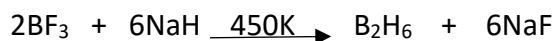


P – BLOCK ELEMENTS -I

1. Write a short note on anomalous properties of the first element of p – block.

- Small size
- High ionization energy and high electronegativity
- Absence of d – orbitals in their valence shell

2. Boron does not react directly with hydrogen. Suggest one method to prepare diborane from BF₃.



3. Give the uses of Borax.

- It is used as a flux in metallurgy
- It acts as a preservative
- It is used in the identification of coloured metal ions

4. What is catenation? Describe briefly the catenation property of carbon.

Catenation is an ability of an element to form chain of atoms.

- The valency of element is greater than or equal to two
- Element should have the ability to bond with itself
- The self bond must be as strong as its bond with other elements.
- Kinetic inertness of catenated compound towards other molecules

5. Give the uses of Silicones.

- They are used for making water proofing clothes
- They are used as insulating material in electrical motor
- They are mixed with paints and enamels.

6. Give one example for each of the following.

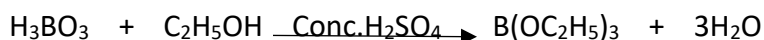
- i. icosagens – Boron
- ii. tetragen – Carbon
- iii. pnictogen – Nitrogen
- iv. chalcogen – Oxygen

7. Write a note on metallic nature of p – block elements.

- The tendency of an element to form a cation by losing electrons is known as electropositive or metallic character.
- this character depends on the ionization energy.
- Generally on descending a group the ionization energy decreases and hence the metallic character increases.
- Ex: group 13 – Al, Ga, In, Tl are metals

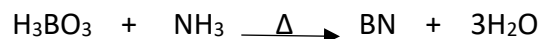
8. How will you identify borate radical.

When boric acid or borate salt is heated with ethyl alcohol in presence of conc. H₂SO₄, an ester, trialkylborate is formed. The vapours of this ester burns with green edged flame.



9. How will you convert boric acid into boron nitride?

Fusion of urea with boric acid in an atmosphere of ammonia at 800 – 1200 K gives Boron nitride

**10. Describe briefly allotropism in p – block elements with specific reference to carbon.**

Allotropic forms of carbon are : Graphite, Diamond, Fullerenes, Graphene and Carbon nano tubes.

Graphite:

- Most stable allotropic form
- Soft and conduct current
- Composed of two dimensional sheets of carbon atoms
- Carbon atoms are sp^2 hybridised
- Used as lubricant

Diamond:

- Very hard
- Carbon atoms are sp^3 hybridised
- There is no free electrons for conductivity
- Used for cutting glasses and for sharpening tools.

Fullerenes:

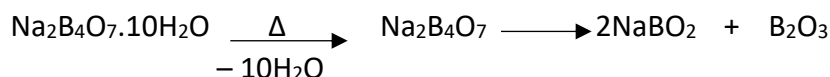
- These molecules have cage like structure
- The C₆₀ molecules have a soccer ball like structure and is called Buckminster fullerene or buckyballs.
- It has a fused ring structure consisting of 20 six membered rings and 12 five membered rings.
- Carbon atoms are sp^2 hybridised

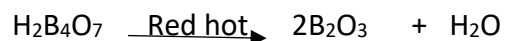
11. What is inert pair effect?

In heavier post transition metals, the outer s electrons have a tendency to remain inert and do not take part in bonding. This is called inert pair effect.

12. Give the uses of Boron.

- $^{10}\text{B}_5$ is used as a moderator in nuclear reactor
- It is used as a rocket fuel igniter
- It is essential for the cell wall of plants

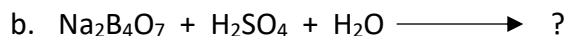
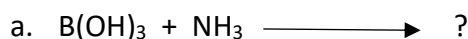
13. How is borax beads are formed?

14. Give the action of heat on boric acid.**15. Give the uses of Boric acid.**

- Used as an antiseptic
- Used as an eye lotion
- Used as a food preservative

16. Give the uses of Alum.

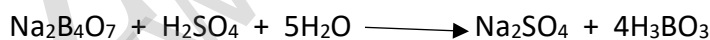
- Used for purification of water
- Used in dyeing and in paper industry
- Used for water proofing

17. Complete the following reactions:**18. Give the Preparation of Borax.**

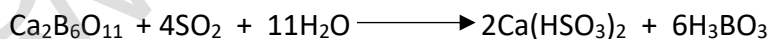
Borax is obtained from the colemanite ore by boiling its solution with sodium carbonate.

**19. Give the preparation of Boric acid.**

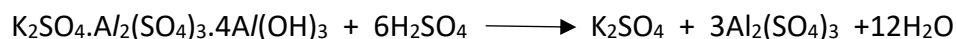
- From borax:



- From colemanite:

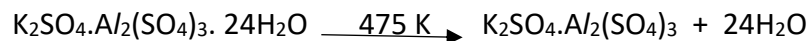
**20. Give the preparation of Alum or Potash alum.**

- When alum stone is treated with excess of H_2SO_4 , the aluminium hydroxide is converted to aluminium sulphate.
- A calculated quantity of K_2SO_4 is added and the solution is crystallised to generate potash alum.
- It is purified by recrystallisation.



21. What is called Burnt alum?

At 475 K alum loses water of hydration and swells up. The swollen mass is known as Burnt alum.

**22. Write notes on Carbon nanotubes.**

- It is an allotropic form of carbon
- They have graphite like tubes with fullerene ends.
- Along the axis, these are stronger than steel and conduct electricity
- They have many applications in nanoscale electronics, catalysis, polymers and medicine.

23. Write notes on Graphene.

- It is an allotropic form of carbon.
- It has a single planar sheet of sp^2 hybridised carbon atoms that are densely packed in a honeycomb crystal lattice.