



# CHEMISTRY

## BOOKS - MTG WBJEE CHEMISTRY (HINGLISH)

### CHEMISTRY OF NON-METALLIC ELEMENTS AND THEIR COMPOUNDS

**Wb Workout Category 1 Single Option Correct Type**

1. Thermodynamically, the most stable allotrope of C is

- A. diamond
- B. graphite
- C. anthractice
- D. all of these

**Answer: B**



**View Text Solution**

**2. Dry ice is**

- A. solid  $NH_3$
- B. solid  $SO_2$

C. solid  $CO_2$

D. dry  $CO_2$  gas

**Answer: C**



**View Text Solution**

**3.** The carbon atoms in graphics are

A.  $sp^3$ -hybridized

B.  $sp$ -hybridized

C.  $sp^2$ -hybridized

D. none of these

**Answer: C**



**View Text Solution**

4. Diamond and graphite are shown to be allotropic forms of carbon by the fact that

A. diamond is hard but graphite is soft

B. diamond is transparent while graphite is opaque

C. they have different crystal structures

D. both form  $CO_2$  when burnt.

**Answer: D**



**View Text Solution**

5. Which of the following statement is not true for carbon?

- A. It forms compounds with multiple bonds.
- B. Its ionization energy is very high.
- C. It undergoes catenation.
- D. It shows inert pair effect.

**Answer: D**



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6. The element which occurs in the gaseous state at room temperature is

A. phosphours

B. nitrogen

C. arsenic

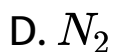
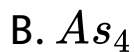
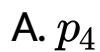
D. antimony.

**Answer: B**



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7. Which of the following molecules show  $p\pi - p\pi$  bonding?



**Answer: D**



**View Text Solution**

8.  $\text{NCl}_5$  is not formed because

- A. it is unstable
- B. nitrogen is inert
- C. nitrogen does not have d-orbitals
- D. nitrogen has small atomic radius.

**Answer: C**



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9. Hypophosphorous acid is



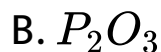
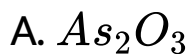
- A. a triprotic acid
- B. a diprotic acid
- C. a monoprotic acid
- D. not acidic at all.

**Answer: C**



**View Text Solution**

**10.** Of the following, the most acidic is



C.  $Sb_2O_3$

D.  $Bi_2O_3$

**Answer: B**



**View Text Solution**

**11.** White phosphorus is kept under

A. cold water

B. ammonia

C. alcohol

D. Kerosene.

**Answer: A**



**View Text Solution**

12. Of the different allotropic forms of phosphorus, the one which has a metallic lustre is

- A. black phosphorus
- B. red phosphorus
- C. white phosphorus
- D. scarlet phosphorus.

**Answer: A**



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13. An allotrope of phosphorus used in safety matches is

A. white phosphours

B. red phosphorus

C. violet phosphorus

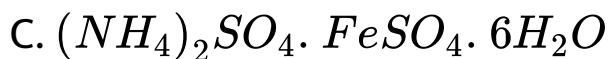
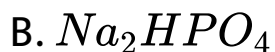
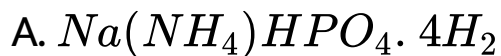
D. black phosphorus.

**Answer: B**



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14. which of the following salts used I the bead test for basic radicals?



**Answer: A**



**View Text Solution**

15. White phosphorus reacts with caustic soda.

The products are  $PH_3$  and  $NaH_2PO_2$ . This

reaction is an example of

A. oxidation

B. reduction

C. oxidation and reduction

D. neutralisation.

**Answer: C**



**View Text Solution**

16. Phosphine is not obtained by the reaction when

A. white P is heated with NaOH

B. red P is heated with NaOH

C.  $Ca_3P_2$  reacts with water

D.  $P_4O_6$  is boiled with water.

**Answer: B**



[View Text Solution](#)

17. Oxygen exhibits positive oxidation state in

A. CO

B.  $F_2O$

C. NO

D.  $N_2O$

**Answer: B**



**View Text Solution**

**18.** Oxygen is always divalent whereas sulphur can form 2, 4 and 6 bonds. This is because

A. oxygen is more electronegative than sulphur



B. sulphur contains d-orbitals whereas oxygen does not

C. sulphur has larger atomic radius than oxygen

D. sulphur is more electronegative than oxygen.

**Answer: B**



**View Text Solution**

19. Which of the following is the most electronegative element?

A. O

B. S

C. Se

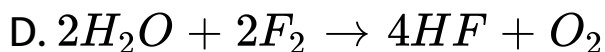
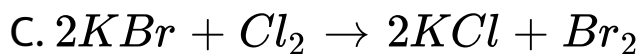
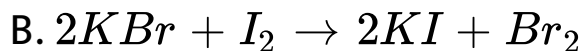
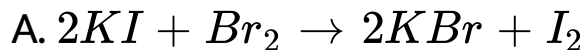
D. Te

**Answer: A**



**View Text Solution**

20. Which reaction is not feasible?

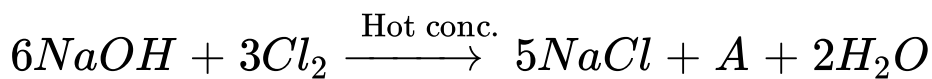


**Answer: B**



**View Text Solution**

21. Consider the following reaction



What is the oxidation number of chlorine in "A"?

A. +5

B. -1

C. +3

D. +1

**Answer: A**



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22. Which of the following statement is not correct?

A. Silicon is extensively used as a semiconductor.

B. Carborundum is SiC.

C. Silicon occurs in free state in nature.

D. Mica contains the element silicon.

**Answer: C**



**View Text Solution**

23. Which of the following statements regarding ozone is not correct ?

A. The ozone molecule is angular in shape.

B. The ozone is resonance hybrid of two structures.

C. The oxygen-oxygen bond length in ozone is identical with that of molecular oxygen.

D. Ozone is used as a germicide and disinfectant for the purification of air.

**Answer: C**



[View Text Solution](#)

24. Which of the following is used to prepare  $Cl_2$  gas at room temperature from concentrated HCl?

A.  $MnO_2$

B.  $H_2S$

C.  $KMnO_4$

D.  $Cr_2O_3$

**Answer: C**



[View Text Solution](#)

25. Which one of the following statements is not true at room temperature and pressure?

A.  $P_4O_{10}$  is a white solid.

B.  $SO_2$  is a colourless gas.

C.  $SO_3$  is a colourless gas.

D.  $NO_2$  is a brown gas.

**Answer: C**



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26. The stable bivalency of Pb and trivalency of Bi is

A. due to d contraction in Pb and Bi

B. due to relativistic contraction of the 6s orbitals of Pb and Bi, leading to inter pair effect

C. due to screening effect

D. due to attainment of noble configuration.

**Answer: B**



**View Text Solution**

27. The number of acidic protons in  $H_3PO_3$  are

A. 0

B. 1

C. 2

D. 3

**Answer: C**



**View Text Solution**

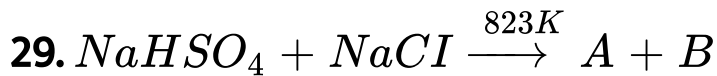
28. HF is not kept inside

- A. glass bottle
- B. plastic bottle
- C. tin bottle
- D. iron bottle

**Answer: A**



**View Text Solution**



Identify A and B.

A.  $Na$  and  $HCl$

B.  $Na_2SO_4$  and  $HCl$

C.  $NaH$  and  $Na_2SO_4$

D. None of these

**Answer: B**



**View Text Solution**

30. When KI is added to acidified solution of sodium nitrite

- A. NO gas is liberated and  $I_2$  is set free
- B.  $N_2$  gas is liberated and HI is produced
- C.  $N_2O$  gas liberated and  $I_2$  is set free
- D.  $N_2$  gas is liberated and HOI is produced.

**Answer: A**



[View Text Solution](#)

1. An oxide of a non-metal has the following properties.

(i) It acts both as a proton donor as well as a proton acceptor.

(ii) It reacts readily with basic and acidic oxides.

(iii) It oxidises Fe at its boiling point.

(iv) It is a poor conductor of electricity.

The oxide is



D.  $CO_2$

**Answer: A**



**View Text Solution**

2. Which of the following statements is correct?

A. Silicon exhibits 4 coordination number in its compounds.

B. Bond energy of  $F_2$  is less than  $Cl_2$

C. Mn(III) oxidation state is more stable than Mn(II) in aqueous state

D. Elements of 15th group show only +3 and +5 oxidation states.

**Answer: B**



**View Text Solution**

3. Concentrated hydrochloric acid when kept in open air sometimes produces a cloud of white fumes. The explanation for it is that

A. oxygen in air reacts with the emitted HCl gas to form a cloud of chlorine gas



- B. strong affinity of  $\text{HCl}$  gas for moisture in air results in forming of droplets of liquid solution which appears like a clouds smoke
- C. due to strong affinity for atmospheric oxide of sulphur
- D. conc.  $\text{HCl}$  emits strongly smelling  $\text{HCl}$  gas all the time

**Answer: B**



**View Text Solution**

4. Five most abundant elements in the living cell are

A. *C, H, O, N, Fe*

B. *C, H, O, N, P*

C. *C, H, N, Mg, Ca*

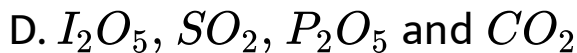
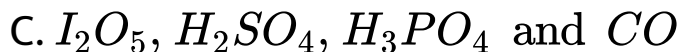
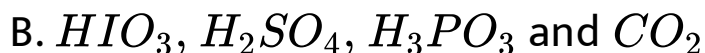
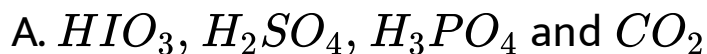
D. *C, H, Fe, Mg, Ca*

**Answer: B**



**View Text Solution**

5. Reaction of  $HNO_3$  with I, S, P and C gives respectively

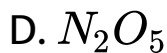


**Answer: A**



**View Text Solution**

6. Which gas evolve when ammonia solution is added to potassium permanganate?



**Answer: A**



**View Text Solution**

7. Which one of the following statements about the zeolites is false?

A. They are used as cation exchangers.

B. They have open structure which enables them to take up small molecules.

C. Zeolites are aluminosilicates having three dimensional network.

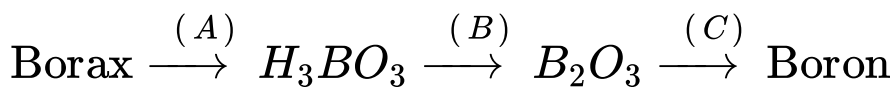
D. Some of the  $SiO_4^{4-}$  units are replaced by

$AlO_4^{5-}$  and  $AlO_6^{9-}$  ions in zeolites.

**Answer: D**



8. Amorphous boron is extracted from borax by following steps.



(A) and (C) are

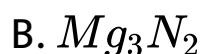


**Answer: C**



**View Text Solution**

9. When a burning Mg-ribbon is introduced into a jar of colourless gas 'A', the product 'B' is the obtained. 'B' on boiling with water gives a gas 'C' with pungent odour. When 'C' gas is passed over heated cupric oxide, again the gas 'A' is obtained. Identify C.



C.  $H_2O$

D.  $NH_3$

**Answer: D**



**View Text Solution**

10. What happens when concentrated  $H_2SO_4$  is slowly added to a mixture of solution of  $NaNO_3$  and  $FeSO_4$ ?

A. Green ring of  $Fe(SO_4)_3$  is formed.



B. Browning ring of  $[Fe(H_2O)_5NO]SO_4$  is formed

C. Brown ring of  $Fe_2(SO_4)_3$  is formed.

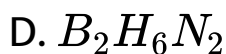
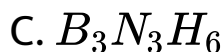
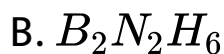
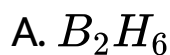
D. None of these

**Answer: B**



[View Text Solution](#)

11. When  $NH_3$  is treated with diborane at low temperature and then heated at  $200^\circ C$ , the product formed is



**Answer: C**



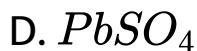
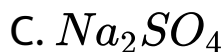
**View Text Solution**

**12.** A sodium salt (A) when reacts with dilute HCl produces a salt and a colourless, rotten egg smelling gas (B). (B) when passed through lead

acetate solution produces a black precipitate (C).

Further (C) on treatment with  $H_2O_2$  solution yields

a white precipitate (D). Identify (A).

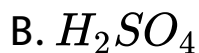


**Answer: B**



**View Text Solution**

13. Concentrated  $H_2SO_4$  on being heated with zinc yields a gas (A), which when passed through bromine solution produces a white precipitate (D) with  $BaCl_2$  solution while the acid (C), when heated with concentrated  $H_2SO_4$  yields the original gas (A) and another reddish brown gas (E). Identify B.



**Answer: B**



**View Text Solution**

**14.** A colourless solid (X) on heating gives another solid (Y) with evolution of oxygen gas. The solid (Y) on treatment with hydrochloric acid produces a brown gas. Again solid (Y) is mixed with  $NH_4Cl$  and the mixture on heating produces a colourless gas (Z). Identify Z.

A.  $H_2$

B.  $O_2$

C.  $N_2$

D.  $CO_2$

**Answer: C**

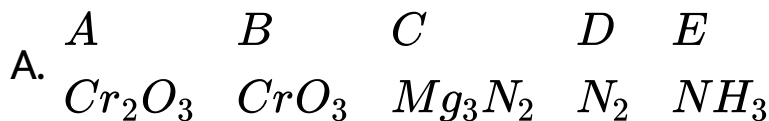


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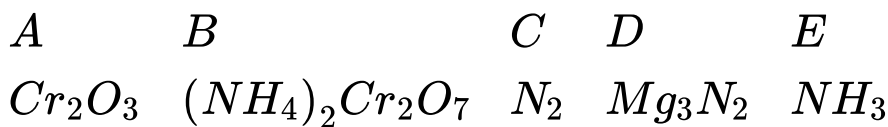
**15.** An orange coloured solid (A) on heating left a green residue (B) with evolution of a colourless gas (C) and water vapour. When the gas (C) is passed over heated  $Mg$  a white solid (D) is formed. The solid (D) on boiling with water produces a gas (E), that forms a dense white

fumes when comes in contact with HCl. Identify (A)

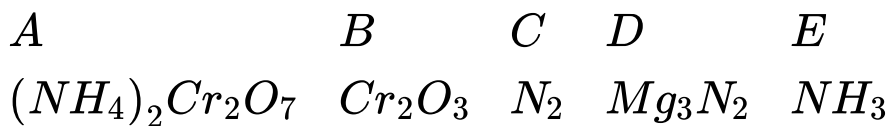
to (E) from the options given below.



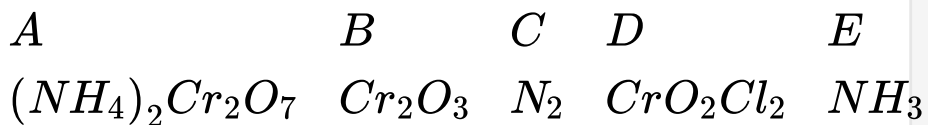
B.



C.



D.



**Answer: C**



**View Text Solution**

## Wb Workout Category 3 One Or More Option Correct Type

1. Out of  $CO_2$ ,  $SiO_2$ ,  $GeO_2$ ,  $SnO_2$  and  $PbO_2$

A. solid carbon dioxide and silicon dioxide are hard solid

B.  $CO_2$  and  $SiO_2$  are acidic and  $SnO_2$  is amphoteric

C.  $PbO_2$  reacts with  $H_2SO_4$  to give  $PbSO_4$

D.  $CO_2$  does not contain  $p\pi - p\pi$  bonding.

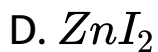
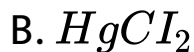


Answer: B::C



View Text Solution

2.  $CO_2$  is isostructural with



Answer: B::D



View Text Solution

3. Decomposition of oxalic acid in presence of conc.

$H_2SO_4$  gives

A.  $CO$

B.  $CO_2$

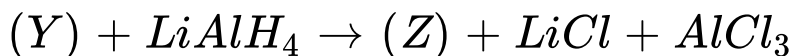
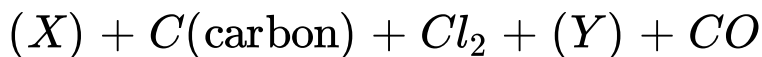
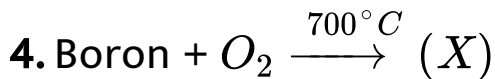
C. formic acid

D.  $H_2O$

**Answer: A::B::D**



**View Text Solution**



Compound (Z) is

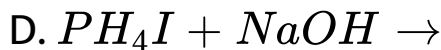
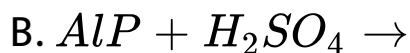
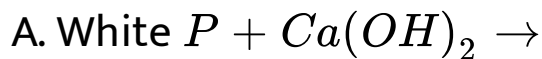
- A. an ionic compound
- B. an electron deficient compound
- C.  $3c - 2e$  compound
- D. having ethane like structure.

**Answer: B::C**



**View Text Solution**

5. Which of the following reaction can evolve phosphine?

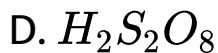
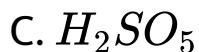
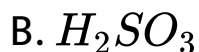
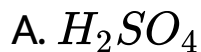


**Answer: B::C::D**



**View Text Solution**

6. Which among the following are peroxo acid of sulphur?



**Answer: C::D**



**View Text Solution**

7. Select the correct statements about oxygen molecule.

- A. It is paramagnetic.
- B. Its bond order is two
- C. In liquid state it is blue coloured.
- D. It has two unpaired electrons.

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



**View Text Solution**

8. Which of the following statements is/are correct.

A.  $SO_2$  dissolves in water to form sulphur acid.

B.  $SO_2$  acts as a bleaching agent.

C.  $SO_2$  has pungent odour.

D.  $SO_2$  acts only as oxidising agent.

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



**View Text Solution**

9.  $HNO_3$  can be in  $Al$  vessel but  $NaOH$  can't be, because

A.  $Al$  develops a protective layer of oxide with



B.  $Al$  reacts with  $HNO_3$  to dissolve it

C.  $Al$  reacts with  $NaOH$  forming  $NaAlO_2$

D.  $Al$  develops a protective layer of oxide with



**Answer: A::C**



**View Text Solution**



10. Choose the correct statements (s)

A. Oxides of carbon family ( $MO_2$ ) are all network solids with octahedral coordination.

B. Silica is a network solid with tetrahedral coordination

C. Carbon dioxide, tin dioxide and lead dioxide are all acidic oxides.

D.  $N(CH_3)_3$  has pyramidal structure.

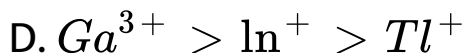
**Answer: B::D**



[View Text Solution](#)

11. Stability of monovalent and trivalent cations of

Ga, In, Tl lie in the following sequence



**Answer: B::C**



[View Text Solution](#)

12. Which of the following arrangements truly represent the property indicated against it?

A.  $Br_2 < Cl_2 < F_2$  (bond energy)

B.  $Br_2 < Cl_2 < F_2$  (electronegativity)

C.  $Br_2 < Cl_2 < F_2$  (oxidising power)

D.  $Br_2 < Cl_2 < F_2$  (electron affinity)

**Answer: B::C**



**View Text Solution**

13. Which of the following is/are not correct regarding graphite?

A. Graphite is anisotropic.

B. Graphite is isotropic.

C. Graphite is oxidised by not concentrated

$HNO_3$  to metallic acid

D. Graphite is unaffected by HF .

**Answer: B::D**



**View Text Solution**

14. Which of the following statements is/are correct?

A. Fluorine does not show positive oxidation state.

B. Fluorine is most reactive.

C. HF is the strongest acid.

D. X-X bond dissociation energy is minimum in



**Answer: A::B**

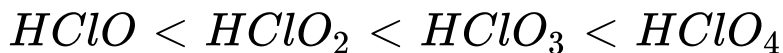


**View Text Solution**

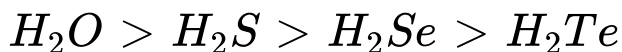
15. Which of the following is/are correct

A. Bond angle :  $PH_3 < PCl_3 < PBr_3 < PI_3$

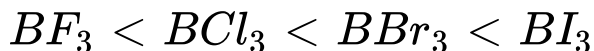
B. Acidic strength :



C. Reducing nature :



D. Lewis acid character :



Answer: A::B::D



[View Text Solution](#)

## Wb Jee Previous Years Questions Category 1 Single Option Correct Type

1. In diborane, the number of electrons that account for bonding in the bridges is

A. six

B. two

C. eight

D. four

**Answer: D**



**View Text Solution**

2. In  $SOCl_2$ , the Cl-S-Cl and Cl-S-O bond angles are

A.  $130^\circ$  and  $115^\circ$

B.  $106^\circ$  and  $96^\circ$

C.  $107^\circ$  and  $108^\circ$

D.  $96^\circ$  and  $106^\circ$

**Answer: D**





[View Text Solution](#)

3. Chlorine gas reacts with red hot calcium oxide to give

- A. bleaching powder and dichlorine monoxide
- B. bleaching powder and water
- C. calcium chloride and chlorine dioxide
- D. calcium chloride and oxygen.

**Answer: D**



[View Text Solution](#)

4. In  $O_2$  and  $H_2O_2$  the O - O bond lengths are 1.21 and 1.48 Å . Respectively. In ozone, the average O - O bond length is

A. 1.28Å

B. 1.18Å

C. 1.44Å

D. 1.52Å

**Answer: A**



**View Text Solution**

5. Addition of excess potassium iodide solution to a solution of mercuric chloride gives the halide complex

A. tetrahedral  $K_2[HgI_4]$

B. trigonal  $K[HgI_3]$

C. linear  $Hg_2I_2$

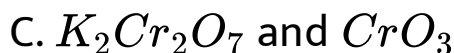
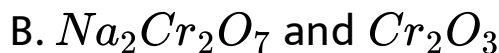
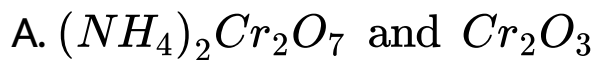
D. square planer  $K_2[HgCl_2I_2]$

**Answer: A**



**View Text Solution**

6. The orange solid on heating gives a colourless gas and a green solid which can be reduced to metal by aluminium powder. The orange and the green solids are, respectively.



**Answer: A**



**View Text Solution**

7. Sulphan' is

A. a mixture of  $SO_3$  and  $H_2SO_5$

B. 100 % conc.  $H_2SO_5$

C. a mixture of gypsum and conc.  $H_2SO_4$

D. 100% oleum (a mixture of 100%  $SO_3$  in  
100%  $H_2SO_4$ )

**Answer: D**



**View Text Solution**

8. The increasing order of O-N-O bond angle in the species  $NO_2$ ,  $NO_2^+$  and  $NO_2^-$  is



**Answer:**



**View Text Solution**

9. If  $CI_2$  is passed through hot aqueous NaOH, the products formed have Cl in different oxidation states. These are indicated as

A.  $-1$  and  $+1$

B.  $-1$  and  $+5$

C.  $+1$  and  $+5$

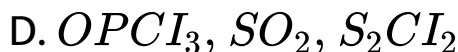
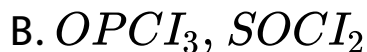
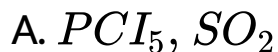
D.  $-1$  and  $+3$

**Answer: B**



[View Text Solution](#)

10. Sulphuryl chloride ( $SO_2Cl_2$ ) reacts with white phosphorus ( $P_4$ ) to give



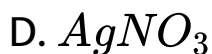
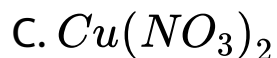
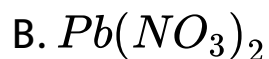
**Answer: A**



**View Text Solution**

11. Nitrogen dioxide is not produced on heating





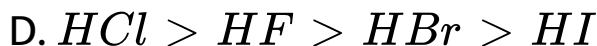
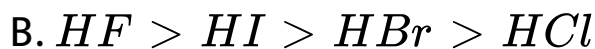
**Answer: A**



**View Text Solution**

**12.** The boiling points of HF, HCl, HBr and HI follow the order





**Answer: B**



**View Text Solution**

**13.** In the solid state  $PCl_5$  exists as



B. covalent  $PCl_5$  molecules only



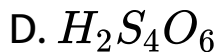
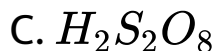
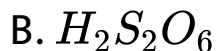
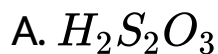
D. covalent  $P_2Cl_{10}$  molecules only

Answer: C



View Text Solution

14. The acid in which O - O bonding is present, is



**Answer: C**



**View Text Solution**

15.  $PbCl_2$  is insoluble in cold water. Addition of HCl increases its solubility due to

A. formation of soluble complex anions like



B. oxidation of  $Pb(II)$  to  $Pb(IV)$

C. formation of  $[Pb(H_2O)_6]^{2+}$

D. formation of polymeric lead complexes.

**Answer: A**



**View Text Solution**

16.  $Cl_2O_7$  is the anhydride of

A.  $HOCl$

B.  $HClO_2$

C.  $HClO_3$

D.  $HClO_4$

**Answer: D**



**View Text Solution**

17. The main reason that  $SiCl_4$  is easily hydrolysed as compared to  $CCl_4$  is that

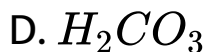
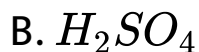
- A.  $Si - Cl$  bond is weaker than C - Cl bond
- B.  $SiCl_4$  can form hydrogen bonds
- C.  $SiCl_4$  can form hydrogen bonds
- D.  $Si$  can extend its coordination number beyond four.

**Answer: D**



View Text Solution

18. Which of the following is present in maximum amount in acid rain?

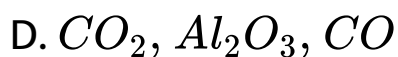
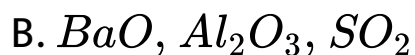
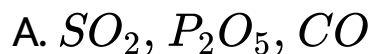


**Answer: B**



**View Text Solution**

19. Which of the set of oxides are arranged in the proper order of basic, amphoteric, acidic?



**Answer: B**



**View Text Solution**



20. The first electron affinity of C, N and O will be of the order

A.  $C < N < O$

B.  $N < C < O$

C.  $C < O < N$

D.  $O < N < C$

**Answer: B**



**View Text Solution**

21. The creative species in chlorine bleach is



**Answer: B**



**View Text Solution**

**Wb Jee Previous Years Questions Category 2 Single  
Option Correct Type**

1. In borax, the number of B - O - B links and B - OH bonds present are, respectively

- A. five and four
- B. four and five
- C. three and four
- D. five and five.

**Answer: A**



**View Text Solution**

2. On heating, chloride acid decomposes to

A.  $\text{HClO}_4$ ,  $\text{Cl}_2$ ,  $\text{O}_2$  and  $\text{H}_2\text{O}$

B.  $\text{HClO}_2$ ,  $\text{Cl}_2$ ,  $\text{O}_2$  and  $\text{H}_2\text{O}$

C.  $\text{HClO}$ ,  $\text{Cl}_2\text{O}$  and  $\text{H}_2\text{O}_2$

D.  $\text{HCl}$ ,  $\text{HClO}$ ,  $\text{Cl}_2\text{O}$  and  $\text{H}_2\text{O}$

**Answer: A**



**View Text Solution**

3. The bond angle in  $NF_3(102.3^\circ)$  is similar than  $NH_3(107.2^\circ)$ . This is because of

- A. large size of F compared to H
- B. large size of N compared of F
- C. opposite polarity of N in the two molecules
- D. small size of H compared to N.

**Answer: C**



**View Text Solution**

## Wb Jee Previous Years Questions Category 3 One Or More Option Correct Type

1. white phosphorus  $P_4$  has the following characteristics.

- A. 6P - P single bonds
- B. 4P - P single bonds
- C. 4 lone pair of electrons
- D. P - P - P angle of  $60^\circ$

**Answer: A::C::D**



**View Text Solution**

