



CHEMISTRY

BOOKS - SURA CHEMISTRY (TAMIL ENGLISH)

P - BLOCK ELEMENTS - I

Evaluation Choose The Correct Answer

1. An aqueous solution of borax is

A. neutral

B. acidic

C. basic

D. amphoteric

Answer: A::B::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

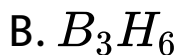
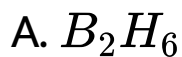
D. accepts OH^- from water, releasing proton

Answer: A::C::D



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3. Which among the following is not a borane ?



D. none of these

Answer: B::C



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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: A::C::D



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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: B::C::D



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8. Oxidation state of carbon in its hydrides

A. +4

B. -4

C. +3

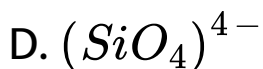
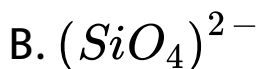
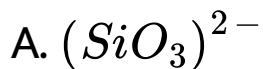
D. +2

Answer: A::D



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9. The basic structural unit of silicates is



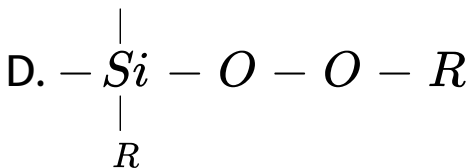
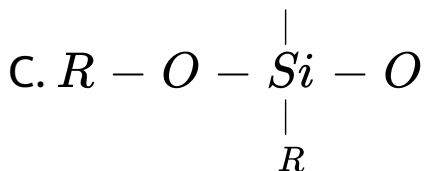
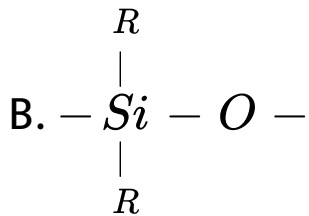
Answer: D



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10. The repeating unit in silicone is



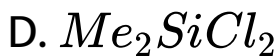
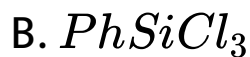
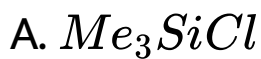


Answer: B::D



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



Answer: A:C



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

A. Graphite

B. graphene

C. Fullerene

D. dry ice

Answer: C::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: A::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

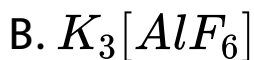
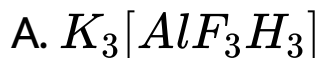
D. Feldspar is not aluminosilicate

Answer: A::C::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



Answer: A::B::C



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16. Match items in column - I with the items of column - II and assign the correct code.

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
(i)	(ii)	(iii)	(iv)

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
(iii)	(iv)	(ii)	(i)

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
(iv)	(ii)	(iii)	(i)

D.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
(ii)	(i)	(iv)	(iii)

Answer: A::B::C::D



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17. Duralumin is an alloy of

A. Cu, Mn

B. Cu, Al, Mg

C. Al, Mn

D. Al, Cu, Mn, Mg

Answer: A::C::D



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18. Thermodynamically the most stable form of carbon is

A. Diamond

B. graphite

C. Fullerene

D. none of these

Answer: A::B



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

A. Metal borides

B. Metal oxides

C. Metal carbonates

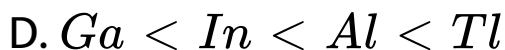
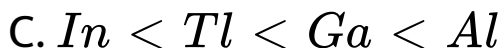
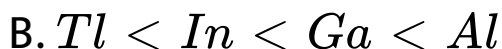
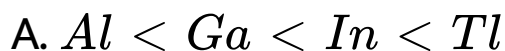
D. Metal carbide

Answer: A::B::D



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20. The stability of +1 oxidation state increases in the sequence



Answer: A::B::C::D



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Evaluation Answer The Following Questions

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



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2. (a) 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 Fisher 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 each of the following

(i) icosogens (ii) tetragen

(iii) pnictogen (iv) chalcogen



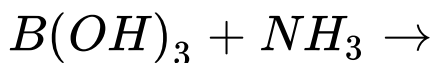
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13. Write a note on metallic nature of p-block elements.



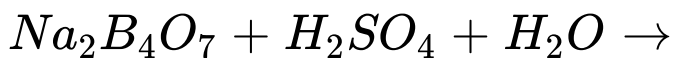
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14. Complete the following reactions



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15. Complete the following reactions



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16. Complete the following reactions



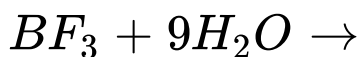
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17. Complete the following reactions



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18. Complete the following reactions



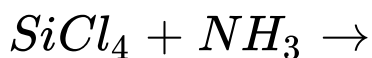
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19. Complete the following reactions



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20. Complete the following reactions



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21. Complete the following reactions



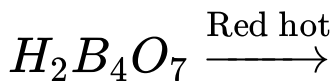
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22. Complete the following reactions



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23. Complete the following reactions



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24. How will you identify borate radical ?



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25. Write a note on zeolites.



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26. How will you convert boric acid to boron nitride ?



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27. A hydride of 2nd period alkali metal (A) on reaction with compound of Boron (B) to give a reducing agent (c) I identify A, B and C.



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28. A double salt which contains fourth period alkali metal (A) on heating at 500K gives (B). Aqueous solution of (B) gives a red colour compound with alizarin. Identify A and B.



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29. CO is a reducing agent. Justify with an example.



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Evaluation Evaluate Yourself

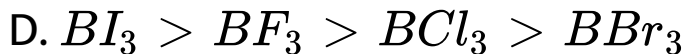
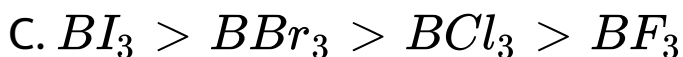
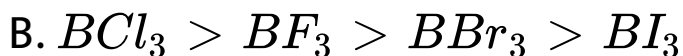
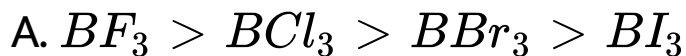
1. Why group 18 elements are called inert gases ? Write the general electronic configuration of group 18 elements.



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Additional Questions And Answers Choose The Correct Answer

1. Lewis acid character of boron trihalides is as follows :



Answer: C



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2. Select the incorrect statement regarding B_2H_6 .

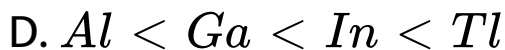
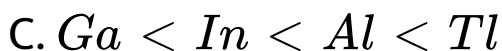
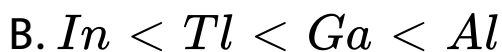
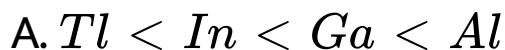
- A. It contains B-B ionic bond
- B. Each boron is sp^3 hybridised
- C. It has two types of hydrogen bonds
- D. it is used as a reducing agent.

Answer: A



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3. The stability of +1 oxidation state increases in the sequence



Answer: D



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4. Which one of the following compounds has similar structure to that of graphite ?

A. Boron nitride

B. Boron Carbide

C. Aluminium Carbide

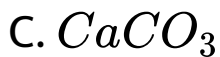
D. Aluminium Oxide

Answer: A



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5. Chemical formula of phosgene is



Answer: A



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6. Graphite has

A. 2-d sheet structure

B. Vander waals force between successive
layers of carbon sheets

C. sp^2 hybridised carbon linked with other
three carbon atoms in hexagonal planar
structure

D. all the above

Answer: D



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7. SiO_4^{4-} ion has _____ geometry

A. Trinagular

B. Tetrahedral

C. Linear

D. Pentagonal bipyramidal

Answer: B



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8. Which one is correct statements for zeolite ?

A. Zeolites are aluminosilicates having three dimensional framework

B. Hydrate zeolites are used as ion exchangers in hardening of soft water

C. Zeolites are alumino silicates

D. all the above

Answer: D



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9. Which of the following oxide is amphoteric ?

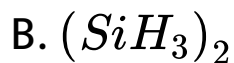


Answer: C



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10. Identify the electron - deficient species



Answer: A



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11. Which of the following statements about H_3BO_3 is not correct ?

A. It has a layer structure in which planar

BO_3 units are joined by H-bonds

B. It is a strong tribasic acid

C. It is prepared by acidifying an aqueous

solution of borax

D. It does not act as proton donor but acts

as lewis acid by accepting hydroxyl ion.

Answer: B



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12. Boron compounds behave as lewis acid because of their _____

- A. ionisation property
- B. acidic nature
- C. covalent nature
- D. electron deficient nature

Answer: D



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13. In graphite, electrons are

- A. localised on each C-atom
- B. localised on every third C-atom
- C. delocalised within the layer
- D. present in anti-bonding orbital

Answer: C



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Additional Questions And Answers Fill In The Blanks

1. On moving down the group 13, density

A. decreases

B. increases

C. First decreases then increases

D. remains same

Answer: B



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2. Elements of group 13 mainly form covalent compounds because _____

A. small size

B. electro negativity values are high

C. ionizatio energy is very high

D. both (a) and (c)

Answer: D



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3. Oxidation state exhibited by group 13 elements is _____

A. +1, +2 and +3

B. +1 and +3

C. +1 and +4

D. $+2 + 3$ and $+4$

Answer: B



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4. All elements except carbon have the tendency to show maximum covalency of six

A. due to presence of vacant d-orbitals

B. due to absence of vacant d-orbitals

C. due to presence of partially filled d-orbitals

D. due to presence of completely filled d-orbitals

Answer: A



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5. Aluminium is used for making alloys because of its _____

A. resistance to corrosion

B. poor conductivity

C. heaviness

D. all of these

Answer: A



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6. Group 14 elements have general electronic configuration _____

A. ns^2

B. ns^2np^4

C. ns^2np^6

D. ns^2np^2

Answer: D



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7. Allotropy is due to _____

A. difference in chemical properties

B. difference in the number of atoms in the molecules

C. difference in the arrangement of atoms in the molecules in the crystal

D. None of these

Answer: C



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8. The silicates which contain discrete tetrahedral units are _____

A. ortho silicates

B. sheet silicates

C. pyrosilicates

D. three dimensional silicates

Answer: B



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9. Silicones are _____

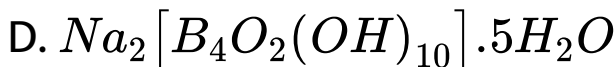
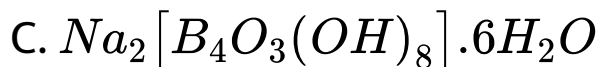
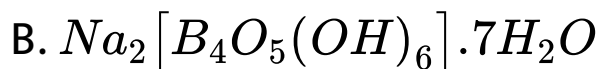
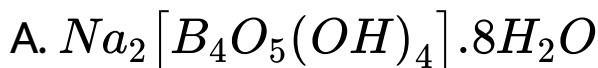
- A. ortho silicates
- B. water repellent thermal insulators
- C. both (a) and (b)
- D. None of these

Answer: C



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10. Borax is _____



Answer: A



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Additional Questions And Answers Assertion Reason

1. Assertion : In diborane containing eight -B-H bonds, the four terminal bonds are covalent

Reason : Boron in B_2H_6 is sp^2 hybridised.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: C



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2. Assertion : When borax is strongly heated it forms transparent glassy bead.

Reason : Borax is the other name for sodium tetraborate decahydrate.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: B



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3. Assertion : Boric acid is weak monobasic acid.

Reason : Boric acid gives one H^+ ion.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: C



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4. Assertion : Fullerene is the purest allotrope of carbon.

Reason : They have smooth structure without dangling bonds.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: A



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5. Assertion : Carbon has maximum tendency of catenation among group 14.

Reason : C-C bond strength is very strong.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: A



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6. Assertion : Carbon shows an anomalous behaviour in group 14.

Reason : Carbon has maximum covalency of 4.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false.

Answer: B



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Additional Questions And Answers Correct Statement S

1. I. The boron occurs mostly as borates.

II. Boron does not react directly with hydrogen.

III. The simplest borane is triborane.

IV. Boron combines with halogen to form boron trihalides.

A. Only I

B. Only II

C. III & IV

D. I, II & IV

Answer: D



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2. I. Boric acid can be extracted from borax and colemanite.

II. Boric acid is a colourful crystal.

III. It is very weak monobasic acid.

IV. It accepts hydroxyl ion rather than donating proton.

A. Only I

B. Only II

C. I, III & IV

D. III & IV

Answer: C



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3. I. Aluminium chloride is obtained by heating a mixture of alumina and coke in a current of chlorine

II. Anhydrous aluminium chloride is a hygroscopic substance.

III. Anhydrous aluminium chloride is a colourless substance.

IV. Aluminium chloride is a lewis base

A. I, II & III

B. Only II

C. Only I

D. III & IV

Answer: A



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4. Select correct statements from the following:

I. Potash alum is a white crystalline solid.

II. It is soluble in water.

III. It is used as a styptic agent

IV. The aqueous solution is base.

A. III & IV

B. Only II

C. Only I

D. I, II & III

Answer: D



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5. I. Graphene is an allotropic form of carbon

II. CO is a strong reducing agent

III. CO is a poisonous gas.

IV. CO is used as a propellant

A. I, II & III

B. Only II

C. Only I

D. III & IV

Answer: A



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Additional Questions And Answers Incorrect Statement S

1. Identify correct statement/s from the following:

(a) Boron has the capacity to absorb neutrons.

(b) Amorphous boron is used as a rocket fuel igniter.

(c) Boron is essential for the cell walls of plants.

(d) Boron shows reactivity at higher temperatures.





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2. Identify correct statement/s from the following:

(a) In diborane two BH_2 units are linked by three bridged hydrogens.

(b) It has six B-H bonds.

(c) Diborane is used as a high energy fuel for propellant

(d) It is used in welding torches



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3. Find out the correct statement from the following:

(a) Alum is potassium aluminium sulphate

(b) Alum is extracted from colemanite

(c) Anhydrous aluminium chloride a catalyst in Friedel-Crafts reactions.

(d) It's a Lewis acid

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4. Identify correct statement/s from the following:

(a) Carbon is found in the native form as graphite.

(b) Coal contains large quantities of carbon

(c) Clay is important source for carbon.

(d) Carbon exists in many allotropic forms.



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5. Find out the correct statement from the following:

(a) General formula of silicones $R_2CO Si$

(b) Silicones are high - temperature polymers

(c) Silicones are used for water proofing clothes

(d) They are good thermal and electrical conductors.



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Additional Questions And Answers Very Short Answer

1. How is boric acid extracted from borax ?



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2. Explain the formation of boron trifluoride.



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3. Draw the structure of borazole. $B_3N_3H_6$.



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4. Mention the physical properties of boranes.



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5. Write the reaction of diboranes with water and alkali.



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6. What are the uses of boron trifluoride ?



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7. What are alums ?





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8. What is burnt alum ?



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9. Give the uses of alum.



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10. What is phosgene ? How is it prepared ?





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11. What is oxo process ?



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12. What is water gas equilibrium ?



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13. What happens to CO_2 when dissolved in water ?



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14. What is tetraethoxy silane ? How is it obtained ?



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15. Give the formula of chlorosilazanes. Explain its preparation from $SiCl_4$.



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16. What are the uses of silicon tetra chloride ?



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17. What are silicones ?



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18. What is inert pair effect ?



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19. Among group 14 elements, name
the most electro negative element



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20. Among group 14 elements, name the most metallic element



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21. Name the building block of zeolites. Why zeolites have high porosity?



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22. Silicones are used for making waterproof fabrics. Give reason.



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23. Diamond - bad conductor of electricity.



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24. Name the two important ores of Boron.



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25. What is crystal field splitting energy?



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Additional Questions And Answers Short Answer

1. Draw the structure of boric acid.



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2. What are the uses of boric acid ?



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3. What happens to boranes at high temperatures ?



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4. How is boron trifluoride obtained from boron trioxide ?



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5. What are the uses of diborane ?



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6. How is aluminum chloride prepared from aluminum ?



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7. How is aluminium chloride prepared by McAfee process ?



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8. Give 3 uses of aluminium chloride.



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9. Describe the structure of graphite.



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10. Describe the structure of diamond.



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11. Describe the structure of fullerenes.



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12. Describe the structure of carbon nanotubes.



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13. Describe the structure of graphene.



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14. Give 3 uses of carbon monoxide.



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15. How is CO_2 manufactured ?



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16. Find out the oxidation state of carbon in each of the following :



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17. Find out the oxidation state of carbon in each of the following :





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18. Find out the oxidation state of carbon in each of the following :

HCN



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19. Find out the oxidation state of carbon in each of the following :

CO



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20. Account for the followig :

CO is used in the extraction of metals.



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21. Account for the followig :

CO is poisonous



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22. Account for the following :

CO_2 is used in refrigeration



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Additional Questions And Answers Long Answer

1. What are the various methods by which carbon-di-oxide is prepared?



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2. How are silicates classified ? Give an example for each type of silicate.



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3. Distinguish between diamond and graphite.



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Additional Questions And Answers Hots

1. Which one is more soluble in diethyl ether, anhydrous $AlCl_3$ or hydrated $AlCl_3$? Explain in terms of bonding.



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2. Starting from $SiCl_4$, prepare the following in steps not exceeding the number given in parentheses.

Silicon



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3. Starting from $SiCl_4$, prepare the following in steps not exceeding the number given in parentheses.

Linear silicon containing methyl groups only



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4. Starting from $SiCl_4$, prepare the following in steps not exceeding the number given in parentheses.

Na_2SiO_3 .



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Unit Test Choose The Correct Answer

1. Silicones are _____

A. Water repelling in nature

B. High in thermal stability

C. Both a & b

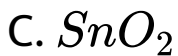
D. None of these

Answer: B



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2. Which of the following oxide is amphoteric ?



Answer: C



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3. Boron compounds behave as lewis acid because of their _____

A. ionisation property

B. acidic nature

C. covalent nature

D. electron deficient nature

Answer: D



4. Formula for phosgene is _____



Answer: A



5. Assertion : In diborane containing eight -B-H bonds, the four terminal bonds are covalent

Reason : Boron in B_2H_6 is sp^2 hybridised.

A. Both assertion and reason are true and the reason is the correct explanation of the assertion.

B. Both the assertion and reason are true but the reason is not the correct explanation of the assertion.

C. Assertion is true but reason is false.

D. Both assertion and reason are false statements.

Answer: C



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Unit Test Short Answer

1. What are the uses of silicon tetra chloride ?



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Unit Test Answer In Paragraph

1. Draw the structure of carbon dioxide.



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2. How is CO_2 produced in the industry?



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