. carbon shows a self linkage property which is called catenation but other members don't show this property.

Q # 19:- How carbon and silicon are similar ?

- Ans:-
1. Both carbon & silicon are non-metal.
 2. carbon and silicon both form acidic oxides.
 3. Both carbon and silicon form covalent bonds.
 4. Both forms hydrides and chloride.
 5. Both form long chain molecule.

Q # 20:- Why CO is a polar while CO₂ is a non-polar in nature ?

Ans:- carbon monoxide is a diatomic molecule having triple bond b/w two atoms so it is a polar $\ddot{\text{C}}\equiv\ddot{\text{O}}$ $\mu = 0.12 \text{ D}$. while CO₂ have a linear structure and bond-moments cancelled out each other. So as a whole CO₂ is a non-polar.



Q # 21 Why CO₂ is acidic in nature ?

Ans:- CO₂ is water soluble gas and changes to carbonic acid. So CO₂ is an acidic gas.



Q # 22:- Why CO₂ is gas while SiO₂ is solid ?

Ans:- CO₂ is a non-polar and linear molecule and having zero dipole moment so weak intermolecular forces are present. So molecules are at larger distance. Therefore exist as a gas.

In SiO_4 , each Si-atom is bonded tetrahedrally to four oxygen atom and each oxygen is bonded b/w two Si-atom. It forms a network structure. B/w of this SiO_4 is a solid.

Q #22:- Why liquid Silicones preferred over ordinary organic lubricants?

Ans:- It is preferred due to following reasons.

1. The viscosity of liquid silicon remain constant with the change of Temperature.
2. Silicon oil are highly stable and non-volatile.
3. Silicon liquid oil do not form acid in the presence of air even at high Temperature.

Q #23:- What is water glass?

Ans:- Sodium silicate is known as water glass and it is prepared by fusing Sodium carbonate with sand.



Q #24 What is Chemical Garden?

Ans:- When crystals of soluble salt like nickel chloride, ferrous sulphate, copper sulphate or cobalt nitrate are placed in a solution of sodium silicate, they produce a very beautiful growth like plant which is called Chemical Garden.

Q #25 what are Semi-Conductors & what is the effect of Temperature on Conductivity of Semi-Conductor?

Ans:- Those substances which can conduct electricity at high temperature and acts as an insulator at room temperature. When Temperature increases then resistance decreases so their conductivity increases. e.g. silicon, germanium, PbS, Silicon carbide etc.

Q #26:- How transistors are prepared and where they are used?

Ans:- A semi conductor is joined to another metal of different semi conductor. This junction b/w the different material forms a boundary which allows electricity to pass more properly and is used in transistor.

Q #27 What is Talc or Soapstone & Asbestos?

Ans:- Talc :- The magnesium silicate is commonly known as talc ($Mg_3{H_2}(SiO_3)_2$). It is physically greasy in touch. therefore it is used in making cosmetics. It is also used in house hold articles.

Asbestos :- Asbestos is hydrated calcium magnesium silicate ($CaMg_3(SiO_3)_4$). It is commonly used in making Incombustible fabric and hard boards etc.

Q # 28:- What is Silica glass or vitreous silica?

Ans:- When crystalline silica is melted and again cooled, the atoms not have a regular arrangement. This irregular arrangement of silica is called silica glass or vitreous silica.

Q # 29:- How lead Sub-Oxide is prepared.

Lead Sub-Oxide is prepared by heating plumbous oxalate. It is a black powder and used as a black pigment in paint. It is also used for the manufacturing of lead storage batteries.

Q # 30:- How red lead or minium is prepared? (Sindur)

Ans:- It is prepared by heating lead with oxygen at 340°C .

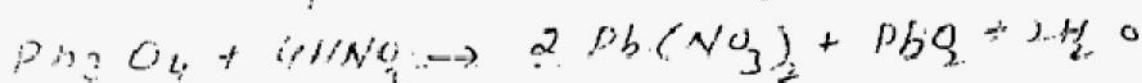


Red Lead is used as a pigment, flint glass, matches and ceramic glazes.

Q # 31:- What is PbO_2 ? (Black lead)

Ans:- When red lead is treated with Conc. HNO_3 ,

it is decomposed into $\text{Pb}(\text{NO}_3)_2$ & PbO_2 .



It is a reddish brown powder. It is soluble in alkaline water to yield soluble plumbates.

Q # 32:- What is (litharge, massicot) PbO ?

Ans:- It exist in two form rhombic (yellow) and tetragonal (red). It is slightly soluble in

water and used in prepared flint glass and paints. Litharge is used in preparing oils, varnishes and in the manufacturing of flint glass.

Q # 33:- what is white lead (white pigment)?

Ans:- Basic $2\text{PbCO}_3 \cdot \text{Pb(OH)}_2$ is an amorphous white pigment. It mixes readily with linseed oil and has a good covering power. White lead is not a good pigment b/c it is darkened in the presence of H_2S which is present in atmosphere.

Q # 34 What is Lead Chromate (yellow pigment)

Ans:- Its other name is chrome yellow. Red chromate is boiled with dilute alkali hydroxide and are used as a pigment. This stable yellow modification of Lead Chromate is monoclinic. Mixing of PbO with PbSO_4 are used as yellow pigment.

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CH # 3:

Q:- why is aluminium not found as a free element?
 Ans:- Aluminium is a reactive metal and does not exist in free state.

It is mostly found in the form of aluminosilicates and also as oxides.

Q:- Why aluminium is said to be corrosion free?

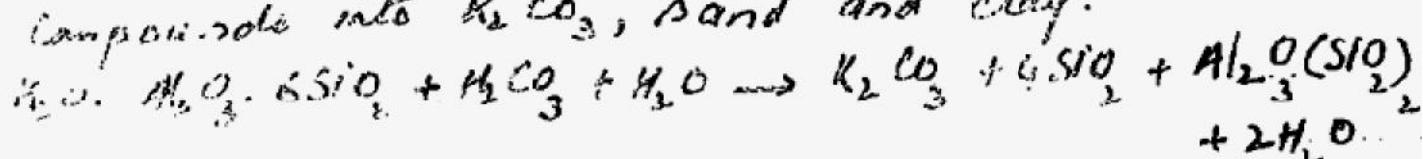
Ans:- When a piece of aluminium sheet is exposed to moist air, it acquires a thin, continuous coating of aluminium oxide, which prevents further attack on the metal by atmospheric oxygen and water under normal conditions. because of this aluminium sheets are said to be corrosion free.

Q:- what do you mean by Inert pair effect?

Ans:- The pair of outermost electrons that does not readily take part in chemical combination is termed as inert pair and their effect is termed as inert pair effect.

Q:- What is meant by weathering of silicate rocks?

Ans:- Silicate aluminium silicate are formed by the chemical weathering of rocks. clay is formed by disintegration and weathering of rocks.
 Due melting and freezing of water in the rocks and the chemical action of water and CO_2 converts these compounds into K_2CO_3 , sand and clay.



Q:- what is semi-conductor and why it is called so?

Ans:- A substance that has different resistances to the passage of an electric current under different circumstances is called a semi-conductor. Semi-conductor is basically a half conductor.

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Q:- what is the effect of heat and light on the conductivity of semi-conductor?

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Ans:- The electrical conductivity of semi-conductor increases by increasing the temperature.

→ Semi-conductors are sensitive to light. the greater the intensity of light, the better they conduct electricity.

Q:- Aqueous solution of borax is alkaline why?

Ans when borax is dissolved in water then NaOH and H_3BO_3 is prepared. NaOH is strong base while H_3BO_3 is a weak acid.

