# 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?

A. $B_2H_6$

B. $B_3H_6$

C. $B_4H_{10}$

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:

A. $(SiO_3)^{2-}$

B. $(SiO_4)^{2-}$

C. $(SiO)^-$

D. $(SiO_4)^{4-}$

**Answer: D**

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

A. $SiO_2$

B. $-\overset{\overset{R}{|}}{\underset{\underset{R}{|}}{Si}}-O-$

C. $R-O-\underset{\underset{R}{|}}{\overset{\overset{|}{}}{Si}}-O-$

D. $-\underset{\underset{R}{|}}{\overset{\overset{|}{}}{Si}}-O-O-R$

**Answer: B**

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

A. $Me_3SiCl$

B. $PhSiCl_3$

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. $SiO_4^{4-}$ is the basic structural unit of silicates

D. Feldspar is not aluminosilicate

**Answer: D**

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**15.** $AlF_3$ is soluble in HF only in the presence of KF. It is due to the formation of :

A. $K_3[AlF_3H_3]$

B. $K_3[AlF_6]$

C. $AlH_3$

D. $K[AlFH_3]$

**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:

A. $Al < Ga < In < Tl$

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 anamolous 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? decribe briefly the catenation property of carbon.

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**6.** Write a note on Fischer tropsch synthesis.

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

View Text Solution

**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.

View Text Solution

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

View Text Solution

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

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

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**17.** Complete the following reactions

$B(OH)_3 + NH_3 \rightarrow$

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**18.** Complete the following reactions

$$Na_2B_4O_7 + H_2SO_4 + H_2O \rightarrow$$

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**19.** Complete the following reactions

$$B_2H_6 + 2NaOH + 2H_2O \rightarrow$$

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**20.** Complete the following reactions

$B_2H_6 + CH_3OH \rightarrow$

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**21.** Complete the following reactions

$BF_3 + 9H_2O \rightarrow$

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**22.** Complete the following reactions

$HCOOH + H_2SO_4 \rightarrow$

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**23.** Complete the following reactions

$SiCl_4 + NH_3 \rightarrow$

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**24.** Complete the following reactions

$SiCl_4 + C_2H_5OH \rightarrow$

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**25.** Complete the following reactions

$B + NaOH \rightarrow$

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**26.** Complete the following reactions

$$H_2B_4O_7 \xrightarrow{\text{Red hot}}$$

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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). aqucous 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 reacters?

A. ${}_6C^4$

B. ${}_5B^{10}$

C. ${}_5N^{14}$

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. onetal 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 $\left[LiAl(SiO_3)_2\right]$ 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 an oxidation state of 'p' block elements.

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**2.** Explain how does metallic character of 'p' block elements very 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 tungstn 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.

View Text Solution

**21.** How is borax prepared from colemanite? Give equation.

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

**46.** Complete and balance the following equations.

$AlCl_3 + NaOH \rightarrow$

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**47.** Complete and balance the following equations.

$AlCl_3 + NaOH(\text{excess}) \rightarrow$

View Text Solution

**48.** Complete and balance the following equations.

$Al_2O_3 + C + Cl_2 \rightarrow$

View Text Solution

**49.** Mention the uses of aluminium chloride.

View Text Solution

**50.** What are alums? Give examples.

View Text Solution

**51.** Mention the uses of alum.

View Text Solution

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

View Text Solution

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

View Text Solution

**54.** Explain the strucure of graphite.

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

**58.** Complete the following equations.

$HCOOH + H_2SO_4 \rightarrow$

View Text Solution

**59.** Complete the following equations.

$CO + FeO_3 \rightarrow$

View Text Solution

**60.** Complete the following equations.

$CO + H_2 \rightarrow$

View Text Solution

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

View Text Solution

**62.** What are carbonyls? Give examples.

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

**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.

View Text Solution

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

View Text Solution

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

View Text Solution

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

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**72.** Mention the uses of silicon tetrachloride.

View Text Solution

**73.** What are silicones?

View Text Solution

**74.** Mention the various types of silicon?

View Text Solution

**75.** Give the various properties of silicones.

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

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

View Text Solution

**80.** What are ortho silicates?

View Text Solution

**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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