



MORE QUESTIONS SOLVED

I. Very Short Answer Type Questions

Question 1. Why is boron used in nuclear reactions?

Answer: Because Boron can absorb neutrons.

Question 2. Why does boron form stable electron deficient compounds?

Answer: Boron has three electrons in its valence shell that boron show three electrons with other elements and form an electron deficient compound.

Question 3. By giving a balanced equation show how $B(OH)_3$ behaves as an acid in water.

Answer: $B(OH)_3 + 2H_2O \rightarrow [B(OH)_4]^- + H_3O^+$.

Question 4. What is dry ice? Why is it so called?

Answer: Carbon dioxide can be obtained as a solid in the form of dry ice by allowing the liquified CO_2 to expand rapidly.

Unlike ordinary ice it does not melt and hence does not wet the surface on which it is kept. Thus it is called dry ice.

Question 5. Name the element of group 14 which exhibits maximum tendency for catenation.

Answer: Carbon.

Question 6. What is the basic building unit of all silicates?

Answer: SiO_4^{4-} is the basic unit of all silicates.

Question 7. Why do boron halides form addition compounds with NH_3 ?

Answer: Boron halides are lewis acids and can accept a pair of electrons from amines to form addition product.

Question 8. What happens when $NaBH_4$ reacts with iodine?

Answer: $2NaBH_4 + I_2 \rightarrow B_2H_6 + 2NaI + H_2$.

Question 9. Out of CCl_4 and $SiCl_4$ which one react with water and why?

Answer: Due to the presence of d-orbitals in Si, $SiCl_4$ reacts with water. CCl_4 does not react with water due to the absence of d-orbitals in C atom.

Question 10. Which oxide of carbon is regarded as anhydride of carbonic acid?

Answer: CO_2 is regarded as anhydride of carbonic acid.

$H_2CO_3 \rightarrow H_2O + CO_2$

Question 11. What happens when boric acid is heated?

Answer:



Question 12. CO_2 is gas while SiO_2 is solid at room temperature. Give reason.

Answer: The molecules of CO_2 are held together by weak van der Waals forces of attraction which can be easily overcome by collisions of the molecules at room temperature. Consequently CO_2 is a gas.

On the other hand silicon atom forms four single covalent bonds with O-atom which are tetrahedrally arranged and form a three-dimensional structure. Thus SiO_2 is a high melting solid.

Question 13. What is producer gas ?

Answer: Producer gas is a mixture of CO and N_2 in the ratio of 2 : 1

Question 14. Write the state of hybridisation of 'B' in BF_3 .

Answer: Hybridisation of 'B' in BF_3 is sp^2 .

Question 15. Mention the state of hybridisation of B in BH_4 .

Answer: sp^3 .

II. Short Answer Type Questions

Question 1. What is meant by catenation? Why does 'C' show the property of catenation to maximum extent?

Answer: It is the phenomenon of an atom to form a strong covalent bond with the atoms of itself. Carbon shares the property of catenation to maximum extent because it is small in size and can form $\text{P}\pi\text{-P}\pi$ multiple bonds to itself.

Question 2. Give the chemical reactions as an evidence for each of the following observations.

(i) Tin (II) is a reducing agent whereas lead (II) is not.

(ii) Gallium (I) undergoes disproportionation reaction.

Answer:

(i) Due to inert pair effect Pb^{2+} is more stable than Pb^{4+} . Whereas Sn^{4+} is more stable than Sn^{2+} .

Thus Sn^{2+} is a good reducing agent and Pb^{2+} is not.

(ii) $3\text{Ga}^+ \rightarrow 2\text{Ga} + \text{Ga}^{3+}$

This is because Ga^{3+} is more stable than Ga^+ .

Question 3. Describe two similarities and two dissimilarities between B and Al.

Answer: Similarities:

- Both have same number of valence electrons.
- Both have similar electronic configuration.

Dissimilarities:

- B is a non-metal where Al is a metal.
- B forms acidic oxide whereas Al forms amphoteric oxides.

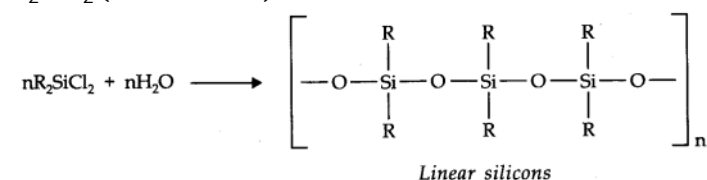
Question 4. (a) What is general formula of silicons?

(b) How are linear silicons obtained?

Answer:

(a) R_2SiO

(b) Linear silicons are obtained by the hydrolysis of R_2SiCl_2 (chlorosilanes).



Question 5. What happens when

- (i) Quick lime is heated with coke?
(ii) Carbon monoxide reacts with Cl_2 ?

Answer:

- (i) $\text{CaO} + 3\text{C} \rightarrow \text{CaC}_2 + \text{CO}$
(ii) $\text{CO} + \text{Cl}_2 \rightarrow \text{COCl}_2$

Question 6. What are Fullerenes ? How are they prepared ?

Answer: Fullerenes are the allotropes of carbon. Its structure is like a soccer ball.

They are prepared by heating graphite in electric arc in presence of inert gases such as helium or argon.

Question 7. Give reason.

- (i) C and Si are always tetravalent but Ge, Sn, Pb show divalency.
(ii) Gallium has higher ionization enthalpy than Al. Explain.

Answer:

- (i) Ge, Sn and Pb show divalency due to inert pair effect, Pb^{2+} is more stable than Pb^{4+} .
(ii) Due to poor shielding effect of d-electrons in Ga, effective nuclear charge increases as compared to Al. Thus the I.E of Ga is higher than Al.

Question 8. Give reason why boron and aluminium tend to form covalent compounds.

Answer: Sum of the three ionization enthalpies of both the elements are very high. Thus they have no tendency to lose electrons to form ionic compound. Instead they form covalent compounds.

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