



# CHEMISTRY

## BOOKS - PREMIERS PUBLISHERS

### P - BLOCK ELEMENTS - I

**Textbook Questions Answers Choose The Correct Answer**

1. An aqueous solution of borax is :

A. neutral

B. acidic

C. basic

D. amphoteric

**Answer: C**



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2. Boric acid is an acid because its molecule:

A. contains replaceable  $H^+$  ion

B. gives up a proton

C. combines with proton to form water molecule

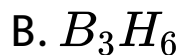
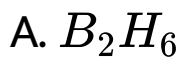
D. accepts  $OH^-$  from water, releasing proton.

**Answer: D**



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**3. Which among the following is not a borane?**



D. none of these

**Answer: B**



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4. Which of the following metals has the largest abundance in the earth's crust?

A. Aluminium

B. calcium

C. Magnesium

D. sodium

**Answer: A**



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**5.** In diborane, the number of electrons that accounts for banana bonds is :

A. six

B. two

C. four

D. three

**Answer: C**



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**6.** The element that does not show catenation among the following p-block elements is :

A. Carbon

B. silicon

C. Lead

D. germanium

**Answer: C**



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7. Carbon atoms in fullerene with formula  $C_{60}$

have:

A.  $sp^3$  hybridised

B.  $sp$  hybridised

C.  $sp^2$  hybridised

D. partially  $sp^2$  and partially  $sp^3$  hybridised

**Answer: C**



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**8. Oxidation state of carbon in its hydrides:**

A. +4



B.  $-4$

C.  $+3$

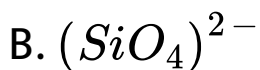
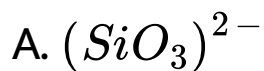
D.  $+2$

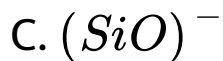
**Answer: A**



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**9. The basic structural unit of silicates is:**



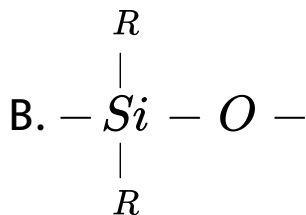


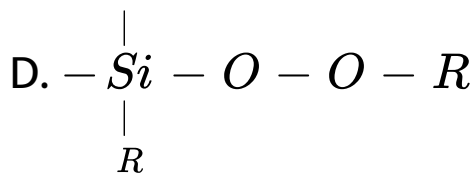
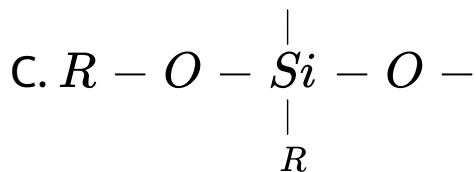
**Answer: D**



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**10.** The repeating unit in silicone is v :

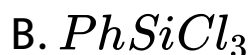
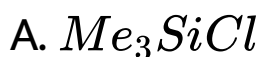




**Answer: B**

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**11.** Which of these is not a monomer for a high molecular mass silicone polymer?



C.  $MeSiCl_3$

D.  $Me_2SiCl_2$

**Answer: A**



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**12.** Which of the following is not  $sp^2$  hybridised?

A. Graphite

B. graphene

C. Fullerene

D. dry ice

**Answer: D**



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**13.** The geometry at which carbon atom in diamond are bonded to each other is :

A. Tetrahedral

B. hexagonal

C. Octahedral

D. none of these

**Answer: D**



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**14.** Which of the following statements is not correct?

A. Beryl is a cyclic silicate

B.  $Mg_2SiO_4$  is an orthosilicate

C.  $\text{SiO}_4^{4-}$  is the basic structural unit of  
silicates

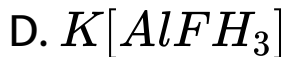
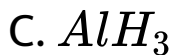
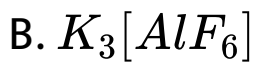
D. Feldspar is not aluminosilicate

**Answer: D**

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15.  $\text{AlF}_3$  is soluble in HF only in the presence  
of KF. It is due to the formation of :

A.  $\text{K}_3[\text{AlF}_3\text{H}_3]$



**Answer: B**



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**16. Duralumin is an alloy of :**

A. Cu, Mn

B. Cu, Al, Mg



C. Al, Mn

D. Al, Cu, Mn, Mg

**Answer: D**



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**17.** Thermodynamically the most stable form of carbon is:

A. Diamond

B. graphite

C. Fullerene

D. none of these

**Answer: B**



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**18.** The compound that is used in nuclear reactors as protective shields and control rods is

A. Metal borides

B. metal oxides

C. Metal carbonates

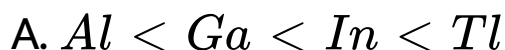
D. metal carbide

**Answer: A**



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**19.** The stability of +1 oxidation state increases in the sequence:



B.  $Tl < In < Ga < Al$

C.  $In < Tl < Ga < Al$

D.  $Ga < In < Al < Tl$

**Answer: A**



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**Textbook Questions Answers Answer The  
Following Questions**

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



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2. Describe briefly allotropism in p-block elements with specific reference to carbon.



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3. Boron does not react directly with hydrogen. Suggest one method to prepare diborane from  $BF_3$ .



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4. Give the uses of Borax.



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5. What is catenation? describe briefly the catenation property of carbon.

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6. Write a note on Fischer tropesch synthesis.

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7. Give the structure of CO and  $CO_2$ .

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8. Give the uses of silicones.

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9.  $AlCl_3$  behaves like a lewis acid. Substantiate this statement.

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10. Describe the structure of diborane.





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**11.** Write a short note on hydroboration.



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**12.** Give one example for icosogens.



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**13.** Give one example for tetragen.



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**14.** Give one example for prictogen.



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**15.** Give one example for chalcogen.



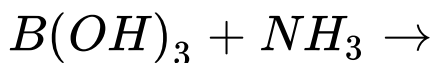
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**16.** Write a note on metallic nature of p-block elements.



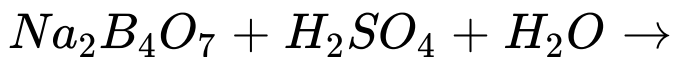
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**17.** Complete the following reactions



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**18.** Complete the following reactions



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**19.** Complete the following reactions



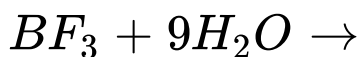
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20. Complete the following reactions



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21. Complete the following reactions



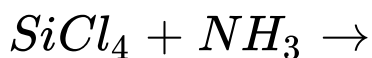
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22. Complete the following reactions



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23. Complete the following reactions



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24. Complete the following reactions



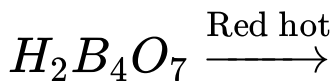
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25. Complete the following reactions



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26. Complete the following reactions



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27. How will you identify borate radical?



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28. Write a note on zeolites.



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**29.** How will you convert boric acid to boron nitride?



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**30.** A hydride of  $2^{nd}$  period alkali metal (A) on reaction with compound of Boron (B) to give a reducing agent (C). Identify A, B and C.



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**31.** A double salt which contains fourth period alkali metal (A) on heating at 500K gives (B). aqueous solution of (B) gives white precipitate with  $BaCl_2$  and gives a red colour compound with alizarin. Identify A and B.



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**32.** CO is a reducing agent. Justify with an example.



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## Other Important Questions Answers Choose The Correct Answer

1. Among the following pairs of elements which act as semiconductors?

A. C and Si

B. Si and Ge

C. B and Al

D. B and Si

**Answer: B**





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2. Among 'p' block elements which group show +6 oxidations state?

A. Icosogens

B. Tetragens

C. Prictogens

D. chalcogens

**Answer: D**



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3. Choose the correct statement:

A. There is an increase in ionisation energy down the group as a result.

B. All the elements in group 13 are metals.

C. Boron and silicon exhibit diagonal relationship.

D. Boron trifluoride is readily hydrolysed.

**Answer: C**



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4. Aluminium (III) chloride is stable where as thallium (III) chloride is highly unstable this is due to :

A. inert pair effect

B. increase in metallic character down the group

C. decrease in metallic character down the group

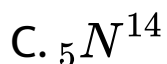
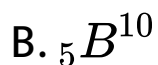
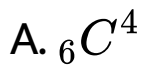
D. aluminium chloride is covalent

**Answer: A**



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5. Which of the following is used as a moderator in nuclear reactors?



D.  ${}_8O^{17}$

**Answer: B**



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**6. An aqueous solution of borax is :**

A. acidic

B. basic

C. neutral

D. is acidic as well as basic



**Answer: B**



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7. Borax Bead test is used to identify:

- A. boron
- B. borate radical
- C. nonmetal cations
- D. boride radical

**Answer: B**



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8. Boric acid is :

- A. a weak mono basic acid
- B. a strong tetrabasic acid
- C. weak mono acidic base
- D. a diabasic acid

**Answer: A**



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9. Boric acid is heated to red hot. The product obtained is :

A. metaboric acid

B. pyroboric acid

C. Boron trioxide

D. all

**Answer: C**



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10. Choose the incorrect statement with regard to boric acid:

A. The structure consists of  $[BO_3]^{-3}$  units linked to each other by hydrogen bonds.

B. It is a monobasic acid as it releases a proton.

C. It is a monobasis acid, as it accepts a hydroxyl ion.

D. Boric acid is used as an antiseptic.

**Answer: B**



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**11.** Which is not true with respect to the structure of diborane?

A. Each boron atoms, are  $sp^3$  hybridised

B. The form  $B-H$  bonds are two centre two electron bonds.

C. The  $B - H - B$  bonds are three centre  
- three electron bonds.

D. The  $B - H - B$  bonds are three centre-  
two electron bonds.

**Answer: C**



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**12.** Producer gas is a mixture of :

A. carbon monoxide and nitrogen

B. carbon monoxide and hydrogen

C. carbon dioxide and nitrogen

D. carbon dioxide and hydrogen

**Answer: A**



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**13.** The hydrolysis of  $CH_3SiCl_3$  yields:

A. complex cross linked polymer

B. cyclic polymer

C. linear polymer

D. silicols

**Answer: A**



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**14. Phenacite is :**

A.  $Be_2SiO_4$

B. an orthosilicate

C. both (a) and (b)



D. a cyclic silicate

**Answer: C**



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**15. Choose the incorrect statement:**

A. pyroxenes contain  $(SiO_3)_n^{2-}$  ions

formed by sharing two of its oxygen atoms with other units.

B. Proxene is also known as chain silicates.

C. spodumore  $[LiAl(SiO_3)_2]$  is an example of pyroxene.

D. Pyroxenes are silicates which contain  $[SiO_4]^{-4}$  units, where all the oxygen atoms are shared with other  $[SiO_4]^{-4}$  tetrahedra.

**Answer: D**



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## Other Important Questions Answers Answer The Following Questions

1. Briefs outline the electronic configuration and oxidation state of 'p' block elements.

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2. Explain how does metallic character of 'p' block elements vary down the group.

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3. What is a metalloid? Name the metalloids present among 'p' block elements.



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4. The ionisations enthalpy decreases from Boron to aluminium, but from aluminium to thallium only a marginal increase is observed. Mention the cause for this observation.



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5. Account for the trend in ionisation enthalpy of group 15/16/18 elements.



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6. How does electronegativity vary from boron to thallium?



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7. Mention the causes for the anomalous behaviour of the first element in each group.



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8. The first member of each group differs from rest of the members in their properties. Explain the statement with an example.



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9. Explain the term inert pair effect with a suitable example.



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10. Name the allotropes of (i) phosphorus, (ii) tin, (iii) carbon, (iv) silicon, (v) sulphur.



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**11.** Briefly detail the trend in physical and chemical properties of boron family.

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**12.** Give chemical equation for the following reactions.

Boron combines with chromium at 1500K.

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**13.** Give chemical equation for the following reactions.

Boron trichloride reacts with tungsten in the presence of hydrogen at 1500K gaseous.



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**14.** Give chemical equation for the following reactions.

Boron trifluoride is treated with sodium hydride at 450K.





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**15.** Give chemical equation for the following reactions.

Boron and chlorine are heated.



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**16.** Give chemical equation for the following reactions.

Boron and nitrogen are heated at high temperatures.



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17. Give one method of preparation of boric anhydride.



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18. How does boron react with (i) conc.  $H_2SO_4$  and (ii) conc.  $HNO_3$  give equations.



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19. How is sodium borate formed from boron?

Give equation.

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20. Mention the uses of boron.

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21. How is borax prepared from colemanite?

Give equation.





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**22.** An aqueous solution of borax is alkaline in nature. Explain.



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**23.** What happen when borax is heated? Give equations.



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24. Given equation for the reaction of an aqueous solution of borax with HCl .

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25. Given equation for the reaction of an aqueous solution of borax with  $H_2SO_4$ .

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26. Explain how boric acid behaves as a monobasic acid?



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27. Give equations for the reactions of boric acid with sodium hydroxide.



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28. What happens when boric acid is heated?  
Give equations.



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**29.** What happens when boric acid is heated with calcium fluoride in the presence of conc.  $H_2SO_4$ .



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**30.** What happens when heated with soda ash? Give equations.



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**31.** Give a brief account of the structure of boric acid.



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**32.** Mention the uses of boric acid.



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**33.** Give two methods of preparation of diborane.



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**34.** Give equation for the reactions between diaborane with oxygen.



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**35.** Give equation for the reactions between diaborane with LiH.



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**36.** Give equation for the reactions between diborane with  $NH_3$ .



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**37.** What is inorganic benzene? How is it prepared? Write its structure.



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**38.** Mention the uses of diborane.





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**39.** How is boron trifluoride prepared? Give equations.



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**40.** Boron trifluoride is a lewis acid. Explain.



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**41.** Discuss the structure of boron trichloride.



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**42.** How do you convert boron trifluoride to fluoroboric acid? Give equations.



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**43.** Give two methods of preparation of aluminium chloride.



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**44.** How is aluminium chloride prepared by McAfee process?



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**45.** Explain why an aqueous solutions of aluminium chloride is acidic?



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46. Complete and balance the following equations.



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47. Complete and balance the following equations.



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48. Complete and balance the following equations.



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49. Mention the uses of aluminium chloride.

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50. What are alums? Give examples.

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51. Mention the uses of alum.



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52. Give a brief account of the trends in properties of carbon group elements.



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**53.** Give a brief account of the allotropes of carbon with specific reference to their uses.

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**54.** Explain the structure of graphite.

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**55.** Briefly explain the structure of diamond.

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**56.** Write a short note on fullerenes.



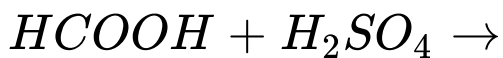
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**57.** How is carbon monoxide produced on an industrial scale?



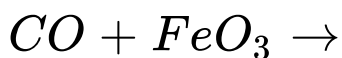
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58. Complete the following equations.



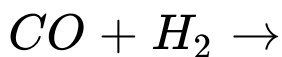
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59. Complete the following equations.



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60. Complete the following equations.



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61. Give equation for the preparation of propanal by axo process.



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62. What are carbonyls? Give examples.



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**63.** Mention the uses of carbon monoxide.



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**64.** How is carbondioxide produced industrially?



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**65.** Give equation for the preparation of carbon dioxide in the laboratory.



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**66.** Give a brief account of the properties of carbon dioxide.



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**67.** Mention the uses of carbondioxide.



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**68.** Give equations for the preparation of silicon tetrachloride from (i) silica and (ii) silicon.



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**69.** What is actions of moisture on silicon tetrachloride? Give equations.



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70. What is the action of moist ether on silicon tetrachloride?



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71. Explain the terms alcoholysis and ammonolysis taking silicon tetrachloride as example.



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72. Mention the uses of silicon tetrachloride.



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73. What are silicones?



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74. Mention the various types of silicon?



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75. Give the various properties of silicones.

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76. Explain the formation of straight chain or linear silicones.

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77. Explain the formation of a complex cross linked polymer with a suitable example.

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**78.** What are synthetic rubber and synthetic resins?



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**79.** What are silicates? Give examples for various types of silicates.



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**80.** What are ortho silicates?



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**81.** What are pyrosilicates? How are they formed?



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**82.** What are cyclic silicates? How are they formed?



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**83.** How are pyroxenes formed?



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**84.** Explain the formation of chain silicates.



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**85.** Explain the formation of sheet or phyllo silicates.



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**86.** What are amphiboles? How are they formed?



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**87.** Briefly explain the structure of three dimensional silicates.



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