



# CHEMISTRY

## BOOKS - ARIHANT CHEMISTRY (HINGLISH)

### P BLOCK ELEMENTS : GROUP 13,14

#### Exercise

1. Boron fibres are used in making

A. bullet-proof jacket

B. light composite material for aircraft

C. Both (a) and (b)

D. None of the above

**Answer:**



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2. Match the columns and choose the correct options from the codes given below

	Column I		Column II
A.	Orthoboric acid	1.	$Na_2B_4O_7 \cdot 4H_2O$
B.	Borax	2.	$Na_2B_4O_7 \cdot 10H_2O$
C.	Kernite	3.	$H_3BO_3$

A.     *A*   *B*   *C*  
        1    2    3

B.     *A*   *B*   *C*  
        3    2    1

C.     *A*   *B*   *C*  
        2    1    3

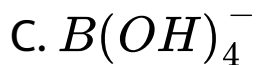
D.     *A*   *B*   *C*  
        1    3    2

**Answer:**



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3. Boron cannot form which one of the following anions?

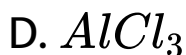
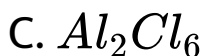
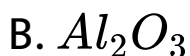


**Answer:**



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4. Heating an aqueous solution of aluminium chloride to dryness will give



**Answer:**



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5. When orthoboric acid ( $H_3BO_3$ ) is heated, the residue is

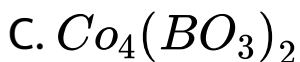
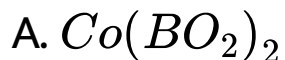
- A. boron
- B. metaboric acid
- C. boric anhydride
- D. borax

**Answer:**



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6. Borax on heating with cobalt oxide forms a blue bead of



**Answer:**



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7. Borax bead test is responded by :

A. divalent metals

B. trivalent metals

C. light metals

D. metal which forms coloured  
metaborates

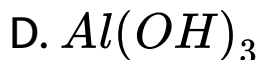
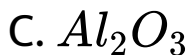
**Answer:**



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8. Which of the following is a compound of ruby?

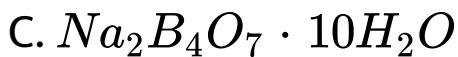
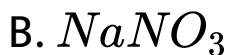
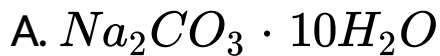


**Answer:**



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9. What is Tincal?



**Answer:**



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**10.** Boric acid is used in carrom boards for smooth gliding of pawns because

A.  $H_3BO_3$  molecules are loosely chemical bonded and hence soft

B. Its low density makes it fluffy

C. It can be powdered to a very small grain size

D. H-bonding in  $H_3BO_3$  gives it a layered structure

**Answer:**



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**11.** A mixture of boric acid with ethyl alcohol burns with green edged flame due to the formation of

- A. boron trifluoride
- B. metaboric acid
- C. ethyl borate
- D. orthoboric acid

**Answer:**



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**12.** In diborane, the two  $H - B - H$  angles are nearly

A.  $60^\circ$ ,  $120^\circ$

B.  $95^\circ$ ,  $120^\circ$

C.  $95^\circ$ ,  $150^\circ$

D.  $120^\circ$ ,  $180^\circ$

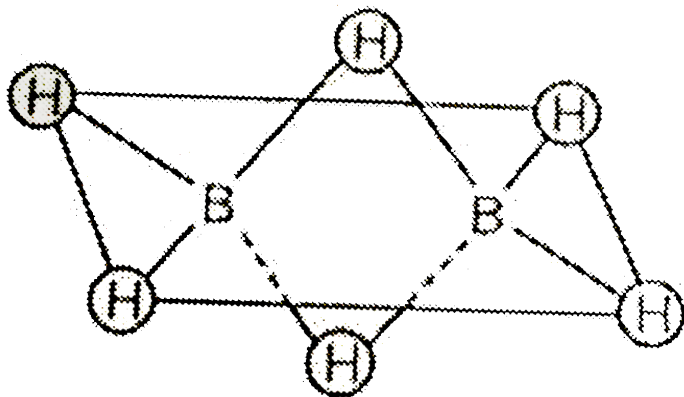
**Answer:**



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**13.** Which of the following statements are correct regarding diborane?

I. Two bridged hydrogen atoms and two boron atoms in one plane.



II. Out of six B-H bond, two bonnds can be described in terms of 3 centre-2 electron bonds.

III. Out of six B-H bonds, four B-H bonds can be described in terms of 3 centre-2 electron bonds.

IV. Four terminal B-H bonds are two centre electrons regular bonds.

A. I,II and IV

B. II,III and IV

C. I and II

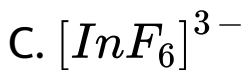
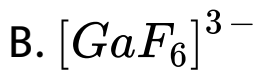
D. III and IV

**Answer:**



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**14.** The species which does not exist is





**Answer:**



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**15.** In  $Al_2Cl_6$ ,

I. six Al-Cl bonds are of same length and two of different length.

II. The angle Al-Cl-Al is  $87^\circ$ .

III. Four Al-Cl bonds are of the same length and two of different length.

IV. The angle Cl-Al-Cl is  $93^\circ$  and  $110^\circ$

A. I,II and III

B. II,III and IV

C. I,III and IV

D. I,II and IV

**Answer:**



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**16.** Consider the following statements

I.  $BBr_3$  is stronger acid than  $BF_3$ .

II.  $p\pi - p\pi$  back bonding occurs in the haldies

of aluminium.

III. Borazine is less reactive than boron.

IV. Al is unstable in air and water.

The set of incorrect statement is

A. I and II

B. II and III

C. III and IV

D. None of the above

**Answer:**



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17. The main factor responsible for weak acidic nature of  $B - F$  bonds in  $BF_3$  is

A.  $p\pi - p\pi$  back bonding

B.  $p\pi - d\pi$  back bonding

C. three centred-two electron bonds in  
 $BF_3$

D. large electronegativity of F

**Answer:**



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18. Which of the following statements is incorrect for aluminium chloride ( $Al_2Cl_6$ ) ?

A. It exists as a dimer in solvents like benzene and carbon disulphides

B. The aluminium atom is tetrahedrally surrounded by four chloride atoms

C. Each aluminium atom forms three covalent bonds and one coordinate bond

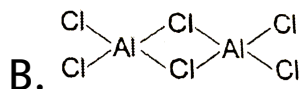
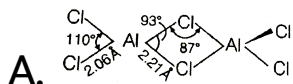
D. In the vapour state, aluminium chloride does not exist as a dimer

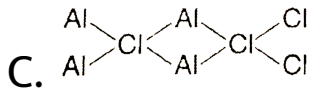
**Answer:**

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19.  $AlCl_3$  achieves stability by forming a dimer.

Structure of the dimer is





D. None of the above

**Answer:**



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20. Which of the following reactions will not give the anhydrous  $AlCl_3$  ?

A. By heating  $AlCl_3 \cdot 6H_2O$

B. By passing dry HCl gas on heated aluminium powder

C. By passing dry chlorine gas on heated aluminium powder

D. By passing dry chlorine gas over a heated mixture of alumina and coke

**Answer:**



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21. The tendency of Ge, Sn, Pb to show +2 oxidation state, increases in the sequence

A.  $Ge = Sn < Pb$

B.  $Ge < Sn < Pb$

C.  $Ge > Sn > Pb$

D.  $Ge > Sn = Pb$

**Answer:**



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22. The order of catenation of C,Si,Ge,Sn is

A.  $C < Si < Ge < Sn$

B.  $C > Si > Ge > Sn$

C.  $C > Si > Ge \approx Sn$

D.  $C \approx Si > Ge \approx Sn$

**Answer:**



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23. The hybridisation of the central atom in

$SiF_6^{2-}$ ,  $[GeCl_6]^{2-}$  and  $[Sn(OH)_6]^{6-}$  is

A.  $sp^3d$

B.  $sp^3d^2$

C.  $sp^3$

D.  $sp^3d^3$

**Answer:**



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24. Graphite conducts electricity due to the

A. highly delocalised nature of  $\pi$  –  
electrons

B. highly localised nature of  $\pi$  –  
electrons

C. highly polarised nature of  $\pi$  –  
electrons

D. None of the above

**Answer:**



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**25.** Graphite is a soft solid lubricant extremely difficult to melt. The reason for this anomalous behaviour is that graphite

A. is an allotropic form of diamond

B. has molecules of variable molecular masses like polymers

C. has carbon atoms arranged in large plates of rings so strongly bound

carbon atoms with weak interplate  
bonds

D. is a non-crystalline substance

**Answer:**



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**26.** Carborundum is obtained when silica is heated at high temperature with

A. carbon

B. carbon monoxide

C. carbon dioxide calcium carbonate

D.

**Answer:**



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**27.** The mixture of CO and  $H_2$  is known as

A. producer gas

B. synthesis gas

C. water gas

D. Both (B) and (c )

**Answer:**



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**28.** The mixture of CO and  $N_2$  is known as

A. synthesis gas

B. water gas

C. producer gas



D. All of these

**Answer:**



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**29.** Water gas is used as an industrial fuel because

A. on combustion, it further produces  $CO_2$

B. on combustion, it loses heat

C. on combustion, It produces  $CO_2$  and liberates heat

D. None of the above

**Answer:**



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**30.** Silica gel is used as a/an

A. dehydrating agent (drying agent)

B. dehydrogenating agent

C. reducing agent

D. oxidising agent

**Answer: A**



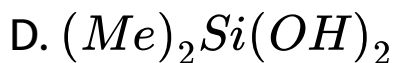
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31.  $Me_2SiCl_2$  on hydrolysis will produce

A.  $(Me)_2Si = O$

B. 

C.  $Me_2SiCl(OH)$



**Answer:**



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**32.** Give the decreasing order of covalent character of the following compounds.

a. I.  $GeCl_2$  II.  $GeCl_4$  III.  $SnCl_2$  IV.  $SnCl_4$

V.  $PbCl_2$  VI.  $PbCl_4$

b. I.  $CH_4$  II.  $NH_3$  III.  $H_2O$  IV. HF

c. I. HF II. HCl III. HBr IV. HI

d. I. AgI II. NaI III. CuI IV. NaCl

A. I and IV

B. II and III

C. I and II

D. III and IV

**Answer:**



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33. The name of the structure of silicates in which three oxygen atoms of  $[SiO_4]^{4-}$  are shared is

A. pyrosilicate

B. sheet silicate

C. linear chain silicate

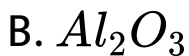
D. three dimensional silicate

**Answer:**



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**34.** An inorganic compound X, made of two most occurring elements in the earth's crust and used in building construction, when reacts with carbon, forms a diatomic molecule, which is poisonous in nature. Compound X may be



**Answer:**



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**35.** The shape of gaseous  $\text{SnCl}_2$  is

A. tetrahedral

B. linear

C. angular

D. T-shaped

**Answer:**





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36. Mark the oxide which is amphoteric in character.



**Answer:**



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37.  $SiH_4 + O_2$  mixture on bubbling through water and bubbles coming in contact with air:

A. burns with a luminous flame

B. vertex rings of finely divided silica are formed

C.  $SiH_4 + 2O_2 \rightarrow SiO_2 + 2H_2O$  reaction occurs

D. All of these

**Answer:**



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**38.** Ionisation enthalpy ( $\Delta_t H_l$  in  $\text{kJ mol}^{-1}$ ) for the elements of group-13 follows the order

A.  $B > Al > Ga > In > Tl$

B.  $B < Al < Ga < In < Tl$

C.  $B < Al > Ga < In > Tl$

D.  $B > Al < Ga > In < Tl$

**Answer:**



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**39.** Two elements P and Q react separately with highly electropositive metal to form binary compounds, which upon hydrolysis yield mixtures of boranes and silanes. P and Q respectively are

A. B,Al

B. Si,B

C. B,Si

D. Al,B

**Answer:**



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**40.** Which of the follownig is most stable?



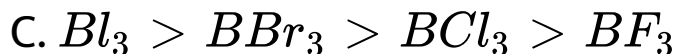
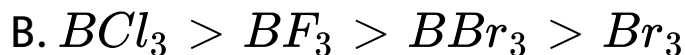
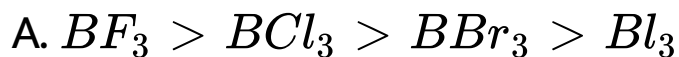


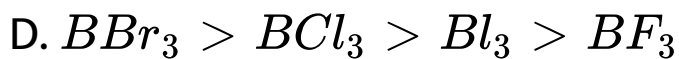
**Answer:**



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**41.** The correct stability order for boron halides is





**Answer:**



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**42.** Aluminium metal is corroded in coastal places near to

A. is removed by sea water

B. reacts with sea water

C. is attacked by salt present in sea water

D. reacts with sand particles

**Answer:**



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**43.** Which of the following elements from both neutral as well as acidic oxides ?

A. Sn

B. Si

C. C



D. P

**Answer:**



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**44.**  $Al_2O_3$  can be converted to anhydrous  $AlCl_3$  by heating

A. a mixture of  $Al_2O_3$  and carbon in dry

$Cl_2$  gas

B.  $Al_2O_3$  with  $Cl_2$  gas

C.  $Al_2O_3$  with HCl gas

D.  $Al_2O_3$  with NaCl in solid state

**Answer:**



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**Archives**

1. Which of the following statements are incorrect in context of borax?

- A. It is made up of two triangular  $BO_3$  units and two tetrahedral  $BO_4$  units
- B. One mole of bora can be used as a buffer
- C. It is a useful primary standard for titrating against acids
- D. Aqueous solution of borax can be used as a buffer

**Answer:**



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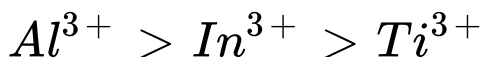
2. For the properties mentioned, the correct trend for the different species is in

A. Strength as Lewis acid



B. Inert pair effect- $Al > Ga > In$

C. Oxidising property-



D. First ionisation enthalpy- $B > Al > TI$

**Answer:**





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3. Which glass has the highest percentage of lead ?

A. Soda glass

B. Flint glass

C. Jena glass

D. Pyrex glass

**Answer:**



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