



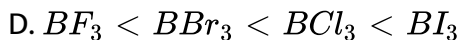
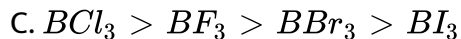
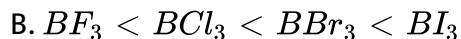
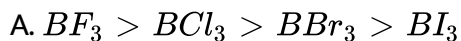
CHEMISTRY

BOOKS - GRB CHEMISTRY (HINGLISH)

P BLOCK ELEMENTS

Straight objective Type

1. The Lewis acid nature of BX_3 follows the order:



Answer: B



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2. Which of the following exists as polymeric (covalent) solid at room temperature with coordination number '6' for the central atom?



Answer: B



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3. PH_3 (Phosphine) when passed in aqueous solution of $CuSO_4$ it produces:



B. dark blue solution of $[Cu(PH_3)_4]SO_4$

C. black precipitate of Cu_3P_3

D. colourless solution of $[Cu(H_2O)_4]^+$

Answer: C

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4. Which of the following is planar?

A. B_2H_6

B. Fe_2Cl_6

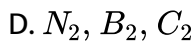
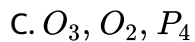
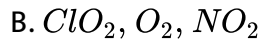
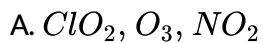
C. $FeCl_4^-$

D. $PtCl_4^{2-}$

Answer: D

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5. Which of the following set of species are paramagnetic?

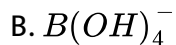
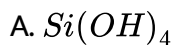


Answer: B



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6. Which of the following does not exist?



Answer: C



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7. Select the correct statement regarding B_2H_6 .

- A. It has only $2c - 2e^-$ bond
- B. It is planar
- C. It does not react with NH_3
- D. Hybridisation of boron is sp^3

Answer: D



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8. The inert compound toward water would be:

- A. $SiCl_4$

B. CCl_4

C. BCl_3

D. PCl_3

Answer: B

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9. $H_3PO_2 \xrightarrow{\Delta} (X) + PH_3$, is :

A. dehydration reaction

B. oxidation reaction

C. disproportionation reaction

D. dephosphorelation reaction

Answer: C

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10. Consider the compounds given below: (P) $BiCl_3$ (Q) $SbCl_3$ (R) VCl_5
(S) $AlCl_3$

Which would form oxo ion of MO^+ type when subjected to hydrolysis?

A. P,Q,R only

B. P,Q,S only

C. P,Q only

D. P,Q,R,S

Answer: C

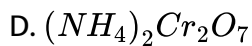
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11. The ammonium salt which produces ammonia gas on heating is :

A. NH_4NO_2

B. $(NH_4)_2SO_4$

C. NH_4NO_3



Answer: B

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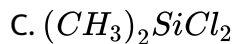
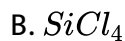
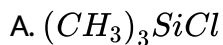
12. Which one of the following are pseudohalide ions ?



Answer: B

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13. Which of the following would produce cyclic silicon on hydrolysis?



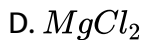
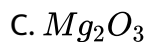
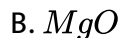
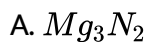
D. All of these

Answer: C



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14. An orange solid (X) on heating, gives a colourless gas (Y) and a only green residue (Z). Gas (Y) on treatment with Mg, produces a white solid substance.....

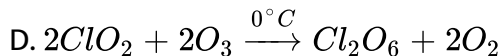
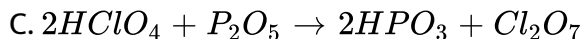
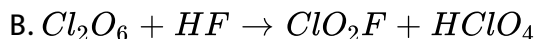


Answer: A



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15. The reaction which is consistent with the fact that $Cl_2O_6(s)$ exists as $[ClO_2^+][ClO_4^-]$, would be:

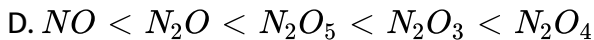
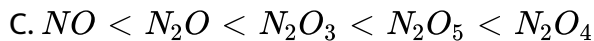
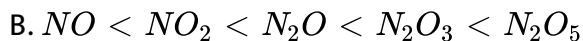
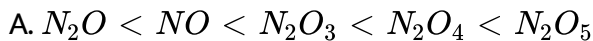


Answer: B



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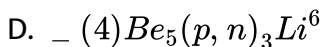
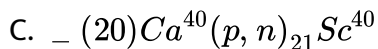
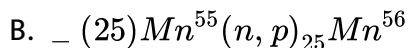
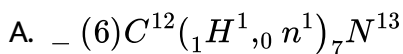
16. The acidic strength of oxides of nitrogen follows the order:



Answer: A

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17. Which of the following representation is correct?



Answer: C

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18. Anhydrous $MgCl_2$ can be prepared by :

A. heating $MgCl_2 \cdot 6H_2O(s)$

B. heating $MgCl_2 \cdot 6H_2O(s)$ in dry HCl atmosphere at 175°

C. heating $KCl \cdot MgCl_2 \cdot 6H_2O$

D. all of the above

Answer: B



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19. Which of the following reactions does not produces H_2O_2 ?

A. $BaO_2 + H_2SO_4 \rightarrow$

B. $Na_2O_2 + H_2O(\text{ice cold}) \rightarrow$

C. $PbO_2 + H_2SO_4 \rightarrow$

D. None of the above

Answer: C



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20. A gas at low temperature does not react with most of the compounds. It is almost inert and is used to create inert atmosphere in bulbs. The combustion of this gas is exceptionally an endothermic reaction. Based on the given information, we can conclude that the gas is :

A. oxygen

B. nitrogen

C. carbon monoxide

D. hydrogen

Answer: B



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21. In between P_4O_6 and P_4O_{10}

Which of the following option is correct ? [State(T) for true and (F) false]

(P) Both having cyclic structure.

(Q) Both having same number of $p\pi - d\pi$ bonds.

(R) Both having same $P - O - P$ bond length.

(S) Both having same hybridisation of P atoms.

A. TFFT

B. TTTT

C. TFFF

D. FTTT

Answer: A



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22. When chlorine gas is passed through an aqueous solution of a potassium halide in the presence of chloroform, a violet colouration is

obtained. On passing more of chlorine water, the violet colour disappears and solution becomes colourless. This that confirms the presence of in aqueous solution.

- A. chlorine
- B. fluorine
- C. bromine
- D. iodine

Answer: D



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23. Which of the following species gives diatomic gas with diamagnetic behaviour with conc. H_2SO_4

- A. NaCl
- B. NaBr
- C. NaI

D. all of them

Answer: D

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24. Which of the following oxides is /are not acidic in nature?

A. ClO_2

B. N_2O

C. Cl_2O

D. NO_2

Answer: B

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25. What is best reagent to convert MnO_4^{2-} to MnO_4^- ?

A. Cl_2 water

B. O_3

C. (a) and (b) both

D. None of the above

Answer: C

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26. For the formation of NH_3 using Haber's process, identify the correct statement.

A. Both yield of the reaction as well as rate of ammonia formation will be more at high temperature.

B. Yield of the reaction will be more in a large container at lower temperature as compared to small container at high temperature.

C. While yield of the reaction will increase with increase in temperature rate of formation will decrease with increase in temperature.

D. For commercial production of ammonia, high pressure and high temperature are maintained

Answer: D



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27. The catalyst used in Haber's process of production of NH_3 now days is :

A. $Fe + Mo$

B. Iron oxide with K_2O and Al_2O_3

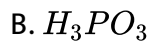
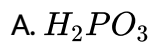
C. Iron oxide with Mo as promoter

D. $Al_2O_3 + FeCl_3$

Answer: B

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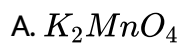
28. $H_3PO_2 \xrightarrow{140^\circ} A \xrightarrow{220^\circ C} B \xrightarrow{320^\circ C} C$. Compound (C) is :

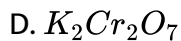


Answer: C

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29. Which of the following is paramagnetic?

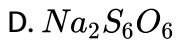
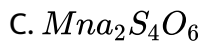
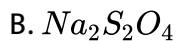
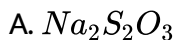




Answer: A

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30. Which of the following compound has maximum $S - S$ linkage?



Answer: D

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31. An explosive compound (A) reacts with water to produce NH_4OH and $HOCl$. Then, the compound (A), is :

A. TNG

B. NCl_3

C. PCl_3

D. HNO_3

Answer: B



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32. An inorganic compound (A) made of two most occurring elements into the earth crust, having a polymeric tetra-hedral network structure. With carbon, compound (A) produces a poisonous gas (B) which is the most stable diatomic molecule. Compounds (A) and (B) will be

A. SiO_2 . CO_2

B. SiO_2 . CO

C. SiC . CO

D. SiO_2 . N_2

Answer: B

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33. A sulphate of a metal (A) on heating evolves two gases (B) and (C) and an oxide (D). Gas (B) turns $K_2Cr_2O_7$ paper green while gas (C) forms a trimer in which there is no $S - S$ bond. Compound (D) with HCl, forms a Lewis acid (E) which exists as a dimer. Compounds (A), (B), (C), (D) and (E) are respectively:

A. $FeSO_4$, SO_2 , SO_3 , FeO_3 , $FeCl_3$

B. $Al_2(SO_4)_3$, SO_2 , SO_3 , Al_2O_3 , $FeCl_3$

C. FeS , SO_2 , SO_3 , $FeSO_4$, $FeCl_3$

D. FeS , SO_2 , SO_3 , $Fe_3(PO_4)_2$, $FeCl_2$

Answer: A

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34. Which of the following pairs of metals would liberate hydrogen gas with dilute nitric acid ?

A. Mn,Cu

B. Mn,Mg

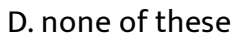
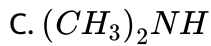
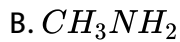
C. Zn,Mg

D. Fe,Cu

Answer: B

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35. B_2H_6 is symmetrically cleaved by:



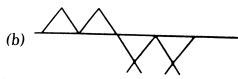
Answer: D

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36. Which diagram is correct for $\frac{9}{4}$ oxygen shared per tetrahedra?



A.



B.



C.



D.

Answer: A



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37. Which of the following on hydrolysis will give dibasic acid ?



Answer: B



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38. R_2SiCl_2 on hydrolysis and after that dehydration we get.

A. Chain silicones

B. Ring silicones

C. Both (a) and (b)

D. None of these

Answer: C

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39. Nitrogen can be prepared by:

- A. decomposition of sodium azide
- B. decomposition of ammonium dichromate
- C. decomposition of ammonium nitrate
- D. all of the above

Answer: D

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40. Ammonia can not be prepared by :

- A. reduction of nitrite
- B. reduction of nitrate
- C. reduction of nitride
- D. hydrolysis of amides

Answer: C

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41. Which metal will give nitrous oxide by cold and dil HNO_3 ?

- A. Zn
- B. Cu
- C. Pb
- D. Ag

Answer: A

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42. Copper exhibits only +2 oxidation state in its stable compounds. Why?

- A. copper is transition metal in +2 state
- B. +2 state compounds of copper are formed by exothermic reactions
- C. Electron configuration of copper in +2 state is $[Ar]3d^94s^0$
- D. Copper gives coloured compounds in +2 state

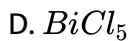
Answer: B



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43. The most stable compound is :

- A. PbF_4
- B. $PbCl_4$
- C. $PbBr_4$

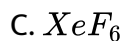
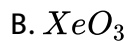


Answer: A



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44. First compound of inert gases was prepared by scientist Neil Barlett in 1962. This compound is :

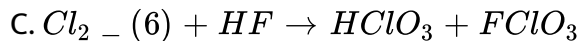
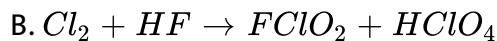
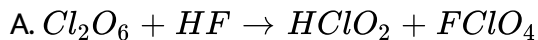


Answer: A



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45. Which of the following reactions correctly represents the existence of Cl_2O_6 as $(ClO_2^+)(ClO_4^-)$ in solid state?



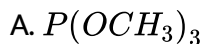
D. All of these

Answer: B



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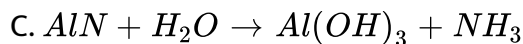
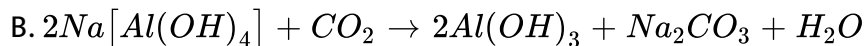
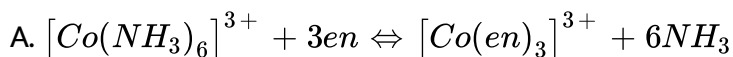
46. Which of the following is least likely to exist?



Answer: D

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47. Which of the following reactions would proceed in the forward direction ?



D. all of the above

Answer: D

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48. Carbonylene has X% of CO_2 and is used as an antidote for poisoning of Y. Then, X and Y are:

A. $X=95\%$ and $Y=$ Lead poisoning

B. $X=5\%$ and $Y=$ CO poisoning

C. $X=30\%$ and $Y=CO_2$ poisoning

D. $X=45\%$ and $Y=$ CO poisoning

Answer: B

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49. A sodium salt X of an unknown anion when treated with $MgCl_2$ gives precipitate Y only on boiling. It gives lime water test positive but doesn't give $KMnO_4$ test. Compound X and Y can't be separated by using.

A. Phenolphthalein test

B. $AgNO_3$ test

C. $CaCl_2$ test

D. $Hg_2(NO_3)_2$ test

Answer: A

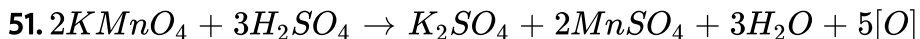
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50. $H_3BO_3 \xrightarrow{T_1} X \xrightarrow{T_2} Y \xrightarrow{\text{red hot}} B_2O_3$ if temperature $T_1 < T_2$ then X and Y respectively are :

- A. X=Metaboric acid and Y=Tetraboric acid
- B. X=Tetraboric acid and Y= Metaboric acid
- C. X=Borax and Y=Metaboric acid
- D. X=Tetraboric and Y=Borax

Answer: A

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X can't be:

A. CO

B. SO_4^{2-}

C. SO_3^{2-}

D. $C_2O_4^{2-}$

Answer: B



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52. When conc. H_2SO_4 was teated with $K_4[Fe(CN)_6]$, CO gas was evolved. By mistake, somebody used dilute H_2SO_4 instead of conc. H_2SO_4 then the gas evolved was

A. CO

B. HCN

C. N_2

D. CO_2

Answer: B

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53. An inorganic white crystalline compound (A) has a rock salt structure. (A) on reaction with conc. H_2SO_4 and MnO_2 , evolves a pungent smelling, greenish-yellow gas (B). Compound (A) gives white ppt. of (C) with $AgNO_3$ solution. Compounds (A), (B) and (C) will be respectively:

A. $NaCl, Cl_2, AgCl$

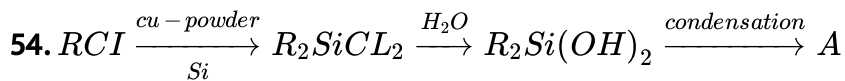
B. $NaBr, Br_2, NaBr$

C. $NaCl, Cl_2, Ag_2SO_4$

D. Na_2CO_3, CO_2, Ag_2CO_3

Answer: A

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Compound (A) is

- A. a linear silicone
- B. a chlorosilane
- C. a linear silane
- D. a network silane

Answer: A



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55. Which of the following set of species are diamagnetic?

- A. S_3, S_8, S_6
- B. $O_3, S_3, S(2)$
- C. P_4, N_2, O_2
- D. Na_2ZnO_2, KO_2, ClO_2

Answer: A



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56. When oxalic acid is heated cone. H_2SO_4 , two gases produced are neutral and acidic in nature respectively. Potassium hydroxide absorbs on the two gases. The product formed during this absorption and the gas which absorbed are respectively

A. K_2CO_3 and CO_2

B. $KHCO_3$ and CO_2

C. K_2CO_3 and CO

D. $KHCO_3$ and CO

Answer: A

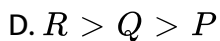
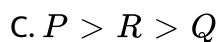
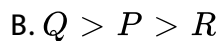
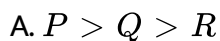


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57. Consider the following compounds.

(P) XeF_2 (Q) XeF_4 (R) XeF_6 The correct order of tendency of accept

F^- ion is :

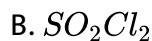


Answer: D



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58. The compound which does not undergo hydrolysis at room temperature is :

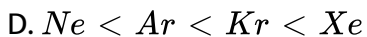
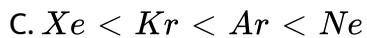
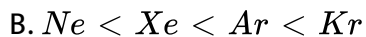
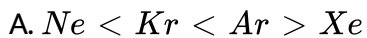




Answer: A

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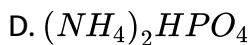
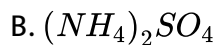
59. The correct order of solubility of noble gases in water is :



Answer: D

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60. By heating ammonium dichromate, a colourless gas is evolved. Which of the following compounds would produce the same gas on heating ?

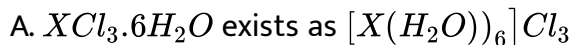


Answer: C



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61. Select the correct statement (s).



B. With moist air, anhydrous XCl_3 produce HCl gas

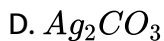
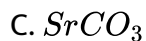
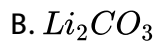
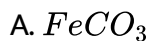
C. When X is treated with aqueous caustic soda, hydrogen gas is liberated.

D. all of the above

Answer: D

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62. Which of the following metal carbonate produce the corresponding metal on strong heating?



Answer: D

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63. CS_2 reacts with Cl_2 to produce:

A. CCl_4 and S_2Cl_2

B. CCl_2 and SCL_4

C. CCl_4 and SCL_2

D. CCl_4 and SCL_6

Answer: A



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64. With respect to halogens, four statements are given below:

(P) The bond dissociation energies for halogens are in the order:



(Q) The only oxidation state is -1.

(R) The amount of energy required for the excitation of electrons to first excited state decrease progressively as we move from F to I.

(S) They form HX_2^- species in their aqueous solutions (X=halogen).

The correct statement are:

A. P,Q and S

B. P, R and S

C. Q,R and S

D. P,R

Answer: D



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65. The reaction that does not produce nitrogen is :

A. heating $(NH_4)_2Cr_2O_7$

B. NH_3 + excess of Cl_2

C. heating of $NaNH_3$

D. heating of NH_4NO_3

Answer: B

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66. The least number of oxyacids are formed by:

- A. chlorine
- B. nitrogen
- C. sulphur
- D. fluorine

Answer: D

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67. Chlorine water on standing loses its colour and forms:

- A. HCl and $HClO_2$

B. HCl only

C. HOCl and $HOCl_2$

D. HCl and $HOCl$

Answer: D

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68. For an interhalogen compound XX'_3 , correct statement (where X, is central atom, X' is surrounding atom):

A. Size of X is greater than size of X'

B. Electronegativity of X' is greater than X

C. X can't be fluorine

D. All of the above are correct

Answer: D

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69. Select are correct statement:

- A. Metal nitrides produce N_2 gas on hydrolysis
- B. Acetic acid is a weaker acid in liquid NH_3 while stronger in water
- C. In Ostwald's process, 'NO' is produced by the reaction of N_2 with O_2
- D. NO_2 is called as mixed anhydride

Answer: D



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70. Both Be and Al become passive on reaction with conc. nitric acid due to-

- A. the non- reactive nature of the meta
- B. the non-reactive nature of the acid
- C. the formation of an oxide layer on the surface of the metals

D. None of the above

Answer: C

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71. Concentrated H_2SO_4 cannot be used to prepare HBr from NaBr ,
because it ,

A. reacts slowly with NaBR

B. oxidises HBr

C. reduces HBr

D. disproportionates HBr

Answer: B

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72. Ammonia can be dried by:

A. Conc. H_2SO_4

B. P_4O_{10}

C. CaO

D. anhydrous $CaCl_2$

Answer: C



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73. One mole of calcium phosphide on reaction with excess of water give:

A. one mole of phosphine

B. two moles of phosphoric acid

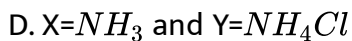
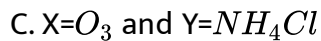
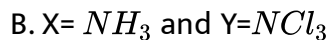
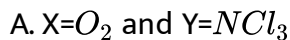
C. two mole of phosphine

D. one mole of phosphorus penta- oxide

Answer: C

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74. When chlorine reacts with a gas X, an explosive inorganic compound Y is formed. Then X and Y will be :



Answer: B

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75. Conc. HNO_3 is yellow coloured liquid due to:

- A. dissolution of NO in conc. HNO_3
- B. dissolution of NO_2 in conc. HNO_3
- C. dissolution of N_2O in conc. HNO_3
- D. dissolution of N_2O_3 in conc. HNO_3

Answer: B

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76. Which one of the following is a mixed anhydride?

- A. NO
- B. NO_2
- C. N_2O_3
- D. N_2O_5

Answer: B

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77. $CH_3 - Mg - Br$ is an organometallic compounds due to :

- A. π -bond between C and Mg
- B. $Mg - Br$ covalent bond
- C. σ -bond between C and Br
- D. σ -bond between C and Mg

Answer: D



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78. Which of the following is the correct statement for PH_3 ?

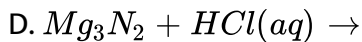
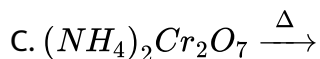
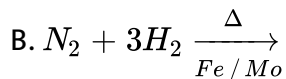
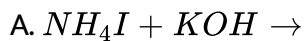
- A. It is less basic than NH_3
- B. It is less poisonous than NH_3
- C. It does not show reducing properties

D. None of the above

Answer: A

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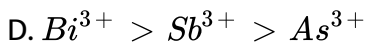
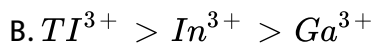
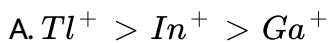
79. Which reaction does not produce ammonia?



Answer: C

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80. Select the incorrect order of stability:



Answer: B

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81. What gas is produced when dilute HNO_3 is added to silver metal?

A. NO

B. H_2

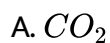
C. NH_3

D. N_2

Answer: C

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82. Which substance produces an acidic solution when it is bubbled into water ?

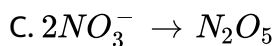
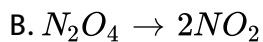
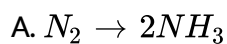


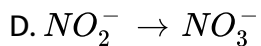
Answer: D



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83. In which process does the nitrogen undergo oxidation ?





Answer: A



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84. Which element reacts most rapidly with water at 25°C to produce a gas?

A. Aluminum

B. Carbon

C. Lithium

D. Phosphorous

Answer: B



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85. Which is the best procedure to follow if a student spills several drops of concentrated HCl on his hand?

- A. Cover the area with solid sodium hydrogen carbonate
- B. Rinse with large amounts of cold water.
- C. Wash with concentrated sodium hydroxide solution
- D. wrap the hand with sterile gauze.

Answer: D



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86. Which pair of substances can be combined to produce ammonia gas?

(P) $(NH_4)_2SO_4(s)$ and $NaOH(aq)$

(Q) $NH_3(aq)$ and $HCl(aq)$

A. P only

B. Q only

C. Both P and Q

D. Neither P nor Q

Answer: B

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87. Which statement about silicon is false?

A. It is a metalloid.

B. It behaves as a semiconductor when pure.

C. It is extremely rare in the earth's crust.

D. It has a smaller atomic radius than aluminium.

Answer: A

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88. A sample of gas in a small test tube produces a pop when a burning splint is inserted. Which gas could it be ?

A. H_2

B. O_2

C. Cl_2

D. NO

Answer: B



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89. Which substance contains individual molecules in the solid ?

A. Graphite

B. Iodine

C. Mercury

D. Silicon carbide

Answer: A



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90. Which of these statements about sulphur is not correct?

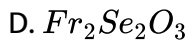
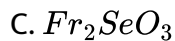
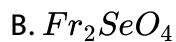
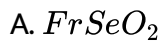
- A. It exists in different allotropic forms
- B. It can behave as either an oxidizing agent or a reducing agent.
- C. It can form up to six covalent bonds in compounds
- D. It is a liquid at $25^{\circ}C$ and 1 atm pressure.

Answer: A



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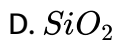
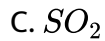
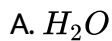
91. Selenium (Se) is similar to sulphur in its properties and francium (Fr) is an alkali metal. What is the formula for francium selenite?



Answer: C

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92. Which oxide has the highest melting point?



Answer: D

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93. What is formed when a solution of NH_4NO_2 is heated gently ?

- A. N_2 and H_2O
- B. N_2O and H_2O
- C. NO and H_2
- D. N_2 , H_2 and O_2

Answer: A



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94. What is the first change that occurs when $I_2(s)$ is heated slowly at one atmosphere pressure?

- A. The solid melts
- B. The solid vapourizes
- C. The solid breaks into atoms

D. The solid becomes darker in colour.

Answer: B



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95. Which oxide is the best reducing agent?

A. CO_2

B. NO_2

C. SiO_2

D. SO_2

Answer: D



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96. For the elements in group 14 (C to Pb), which property increases with increasing atomic number ?

- A. Melting points
- B. Covalent radius
- C. Magnitude of stable oxidation state
- D. Ability to form chains of atoms with themselves

Answer: B



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97. Which acid should be stored in plastic containers rather than in glass ones?

- A. Hydrofluoric acid
- B. Nitric acid
- C. Phosphoric acid

D. Sulphuric acid

Answer: A



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98. Which element does not occur as distinct allotropes at temperatures between $0^{\circ}C$ and $150^{\circ}C$?

A. Phosphorous

B. Silicon

C. Sulphur

D. Tin

Answer: B



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99. Which gas is odourless?

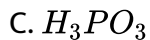
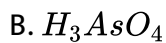


Answer: A



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100. In which species is the oxidation number for hydrogen different from those in the other three?



Answer: A

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101. In a familiar classroom demonstration, concentrated H_2SO_4 is added to a beaker containing sucrose ($C_{12}H_{22}O_{11}$), to produce a column of carbon. In this reaction, the H_2SO_4 is acting primarily as a :

- A. complexing agent
- B. dehydration agent
- C. oxidising agent
- D. precipating agent

Answer: B

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102. Aqua regia, the reagent that can be used to dissolve gold, is a 3:1 mixture of which acids?

- A. Hydrochloric and sulphuric acid
- B. Hydrofluoric and nitric acid
- C. Hydrochloric and nitric acid
- D. Perchloric and sulphuric acid

Answer: C



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103. Which nitrogen halide is least stable thermodynamically?

- A. NF_3
- B. NCl_3
- C. NBr_3
- D. NI_3

Answer: D

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104. Oxygen gas can be produced by the decomposition of all of the following substances except:

- A. calcium oxide
- B. hydrogen peroxide
- C. mercury (II) oxide
- D. ozone

Answer: A

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105. For which pair of allotropes is one a molecular solid and the other a network covalent solid?

A. Dioxygen and ozone

B. White phosphorous and red phosphorous

C. Rhombic sulphur and monoclinic sulphur

D. Grey tin and white tin

Answer: B

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106. XeF_6 on complete hydrolysis gives

A. Xe

B. XeO_2

C. XeO_3

D. XeO_4

Answer: C

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107. Which noble gas does not occur in atmosphere?

- A. Radon
- B. Xenon
- C. Helium
- D. Krypton

Answer: A



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108. The major constituent of noble gases present in atmospheric air (dry air) is :

- A. helium
- B. neon
- C. argon

D. xenon

Answer: C



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109. Minerals of radioactive origin such as pitch blende, monazite, cleveite are found to contain which of the noble gases?

- A. Helium and sometimes neon
- B. Neon and sometimes argon
- C. Helium and sometimes argon
- D. None of the above

Answer: A



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110. What is the main commercial source of helium?

- A. Coal gas
- B. Water gas
- C. Atmospheric air
- D. Natural gas

Answer: D



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111. Which noble gas is obtained as a decay product of radium (Ra_{88}^{226})?

- A. Radon
- B. Xenon
- C. Krypton
- D. None of these

Answer: A



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112. Select two elements from group 18, which are the rarest elements?

A. Xe, Rn

B. Kr, Xe

C. He, Ne

D. Ar, Kr

Answer: A



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113. Elements of group 18 are known as noble gases because:

A. they were discovered by noble kings of ancient times

B. they were extremely rare in atmosphere

C. their valence shell orbitals are completely filled and therefore, react with a few elements only under certain conditions

D. None of the above

Answer: C

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114. The element having highest electron gain enthalpy (with sign) among group 18 elements are:

A. He

B. Ne

C. Ar

D. Rn

Answer: B

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115. Choose the correct statements (s):

- A. All the noble gases have completely filled ns^2np^6 electronic configuration in their valance shell
- B. First ionisation enthalpy of molecular oxygen (1170 kJ mol^{-1}) is almost identical with that of xenon (1175 kJ mol^{-1})
- C. Both $Xe^+ PtF_6^-$ and $O_2^+ PtF_6^-$
- D. None of the above

Answer: C

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116. Amongst crystalline solids XeF_2 , XeF_4 and XeF_6 the one which is coloured is :

A. XeF_2

B. XeF_4

C. XeF_6

D. None of these

Answer: D



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117. The inert gas used for filling electric bulbs as well as in the laboratory for handling substances that are air sensitive:

A. Ne

B. Ar

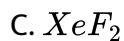
C. Xe

D. He

Answer: B

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118. Which among the following does not exist?



Answer: B

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119. Conc. H_2SO_4 cannot be used to prepared HBr form NaBr.

A. reacts slowly with NaBr

B. oxidises HBr

C. reduces HBr

D. disproportionates HBr

Answer: B

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120. Incorrect statement for ozone is :

(P) More reactive than oxygen

(Q) It reacts with Hg and stop its mobility in test tube.

(R) It is carcinogenic

(S) It can oxidise moist KI to KIO_4

A. Q

B. P and R

C. R and S

D. Q,R and S

Answer: C

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121. $PH_4I + KOH \rightarrow KI + H_2O + X(g)$ correct statement for X is :

- A. colourless
- B. have rotten fish smell
- C. it explodes in contact with traces of HNO_3
- D. all of the above

Answer: D



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122. Copper reacts with hot conc. H_2SO_4 to give:

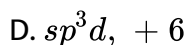
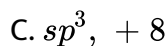
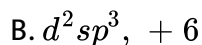
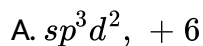
- A. H_2
- B. SO_2
- C. O_2

D. none of these

Answer: B

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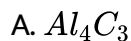
123. Xenon hexafluoride reacts with silica to form oxygen and xenon compound (X). The hybridisation and oxidation state of xenon in the compound:



Answer: A

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124. Which of the following carbide produces different gaseous product as compared to other, when reacted with water?



Answer: A



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125. A silicate mineral having chemical formula $Ca_2Mg_xSi_8O_{22}(OH)_2$ and known as tremolite, predict the value of x:

A. 3

B. 4

C. 2

D. 5

Answer: D

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126. Which of the following metal does not produce NO_2 gas as a side product when it reacts with conc. HNO_3 ?

A. Sn

B. Pb

C. Zn, Mg

D. None of these

Answer: D

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127. Four statements are given below:

(P) B_2 solid does not exist, boron have basic building B_{12} icosahedral units made up of polyhedron having 20 faces and 12 corners.

(Q) In alum each metal ion is surrounded by six water molecules.

(R) Graphite is used as dry lubricant in machines running at high temperature in place of oil.

(S) Fullerene contains twenty, six-membered rings and twelve, five-membered rings.

The correct statements are:

A. P,R and S

B. P and S

C. P,Q,R and S

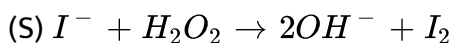
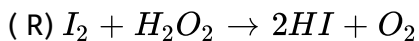
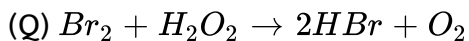
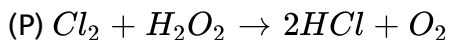
D. Q and S

Answer: C



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128. With respect to halogen or iodide ion four reactions are give below



The correct reactions are :

A. Only S

B. P, Q and S

C. P and S

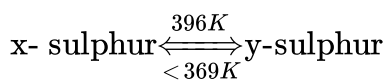
D. P, Q and R

Answer: B



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129. Select the correct statement about follwing reaction:



At 369 K both the forms are stable. This temperature is called transition temperatures

- A. x is (α) rhombic sulphur
- B. y is (β) Monoclinic sulphur
- C. Both x and y sulphur are readily soluble in CS_2
- D. All are correct

Answer: D



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130. Ayush, a student from KOTA, was trying to open an old glass bottle containing NaOH. But the glass stopper got stuck. Can you suggest a reason for this happening?

- A. There were particles of dirt in between
- B. Glass contains a boron compound which forms a precipitate with NaOH solution

C. Solid Na_2CO_3 is formed in between by reaction of CO_2 of air and

NaOH

D. A solid silicate is formed in between by the reaction of SiO_2 of

glass with NaOH

Answer: D

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131. $2K_2MnO_4 + O_3 + H_2O \rightarrow 2KMnO_4 + 2KOH + O_2$ In the above reaction, O_3 acts as oxidising agent and the oxidised product obtained is :

A. O_2

B. OH^-

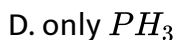
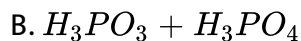
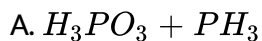
C. $KMnO_4$

D. Can't be predicted

Answer: C

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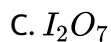
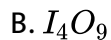
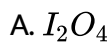
132. Disproportionation products of H_3PO_2 on heating are:



Answer: C

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133. Which of the following compound is used for estimation of CO ?



D. I_2O_5

Answer: D

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134. Two halogens are capable to form XX'_7 type of interhalogen compound. X and X' areand Respectively

A. F and I

B. Br and F

C. Cl and F

D. I and F

Answer: D

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135. Sugar becomes black when comes in contact with conc. H_2SO_4 . It is because of :

- A. oxidising property of conc. H_2SO_4
- B. reducing property of conc. H_2SO_4
- C. dehydrating propery of conc. H_2SO_4
- D. decolorisation property of conc. H_2SO_4

Answer: C



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136. Which of the following statement is incorrect regarding the substance known as Plumbago or balck lead?

- A. It is good conductor of electricity
- B. It's formula is $PbO.2PbO_2$
- C. It leaves balck mark on paper

D. It is very soft and slippery

Answer: B

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137. Out of H_2O , H_2S , S_2Se ,

Hydride which has largest $M - H$ length also has:

A. largest HMM bond angle

B. weakest reducing strength

C. most effective for forming co-ordinate bond with H^+

D. largest H^+ donating ability (K_a)

Answer: D

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138. $Pt + MF_4 \rightarrow PtF_4 + M$ above reaction is easily completed when MF_4 is L:

A. CF_4

B. SF_4

C. XeF_4

D. All are possible

Answer: C



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139. Sulphuric acid is manufactured by the contact process. Which step is not involved in the process?

A. Burning of sulphur or sulphide ores in air to generate SO_2

B. The SO_2 produced is purified by removing dust and other impurities such as arsenic compounds.

C. Conversion of SO_3 to SO_2 in the presence of a catalyst (V_2O_5)

D. Absorption of SO_3 in H_2SO_4 to give oleum ($H_2S_2O_7$)

Answer: C

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140. Tin reacts with dilute nitric acid and produces:

A. NO_2

B. NO

C. NH_4NO_3

D. N_2

Answer: C

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141. Cl_2 cannot be obtained by :

- A. electrolysis of brine
- B. heating KCl with conc. H_2SO_4
- C. heating MnO_2 with conc. HCl
- D. reacting $KClO_3$ with I_2

Answer: B



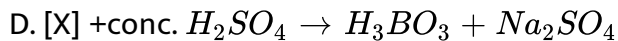
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142. $Ca_2B_6O_{11} + Na_2CO_3 \xrightarrow{\Delta} [X] + CaCO_3 + NaBO_2$ (unbalanced equation) Incorrect choice for [X] is :

- A. Structure of anion of crystalline [X] has one boron atom sp^3 hybridised and other three boron atoms sp^2 hybridised.
- B. X on heating gives a compound which on reaction with hydrogen peroxide in alkaline medium yields a compound used as brighter in

soaps.

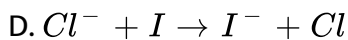
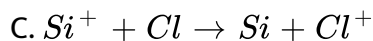
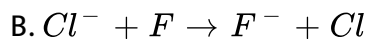
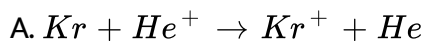
C. It's aqueous solution is basic.



Answer: A

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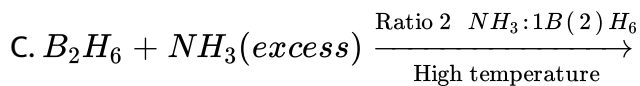
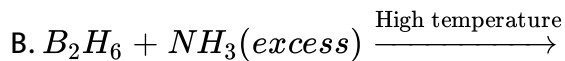
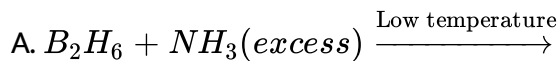
143. Which of the following gas phase reactions can occur spontaneously?



Answer: A

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144. By which of the following reactions is borazine prepared?

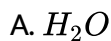


D. None of the above

Answer: C

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145. Which of the following substance has the highest proton affinity?



Answer: C

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146. Select the incorrect option:

A. White phosphorous produce NaH_2PO_2 as a product with conc.

NaOH

B. $K_4[Ni(CN)_4]$ is a tetrahedral complex

C. NO_2^- and NO_3^- ions cannot be distinguished by dil. HCl

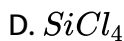
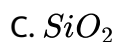
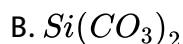
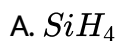
D. Sodium pentacyanonitrosoniumferrate (II) is used to identify S^{2-}

ion

Answer: C

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147. Elemental silicon is oxidized by O_2 to give a compound which dissolves in molten Na_2CO_3 . When this solution is treated with aqueous hydrochloric acid, a precipitate forms. What is the precipitate?



Answer: C



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148. A coloured gas is observed with which combination?

A. Calcium hydride and water

B. Lead metal and nitric acid

C. sodium carbonate and sulphuric acid

D. Zinc sulphide and hydrochloric acid

Answer: B

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149. Which of the following order is incorrect?

A. $B > Tl > Ga > Al > In \rightarrow$ Ionization energy

B. $CH_4 = SnH_4 = GeH_4 \rightarrow$ Bond angle order

C. $Na < K < Rb < Cs < Li \rightarrow$ Reducing nature

D. $Si < P < Be < Mg < Na \rightarrow$ Metallic character

Answer: D

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150. O_3 does not oxidise:

A. KI

B. $FeSO_4$

C. $KMnO_4$

D. K_2MnO_4

Answer: C

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151. When chlorine reacts with a gas X, an explosive inorganic compound Y is formed. Then X and Y will be :

A. $X=O_2$ and $Y=NCl_3$

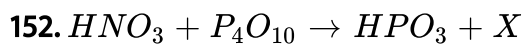
B. $X = NH_3$ and $Y = NCl_3$

C. $X=O_2$ and $Y = NH_4Cl$

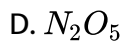
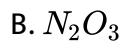
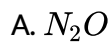
D. $X = NH_3$ and $Y = NH_4Cl$

Answer: B

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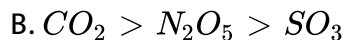
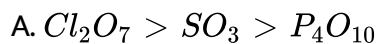
in the above reaction the product X is :

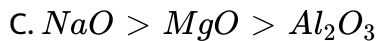


Answer: D

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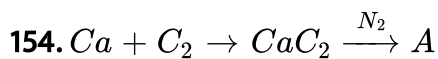
153. Which of the following is the correct order of acidic strength ?





Answer: A

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Compared (A) is as a/an

A. fertilizer

B. dehydration agent

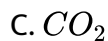
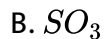
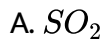
C. oxidising agent

D. reducing agent

Answer: A

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155. A gas which exists in three allotropic forms α , β and γ is :

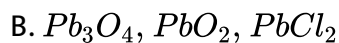
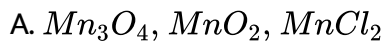


Answer: B



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156. A scarlet red compound (X) on treatment with conc. HNO_3 gives compounds (Y) and (Z). (Z) with HCL produces a chloride compound (A) which can also be produced by treating (X) with conc HCL. Compounds (X), (Z) and (A) will be

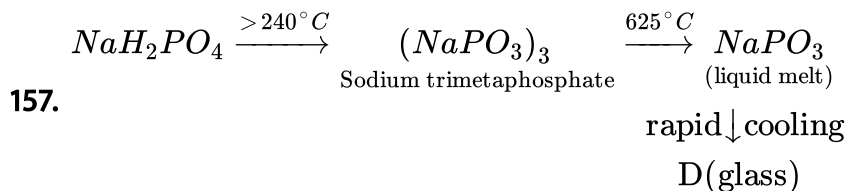


C. Fe_3O_4 , Fe_2O_3 , $FeCl_2$

D. Fe_3O_4 , Fe_2O_3 , $FeCl_3$

Answer: B

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Compound (D) is known as :

A. Microcosmic salt

B. Graham's salt

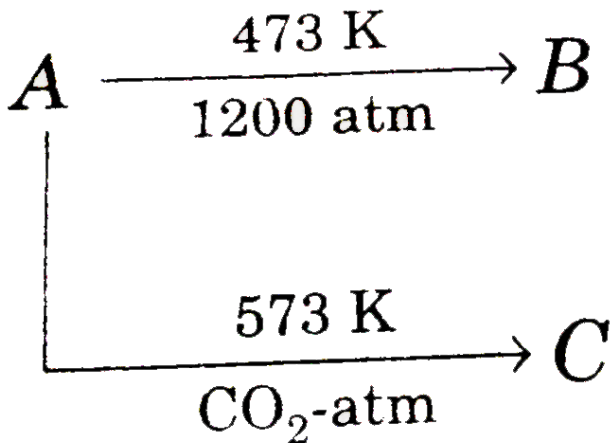
C. Reimann's salt

D. Switzer's salt

Answer: B

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158. Three allotropes (A),(B) and (C) of phosphorous in the following changes are respectively.

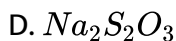
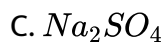
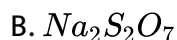


- A. White, β -black, red
- B. β -black, white, red
- C. Red, β -black, white
- D. Red, violet, β -block

Answer: A

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159. When an inorganic compound reacts with SO_2 in aqueous medium produces (A). (A) on reaction with Na_2CO_3 gives the compound (B) which with sulphur gives a substance (c) used in photography. The compound (c) is.

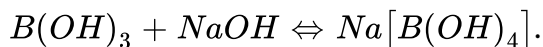


Answer: D



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160. How can the following reaction be made to proceed in forward direction ?



- A. Addition of cis 1, 2-diol
- B. Addition of borax
- C. Addition of trans 1,2-diol
- D. Addition of Na_2HPO_4

Answer: A

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161. Which is the compound responsible for the flickering light called will-o-the-wisp, some times seen in the Marsh?

- A. PH_3
- B. P_2H_4
- C. H_2S
- D. $PH_3 + H_2S$

Answer: B

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162. The gun powder is consisting of '.....'+sulphur+ charcoal. What is the missing substance for gun powder ?



D. (a) and (b) mixture

Answer: C

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163. An aqueous solution of borax is

A. neutral

B. amphoteric

C. basic

D. acidic

Answer: C



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164. Boric acid is polymeric due to

A. its acidic presence

B. the presence of hydrogen bonds

C. its monobasic nature

D. its geometry

Answer: B



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165. Thermodynamically the most stable form of carbon is

- A. diamond
- B. graphite
- C. fullerenes
- D. coal

Answer: B



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166. Elements of group 14

- A. exhibit oxidation state of +4 only
- B. exhibit oxidation state of +2 and +4
- C. form M^{2-} and M^{4+} ions
- D. form M^{2+} and M^{4+} ions

Answer: D

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167. $A + Br_2 + N_2 + (B) \xrightarrow{NaOH} (A)$ if A is a basic gas then identify (A) and (B)

A. NH_3, NH_4Br

B. NH_3, N_2O

C. NH_3, N_2O_5

D. None of these

Answer: A

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168. (a) $Al \xrightarrow{N_2} A$, (b) $Al \xrightarrow{C} B$, Product A and B on hydrolysis yields respectively.

- A. Ammonia and acetylene
- B. Ammonia and methane
- C. Nitric oxide and acetylene
- D. None of the above

Answer: B

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169. The reaction of P_4 with X leads selectively to P_4O_6 The X is :

- A. dry O_2
- B. a mixture of O_2 and N_2
- C. moist O_2
- D. O_2 in the presence of aqueous NaOH

Answer: B

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

- A. has molecules of variable molecular masses like polymers
- B. has carbon atoms arranged in large plate or rings of strongly bonded carbon atoms with weak interplate bonds
- C. is a non-crystalline substance
- D. is an allotropic form of diamond

Answer: B



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171. For making good quality mirrors, the plates of flint glass are used. These are obtained by floating molten glass over a liquid metal which does not solidify before glass. The metal used can be

- A. sodium
- B. magnesium
- C. mercury
- D. tin

Answer: C

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172. The soldiers of Napoleon army while at Alps during freezing winter suffered a serious problem with regard to the tin buttons of their uniform. White metallic tin buttons get converted to grey powder. This transformation is relate to

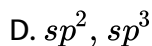
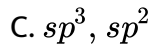
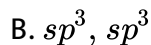
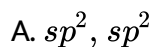
- A. an interaction with water vapour contained in humid air
- B. a change in crystalline structure of tin
- C. a change in the partial pressure of O_2 in air
- D. an interaction with N_2 of air a low temperature

Answer: B



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173. The states of hybridisation of boron and oxygen atoms in boric acid (H_3BO_3) are respectively :



Answer: D



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174. Which allotropic of carbon is thermodynamically more stable ?

A. White

B. Red

C. Black

D. Yellow

Answer: C



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175. When two gases are mixed at $-30^{\circ}C$ the blue coloured gas is formed:

A. N_2O_3

B. O_2

C. NO_2

D. N_2O_5

Answer: A

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176. When PbO_2 reacts with conc. HNO_3 the gas evolved is

A. NO_2

B. O_2

C. N_2

D. N_2O

Answer: B

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177. Bleaching powder contains a salt of an oxoacid as one of its components . The anhydride of that acid is

A. Cl_2O

B. Cl_2O_7

C. ClO_2

D. Cl_2O_6

Answer: A

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178. Lead pipes are not suitable for drinking water because :

A. a layer of lead dioxide is deposited over pipes

B. lead forms basic lead carbonate

C. lead reacts with water containing air to form $Pb(OH)_2$

D. lead reacts with air to form litharge

Answer: C

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179. Suppose you have to determine the percentage of carbon dioxide in a sample of a gas available in a container. Which is the best absorbed material for the carbon dioxide :

- A. Heated copper oxide
- B. Cold, solid calcium chloride
- C. Cold, solid calcium hydroxide
- D. Heated charcoal

Answer: C



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180. Which gas is responsible for greenhouse effect :

- A. CO_2
- B. SO_2
- C. CO

D. SO_3

Answer: A

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181. Bucky ball or Buckminster fullerence is :

- A. an allotrope of carbon
- B. it is referred as $C - 60$
- C. it has sp^2 -hybridised nature and resembles with a soccer ball
- D. all of the above

Answer: D

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182. When CO is heated with NaOH under pressure , we get:

A. sodium benzoate

B. sodium acetate

C. sodium formate

D. sodium oxalate

Answer: C

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183. Artificial gem used for cutting glass is

A. graphite

B. diamond

C. SiC

D. $CaCN_2$

Answer: C

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184. Which of the following properties describes the diagonal relationship between both boron and silicon ?

- A. BCl_3 is not hydrolysed while $SiCl_4$ can be hydrolysed
- B. Both form oxides, B_2O_3 is amphoteric, SiO_2 is acidic.
- C. Both metals dissolve in cold and dilute nitric acid.
- D. Borides and silicides are hydrolysed by water

Answer: D



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185. Aluminium vessels should not be washed with materials containing washing soda because :

- A. washing soda is expensive
- B. washing soda is easily decomposed

C. washing soda reacts with aluminium to form soluble aluminate

D. washing soda reacts with aluminium to form insoluble aluminium oxide

Answer: C

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186. Which of the following noble gases does not form clathrates?

A. He

B. Br_2

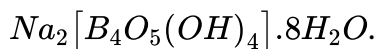
C. Ar

D. Xe

Answer: A

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187. Borax is actually made of two tetrahedra and two triangular units joined together and should be written as



Consider the following statements about borax :

A : Each boron atom has four $B - O$ bonds.

B : Each boron atom has three $B - O$ bonds.

C : Two boron atoms have four $B - O$ bonds while other two have three $B - O$ bonds.

D : Each boron atom has one-OH group.

Select correct statement (s) :

A. P and Q

B. Q and R

C. R and S

D. P and R

Answer: C



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188. The structures of O_3 and N_3^- are:

- A. linear and bent, respectively
- B. both linear
- C. both bent
- D. bent and linear, respectively

Answer: D



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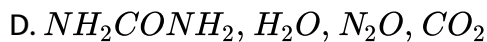
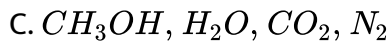
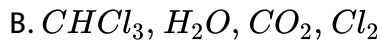
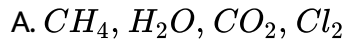
189. $A + O_2 \rightarrow X + Y + Z$
(organic compound)

Compound(A) in pure form does not give ppt. with $AgNO_3$ solution. A mixture containing 70% of (A) and 30% of ether is used as an anaesthetic.

Compound (X) and (Y) are oxides while (Z) is a pungent smelling gas. (X) is a neutral oxide which turns cobalt chloride paper pink. Compound (Y)

turns lime water milky and produces an acidic solution with water.

Compound (A),(X),(Y) and (Z) respectively will be:



Answer: B



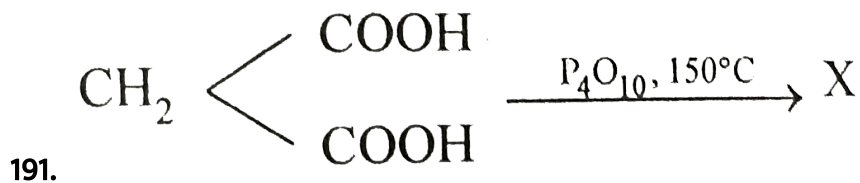
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190. Concentrated HNO_3 reacts with iodine to give:



Answer: C

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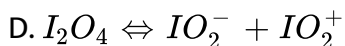
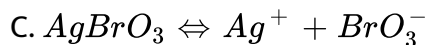
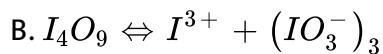
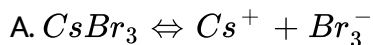
Compound (X) is

- A. malonic acid
- B. carbon suboxide
- C. tartaric acid
- D. acetic acid

Answer: B

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192. Which is incorrectly matched ?

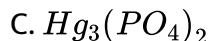
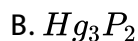
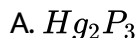


Answer: D



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193. When PH_3 absorbed in $HgCl_2$ solution the corresponding phosphide is obtained:



D. none of these

Answer: B



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194. Nitrogen dioxide is dissolved in water to produce:

A. HNO_3 and HNO_2

B. only HNO_3

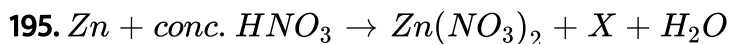
C. only HNO_2

D. HNO_2 and N_2

Answer: A



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Compounds X and Y are respectively:

A. N_2O , NO

B. NO_2 , N_2O

C. N_2 , N_2O

D. NO_2 , NO

Answer: B



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Reasoning Type

1. Statement-1: Noble gases are least reactive

Statement-2: They have high ionisation enthalpy and more positive electron gain enthalpy.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False

D. Statement-1 is False, Statement-2 is True

Answer: A

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2. Statement-1: The study of chemistry of radon is very difficult

Statement-2: Radon is radioactive with very short half-life

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False

D. Statement-1 is False, Statement-2 is True

Answer: A

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3. Statement-I: Borax bead test is applicable only to coloured salt.

Statement-II: In borax bead test, coloured salts are decomposed to give coloured metal meta borates.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False

D. Statement-1 is False, Statement-2 is True

Answer: A



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4. Statement-I: Aluminium and zinc metal evolve H_2 gas from NaOH solution

Statement-II: Several non-metals such as P,S,Cl, etc. yield a hydride instead of H_2 gas from NaOH

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: B



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5. Statement-1: Conc. H_2SO_4 cannot be used to prepare pure HBr from NaBr

Statement-2: It reacts slowly with NaBr.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: C



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6. Statement-1: Oxygen is more electronegative than sulphur, yet H_2S is acidic, while H_2O is neutral.

Statement-2: $H - S$ bond is weaker than $O - H$ bond.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: A

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7. Statement-1: Chlorine gas disproportionates in hot and conc. NaOH solution.

Statement-2: NaCl and NaOCl are formed in the above reaction.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: C

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8. Statement-1: Liquid IF_5 conducts electricity.

Statement-2: Liquid IF_5 self ionizes as, $2IF_5 \Leftrightarrow IF_4^+ + IF_6^-$

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: A

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9. Statement-I: $NaBO_3/OH^-$ can be used for oxidation of Cr^{3+} to Cr^{6+}

Statement-II: In alkaline medium $NaBO_3$ produces H_2O_2

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False

D. Statement-1 is False, Statement-2 is True

Answer: A

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10. Statement-I : Carbon reduction for Al_2O_3 , is very difficult.

Statement-II : Al forms carbide the Al_4C_3 which produces propyne when reacts with H_2O .

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

Answer: C



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11. Statement-1: $Al(OH)_3$ is amphoteric in nature.

Statement-2: It cannot be used as an antacid.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is NOT a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False
- D. Statement-1 is False, Statement-2 is True

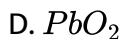
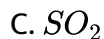
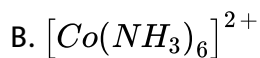
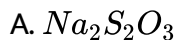
Answer: C



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Multiple Objective Type

1. Which of the following can act as reducing agent ?

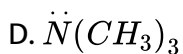
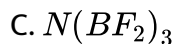
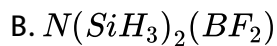
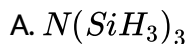


Answer: A::B::C



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2. Which of the following compound(s) is /are planar about nitrogen?

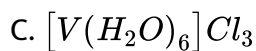
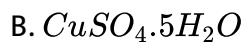
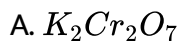


Answer: A::B::C



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3. Select the colored compound (s):

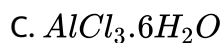
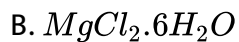
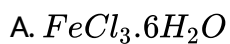


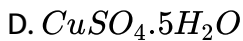
Answer: A::B::C::D



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4. Which of the following will not give anhydrous chloride by heating?

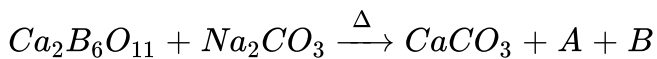




Answer: A::B::C

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5. Which of the following option is /are correct?



A. B contains $\delta B-O-B$ linkage

B. A will be obtained by thermal decomposition of B

C. Aqueous solution of B used as an acidic buffer in titration

D. A exists in a polymeric form.

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

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6. Very pure nitrogen can be obtained by :

- A. thermal decomposition of $Ba(N_3)_2$
- B. thermal decomposition of NaN_3
- C. thermal decomposition of $(NH_4)_2Cr_2O_7$
- D. reaction of NH_4Cl with $NaNO_2$

Answer: A::B



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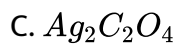
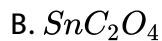
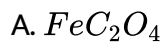
7. Which of the following undergo disproportionation on heating?

- A. H_3PO_3
- B. Na_2SO_3
- C. H_3PO_4
- D. $NaOCl$

Answer: A::B::D

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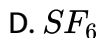
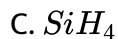
8. The compound which produce CO gas finally on heating are :



Answer: A::B

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9. The compounds which do not undergo hydrolysis at room temperature are:



Answer: A::B::D



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10. Which of the following statement is correct?

A. Diamond is the metastable allotrope of carbon

B. Diamond being thermodynamically less stable than graphite can convert into graphite spontaneously under ordinary conditions

C. Formation of diamond (from graphite) is favoured by high pressure and temperature in accordance with Le-chatelier's principle

D. Diamond has theroretically more efficient packing than graphite

Answer: A::C

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11. Choose the correct statements (s):

- A. CaC_2 has a lattice similar to that of NaCl, but the unit cell is elongated in one direction.
- B. In C_{60} , all carbon atoms are sp^2 hybridised with truncated isosahedron shape
- C. Ge forms only three hydrides
- D. Calcium carbide is manufactured by heating calcium with carbon

Answer: A::B

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12. Which of the following statement are correct ?

- A. Anhydrous $MgCl_2$ cannot be prepared by heating $MgCl_2 \cdot 6H_2O$
- B. Anhydrous $CaCl_2$ is used in drying gases and organic compounds but not NH_3 or ethyl alcohol due to the formation of $CaCl_2 \cdot 8NH_3$ and $CaCl_2 \cdot 4C_2H_5OH$
- C. Leblanc's process is used for preparation of both Na_2CO_3 and K_2CO_3 but not solvay process.
- D. KOH is preferably used compared to NaOH for absorption of CO_2 because $KHCO_3$ formed is soluble whereas $NaHCO_3$ is sparingly soluble and therefore, choke the tubes of apparatus used

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



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13. The Lewis acid strength of following molecule is in the order:





Answer: C::D

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14. Choose the correct statements (s) for group-18 elements:

A. Ionisation enthalpy decrease down the group

B. Density increases down the group

C. M.P (except He) increases down the group

D. B.P increase down the group

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

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15. Select the incorrect statement (s) about noble gases:

- A. Heavier noble gases can sometimes dimerise
- B. Some of them are coloured
- C. They can diffuse through rubber, glass or plastics
- D. They are liquefied at very low temperatures

Answer: A::B

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16. XeF_6 (s) can be prepared by:

- A. $Xe:F_2$ in 1:20 mole ratio and high pressure (60-70 bar) and temperature 573 K
- B. $Xe:F_2$ in 1:5 mole ratio and pressure (7 bar) and temperature 873 K

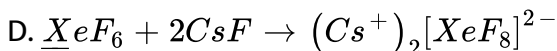
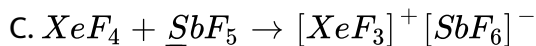
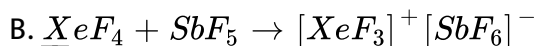
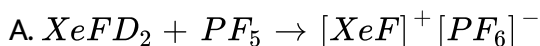
C. From product of (b), followed by an interaction with O_2F_2 at 143 K

D. Taking Xe in excess at atmospheric pressure (1 bar) and temperature (673 K)

Answer: A::C

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17. Identify the reaction(s) in which the stereochemistry of underlined species has changed.



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

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18. Which among the following is a use of helium?

- A. Used in gas cooled nuclear reactors
- B. Used as a cryogenic agent
- C. Used to produce and sustain powerful superconducting magnets
- D. Used as a dilute for oxygen in modern diving apparatus

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



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19. Select the correct statement (s) regarding compounds of noble gases:

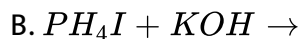
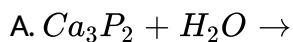
- A. Only compound of Kr, KrF_2 has been studied in detail
- B. RnF_2 has been identified by radiotracer technique
- C. No true compounds of Ar, Ne of He are yet known
- D. Xe forms three binary fluorides XeF_2 , XeF_4 and XeF_6

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

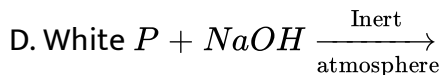


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20. Which of the following methods can be used to produce phosphine gas ?



C. Heating of H_3PO_2

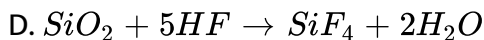
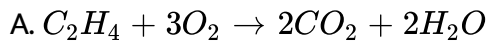


Answer: A::B::C::D



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21. Which of the following is a redox reaction ?



Answer: A::B::C

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22. Compound (A) contains Cl in its structure and Cl has uninegative and unipositive charge in compound (A). On long standing, compound (A) undergoes auto oxidation and form (B) and (C), but in presence of $CoCl_2$ catalyst it forms B and D. B is also produced when compound (A) reacts with H_2S gas.

Which of the following statements are correct about (A)?

A. It is a powerful bleaching agent, bleaching action is due to oxidation

B. It is used in the manufacture of dyes, drugs and organic compounds such as CCl_4 , $CHCl_3$, DDT and refrigerants

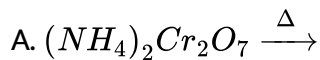
C. It is used in preparation of poisonous gases such as phosgene ($COCl_2$), tear gas (CCl_3NO_2), mustard gas ($ClCH_2CH_2SCH_2CH_2Cl$)

D. It is used in sterilising drinking water.

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

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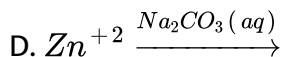
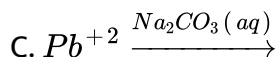
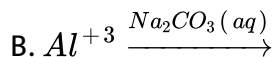
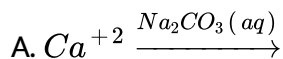
23. Which of the following produce(s) N_2 gas ?



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

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24. Which of the following reaction(s) give white precipitate?



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

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25. Which of the following crystal will have at least two axial angle 90°

A. NaCl

B. Rhombic sulphur

C. Monoclinic sulphur

D. Graphite

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

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26. When a compound X reacts with ozone in aqueous medium, a compound Y is produced. Ozone also react with Y and produces Z. Z acts as an oxidising agent, then X,Y and Z will be:

A. $X = HI, Y = I_2$ and $Z = HIO_3$

B. $X = KI, Y = I_2$ and $Z = HIO_3$

C. $X = KI, Y = I_2$ and $Z = HIO_4$

D. $X = HI, Y = I_2$ and $Z = HIO_4$

Answer: A::B



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27. Which of the following statement is /are correct regarding B_2H_6 ?
- A. Banana bond are longer but stronger than normal $B - H$ bonds
 - B. B_2H_6 is also known as 3c-2e compound
 - C. The hybrid state of B in B_2H_6 is sp^3 while tat of sp^2 in BH_3
 - D. It cannot be prepared by reacting BF_3 with $LiBH_3$ in the presence of dry ether

Answer: A::B::C



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28. Which of the following statements is /are correct regarding inter-halogen compounds of AB_x types?

A. x may be 1,3,5 and 7

B. A is a more electronegative halogen than B

C. FBr_3 cannot exist

D. The interhalogens are generally more reactive than the halogen (except F_2) due to weaker A-X bonds compared to X-X bond

Answer: A::C::D

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29. When an inorganic compound (X) having $(3c, 2e)$ as well as $(2c, 2e)$ bonds reacts with ammonia gas at a certain temperature and gives a compound (Y). Which is isostructural with benzene. Compound (X) with ammonia at very high temperature gives (Z) also known as inorganic graphite. Identify (X), (Y) and (Z).

A. (X) is B_2H_6

B. (Z) is known as inorganic graphite

C. (Z) having structure similar to graphite

D. (Z) having structure similar to (X)

Answer: A::B::C

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30. Boric acid :

A. exists in polymeric form due ot inter-molecular hydrogen bonding

B. is used in manufacturing of optical glasses

C. is a tri-basic acid

D. with borax, it is used in the preparation of a buffer solution

Answer: A::B::D

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31. The correct statement(s) related to allotropes of carbon is/are:

- A. graphite is the thermodynamically most stable allotrope of carbon and having a two dimensional sheet like structure of hexagonal rings of carbon (sp^2)
- B. diamond is the hardest allotrope of carbon and having a three dimensional network structure of $C(sp^3)$
- C. fullerene (C_{60}) is recently discovered non-crystalline allotrope of carbon having a football-like structure
- D. van der Waals force of attraction acts between the layer of graphite 3.35 \AA away from each other

Answer: A:B



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32. $Al_2(SO_4)_3 + NH_4OH \rightarrow X$, then:

- A. X is a white coloured compound

B. X is insoluble in excess of NH_4OH

C. X is soluble in NaOH

D. X cannot be used as an antacid

Answer: A::B::C

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33. The species that undergo(es) disproportionation in alkaline medium is/are:

A. Cl_2

B. MnO_4^{2-}

C. P_4

D. ClO_4^-

Answer: A::B::C

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34. Select correct statement(s):

- A. Borax is used as a buffer
- B. 1 M borax solution reacts with equal volumes of 2 M HCl solution
- C. Titration of borax can be made using methyl orange as the indicator
- D. Coloured bead obtained in borax-bead test contains metaborate

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



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35. Which of the following is/are correct for group 14 elements?

A. The stability of dihalides are in the order



- B. The ability to form $PPI - PPI$ multiple bonds among themselves increases down the group
- C. The tendency for catenation decreases down the group
- D. They all form oxides with the formula MO_2

Answer: A::C::D

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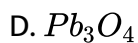
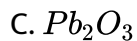
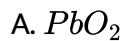
36. Zeolite is used in which of the following cases?

- A. Conversion of alcohols into gasoline
- B. Cracking of hydrocarbons
- C. Isomerisation of hydrocarbons
- D. Softening of hard water

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

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37. Which of the following oxides are mixed oxide?

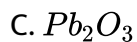
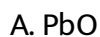


Answer: C::D



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38. Which of the following oxides(s) gives brown ppt on reaction with conc. HNO_3



D. Pb_3O_4

Answer: C::D



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39. Which of the following elements of chalcogen group can form MX_2 type of compound where $X = Cl$ and Br?

A. O

B. S

C. Se

D. Te

Answer: A::B::D



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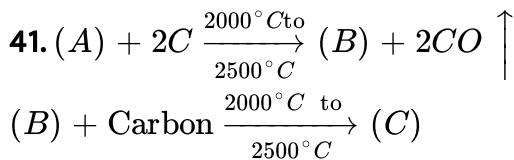
40. $Ca_2B_6O_{11} + Na_2CO_3 \xrightarrow{\Delta} [X] + CaCO_3 + NaBO_2$ (unbalanced equation) correct choice for [X] is :

- A. Structure of anion of crystalline [X] has one boron atom sp^3 hybridised and other three boron atoms sp^2 hybridised.
- B. (X) with NaOH (aq.) gives a compound which on reaction with H_2O_2 in alkaline medium yields a compound used as brightner in soaps
- C. Hydrolysis of (X) with HCl or H_2SO_4 yields a compound which on reaction with HF gives fluoroboric acid
- D. [X] on heating with cobalt salt in oxidising flame give blue coloured bead

Answer: B::C::D



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If A is an example of 3-D silicate then select the correct statements about (C).

A. Central atom of C is sp^3 hybridised

B. (C) is non-planar and all atoms are sp^3 hybridised

C. (C) has diamond like structure, and it is colourless when impurity is present but yellow solid at room temperature

D. (C) is silicon carbide (SiC) and it is not being affected by any acid except H_3PO_4

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



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42. Aqueous solution of boric acid is treated with Salicylic acid. Which of the following statements *is/are* incorrect for the product formed in the above reaction

- A. No product will be formed because both are acid.
- B. Product is 4-coordinated complex and optically resolvable.
- C. Product is 4-coordinated complex and optically non-resolvable.
- D. There are two rings only which are five membered.

Answer: A::C::D



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43. The nitrogen oxide (s) that contain (s) $N - N$ bonds (s) is (are).

- A. N_2O
- B. N_2O_3
- C. N_2O_4

D. N_2O_5

Answer: A::B::C

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44. The hybrid states of phosphorous atoms in each PCl_5 and PBr_5 in gaseous phase are sp^3d . But, in solid PCl_5 , phosphorous shows sp^3d^2 and sp^3 hybrid states. While, P in PBr_5 is in sp^3 hybrid state. This is because:

A. PCl_5 in solid form exists as $[PCl_4]^+ [PCl_6]^-$

B. PBr_5 in solid form exists as $[PBr_4]^+ [PBr_6]^-$

C. PCl_5 in solid form exists as $[PCl_4]^+ Cl^-$

D. PBr_5 in solid form exists as $[PBr_4]^+ Br^-$

Answer: A::D

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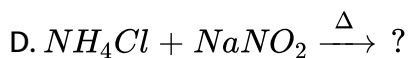
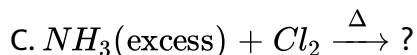
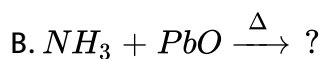
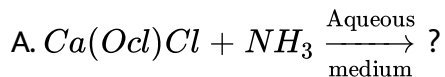
45. $C(OH)_4$ is unstable because a carbon atom cannot hold more than one $-OH$ groups but $Si(OH)_4$ is a stable compound because

- A. $C - O$ bond energy is low
- B. $C - O$ bond energy is high
- C. $Si - O$ bond energy is low
- D. $Si - O$ bond energy is high

Answer: A:D

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46. Choose the reactions which would liberate nitrogen gas?



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



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47. $2NO_2 \rightleftharpoons N_2O_4$. The dimerisation of NO_2 is accompanied with :

- A. decrease in paramagnetism
- B. change in colour
- C. increase in temperature
- D. increase in paramagnetism

Answer: A::B



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Comprehension Type comprehension -1

	F	Cl	Br
B	Monomer	Monomer	X
Al	Ionic	Polymer (W)	Y
Ga	Ionic	Dimer	Z

1.

The compound (X) exists as:

- A. monomer
- B. dimer
- C. polymer
- D. trimer

Answer: A



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	F	Cl	Br
B	Monomer	Monomer	X
Al	Ionic	Polymer (W)	Y
Ga	Ionic	Dimer	Z

1.

Select the correct statement(s) regarding the compounds (W) and (Z)

- A. Coordination number of Al in the compound (W) is 6
- B. Coordination number of Ga in the compound (Z) is 4
- C. The compound (Z) exists as dimer
- D. All of the above

Answer: D



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	F	Cl	Br
B	Monomer	Monomer	X
Al	Ionic	Polymer (W)	Y
Ga	Ionic	Dimer	Z

1.

Which of the following statement is correct for the compound (Y)?

- A. It exists as polymer and the coordination number of Al is 6
- B. It exists as dimer and the coordination number of Al is 4
- C. It exists as monomer
- D. None of the above

Answer: B



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1. The oxides of Cl, Br and I are well known. They have various composition. The oxides are thermally unstable and dangerously explosive. They react with alkali. The bromine oxides are thermally more stable than chlorine oxides. The structure of halogen oxides is explained on the basis of VSEPR theory.

The hydrides of chlorine, bromine and iodine can be made by direct synthesis as they are well strongly fuming become increasingly more powerful reducing agents. Halogens also form oxoacids of the form HOX , HXO_2 , HXO_3 and HXO_4 . The acidic character of oxoacids and halogen oxides decreases from 'Cl' to 'I', however it increases with increase in oxidation number of halogen in them.

The structure of Cl_2O_7 is $O_3Cl - O - ClO_3$. The $Cl - O - Cl$ bond angle is :

- A. 190°
- B. $118^\circ 37'$
- C. $109^\circ 28'$
- D. 108.7°

Answer: B



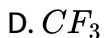
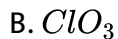
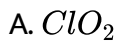
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Comprehension-3

1. The oxides of Cl, Br and I are well known. They have various composition. The oxides are thermally unstable and dangerously explosive. They react with alkali. The bromine oxides are thermally more stable than chlorine oxides. The structure of halogen oxides is explained on the basis of VSEPR theory.

The hydrides of chlorine, bromine and iodine can be made by direct synthesis and they are well strongly fuming become increasingly more powerful reducing agents. Halogens also form oxoacids of the form HOX , HXO_2 , HXO_3 and HXO_4 . The acidic character of oxoacids and halogen oxides decreases from 'Cl' to 'I', however it increases with increase in oxidation number of halogen in them.

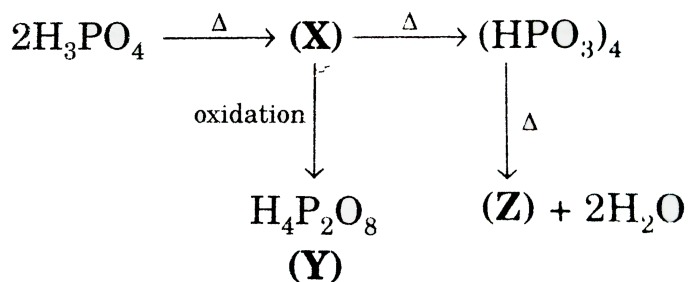
Which of the following does not dimerise?



Answer: A

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2. Consider the following sequence of reactions :



Maximum number of $P - O$ bonds having equal bond length in (Y) is:

A. 2

B. 4

C. 6

D. 8

Answer: B



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Comprehension-4

1. The oxides of Cl, Br and I are well known. They have various composition. The oxides are thermally unstable and dangerously explosive. They react with alkali. The bromine oxides are thermally more stable than chlorine oxides. The structure of halogen oxides is explained on the basis of VSEPR theory.

The hydrides of chlorine, bromine and iodine can be made by direct synthesis as they are well strongly fuming become increasingly more powerful reducing agents. Halogens also form oxoacids of the form HOX , HXO_2 , HXO_3 and HXO_4 The acidic character of oxoacids

and halogen oxides decreases from 'Cl' to 'I', however it increases with increase in oxidation number of halogen in them.

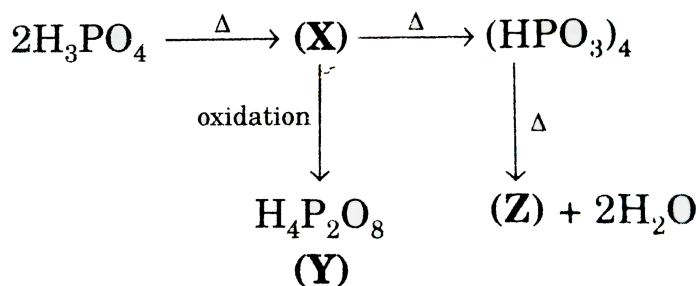
Choose the correct statement about Cl_2O_6

- A. It's most accepted structure has $Cl - Cl$ bond.
- B. It exists in liquid state as ClO_2^+ and ClO_4^-
- C. It is the dimer of ClO_3 .
- D. It does not exist in gaseous state.

Answer: B::C

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2. Consider the following sequence of reactions :



The total number of $P - O - P$ linkage present in the compound (Z) is :

A. 2

B. 4

C. 6

D. 8

Answer: C



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3. $XeF_2 + H_2O \rightarrow$ Product (Set-I)

$XeF_4 + H_2O \rightarrow$ Product (Set-II)

$XeF_6 + H_2O \rightarrow$ Product (Set-III)

In which set HF is obtained as one of the by-products along with O_2 ?

A. only I

B. I and II

C. I and III

D. II and III

Answer: B



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Comprehension-5

1. $XeF_2 + H_2O \rightarrow$ Product (Set-I)

$XeF_4 + H_2O \rightarrow$ Product (Set-II)

$XeF_6 + H_2O \rightarrow$ Product (Set-III)

Which product is not obtained in Set I?

A. Xe

B. HF

C. O_2

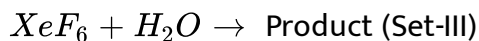
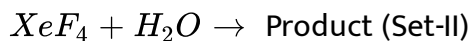
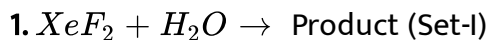
D. XeO_3

Answer: D



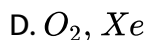
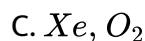
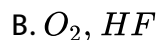
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Comprehension-6



Set-III experiment was performed by three different students and they got three set of products, (based on quantity of water added) set A, B and

C. Which product was present and which was absent respectively, in all three cases?



Answer: A



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2. Silicon forms a very large number of compounds containing SiO_4^{4-} anion as the basic unit. The structure of this basic unit is a tetrahedron in which oxygen atoms are arranged tetrahedral around a silicon atom.

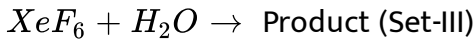
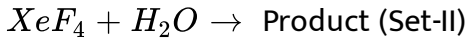
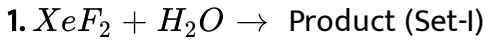
Which of the following type of silicate is represented in the mineral of $Mg_3(OH)_2[Si_4O_{10}]?$

- A. Linear silicate
- B. Cyclic silicate
- C. 3-D-silicate
- D. Sheet silicate

Answer: D



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Experimenter of set A used 3 times more water than that of set B. With the above data, choose the correct match?

List-I		List-I	
(A)	Set-A	(p)	XeO_3
(B)	Set-B	(q)	$XeOF_4$
(C)	Set-C	(r)	XeO_2F_2
		(s)	HF
		(t)	Xe
		(u)	O_2

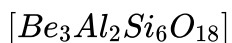
- A. $A \quad B \quad C$
 $p, t \quad q, u \quad r, s$
- B. $A \quad B \quad C$
 $r, s \quad p, s \quad q, s$
- C. $A \quad B \quad C$
 $p, s \quad q, s \quad r, s$
- D. $A \quad B \quad C$
 $q, u \quad r, u \quad p, u$

Answer: C

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2. Silicon forms a very large number of compounds containing SiO_4^{4-} anion as the basic unit. The structure of this basic unit is a tetrahedron in which oxygen atoms are arranged tetrahedral around a silicon atom.

The total number of oxygen shared per tetrahedron in Beryl



A. 4

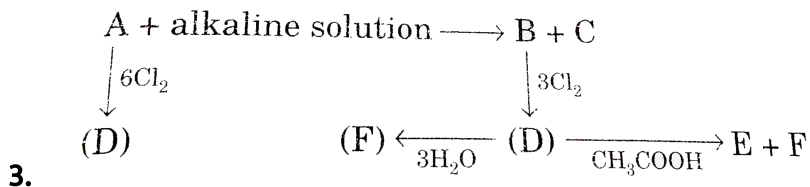
B. 3

C. 2

D. 1

Answer: C

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When D reacts with C_2H_5OH then product will be :

- A. C_2H_5Cl, H_3PO_4
- B. C_2H_5Cl, H_3Cl, H_3PO_3
- C. CH_3COCl, H_3PO_3
- D. only H_3PO_3

Answer: B

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Comprehension -5

1. Nitric acid is a strong oxidizing agent and attacks most metals, non-metals and metalloids.

Which of the following metal is / are inert towards reaction with dil HNO_3 ?

A. Au

B. Ag

C. Pt

D. Fe

Answer: A::C

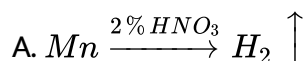


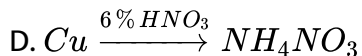
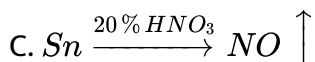
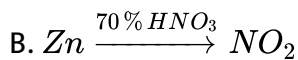
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Comprehension -6

1. Nitric acid is a strong oxidizing agent and attacks most metals, non-metals and metalloids.

Which of the following process is/are incorrect ?

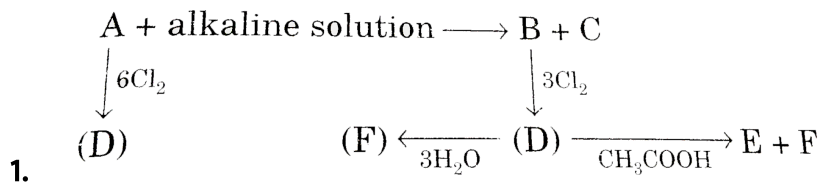




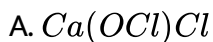
Answer: C::D

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Comprehension-8



B can be absorbed by :



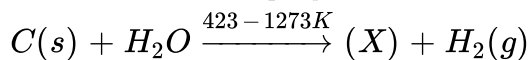
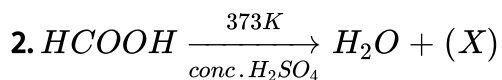
C. Both (a) and (b)

D. none of these

Answer: A



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Select the correct statement about (X):

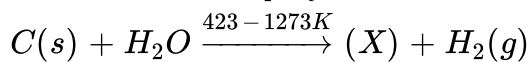
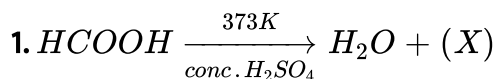
- A. (X) is a colourless, odourless, odourless and almost water insoluble gas
- B. (X) is highly poisonous and burns with blue flame
- C. When (X) gas is passed through PdCl_2 solution black ppt. is formed
- D. All of the above

Answer: D



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Comprehension-9



Mixture of (X) gas + H_2 is called:

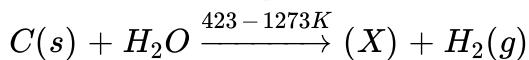
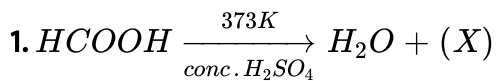
- A. water gas or synthesis gas
- B. producer gas
- C. methane gas
- D. None of the above

Answer: A



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Comprehension-10



In a second reaction when air is used instead of steam a mixture of (X) gas and N_2 is produced which is called:

- A. water gas
- B. synthesis gas
- C. producer gas
- D. carbon dioxide gas

Answer: C

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2. Co gas is absorbed by aqueous suspension of cuprous chloride forming the complex like $[\text{CuCl}(\text{CO})(\text{H}_2\text{O})_2]$

Comment on the shape of the above complex:

A. tetrahedral

B. octahedral

C. square planar

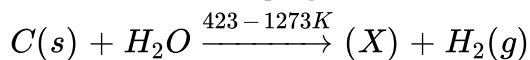
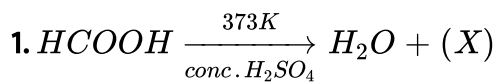
D. can not be predicted

Answer: A



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Comprehension-11



Select the correct statement about (X):

A. (X) gas is estimated by I_2O_5

B. Cu_2Cl_2 is absorber of (X) gas

C. (X) gas is the purifier agent for Ni

D. All of the above

Answer: D

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2. Co gas is absorbed by aqueous suspension of cuprous chloride forming the complex like $[CuCl(CO)(H_2O)_2]$

Choose the correct statement regarding the above molecule:

- A. Cl-atom is separated by equal angle from both of the water molecule.
- B. Magnetic moment of the above complex is 1.73 B.M
- C. There are two stereoisomers for the above complex.
- D. Both (a) and (c)

Answer: A

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3. There are some deposits of nitrated and phosphates in the earth's crust. Nitrates are more soluble in water. Nitrates are difficult to reduce under laboratory conditions but microbes do it easily. Ammonia forms a large number of complexes with transition metal ions. Hybridisation easily explains the ease of sigma donation capability of NH_3 and PH_3 . Phosphine is a flammable gas and is prepared from white phosphorous.

Which of the following statement is correct ?

- A. Phosphates have no biological significance in humans
- B. Between nitrates and phosphate, phosphates are less abundant in earth's crust.
- C. Between nitrates and phosphate, nitrates are less abundant in earth's crust.
- D. Oxidation of nitrates is possible in soil.

Answer: C



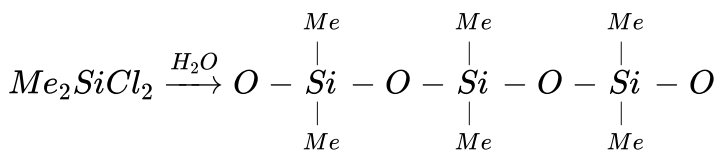
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Comprehension -9

1. Read the following write-ups and answer the question at the end of it.

Silicones are synthetic polymers containing repeated R_2SiO units. Since, the empirical formula is that of a ketone (R_2CO), the name silicone has been given to these materials. Silicones can be made into oils, rubbery elastomers and resins. They find a variety of applications because of their chemical inertness, water repelling nature, heat-resistance and good electrical insulating property. Commercial silicon polymers are usually methyl derivatives and to a lesser extent phenyl derivatives and are synthesised by the hydrolysis of

R_2SiCl_2 [R = methyl (Me) or phenyl(ϕ)]



If we mix Me_3SiCl with Me_2SiCl_2 , we get silicones of the type:

A. 

B. 

C. Both of the above

D. None of the above

Answer: A



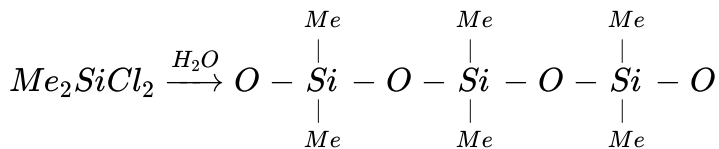
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Comprehension -10

1. Read the following write-ups and answer the question at the end of it.

Silicones are synthetic polymers containing repeated R_2SiO units. Since, the empirical formula is that of a ketone (R_2CO), the name silicone has been given to these materials. Silicones can be made into oils, rubbery elastomers and resins. They find a variety of applications because of their chemical inertness, water repelling nature, heat-resistance and good electrical insulating property. Commercial silicon polymers are usually methyl derivatives and to a lesser extent phenyl derivatives and are synthesised by the hydrolysis of

R_2SiCl_2 [$R = \text{methyl (Me) or phenyl}(\phi)$]



If we start with $MeSiCl_3$ as the starting material, silicones formed is :

A. 

B. 

C. Both of the above

D. None of the above

Answer: B



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Comprehension-12

1. There are some deposits of nitrates and phosphate in earth's crust.

Nitrates are more soluble in water. Nitrates are difficult to reduce under the laboratory conditions but microbes do it easily. Ammonia forms large

number of complexes with transition metal ions. Hybridization easily explains the ease of sigma donation capability of NH_3 and PH_3 .

Phosphine is a flammable gas and is prepared from white phosphorous.

White phosphorus on reaction with $NaOH$ gives PH_3 as one of the products. This is a:

- A. dimerization reaction
- B. disproportionation reaction
- C. condensation reaction
- D. precipitation reaction

Answer: B



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2. The noble gases have closed- shell electronic configuration and are monoatomic gases under normal conditions. The low boiling points of the lighter noble gases are due to weak dispersion forces between the atoms and the absence of other interatomic interactions.

The direct reaction of xenon with fluorine leads to a series of compounds with oxidation number +2,+4 and +6. XeF_4 reacts violently with water to give XeO_3 . The compound of xenon exhibit rich stereochemistry and their geometries can be deduced considering the total number of electron pairs in the valence shell.

Argon is used in arc welding because of its:

- A. low reactivity with metal
- B. ability to lower the melting point of metal
- C. flammability
- D. high calorific value

Answer: A



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1. The noble gases have closed-shell electronic configuration and are monatomic gases under normal conditions. The low boiling points of the lighter noble gases are due to the weak dispersion forces between the atoms and the absence of other interatomic interactions.

The direct reaction of xenon with fluorine leads to a series of compounds with water oxidation number +2, +4 and +6, XeF_4 reacts violently with water to give XeO_2 . The compound's structure and geometry can be deduced considering the total number of electron pairs in the valence shell.

The structure of XeO_3 is

- A. linear
- B. planar
- C. pyramidal
- D. T-shaped

Answer: C

2. Questions given below are based on electronic configurations of the elements. The three elements X, Y and Z with the electronic configuration shown below all form hydrides:

Element	Electronic Configuration
X	$1s^2, 2s^2, 2p^2$
Y	$1s^2, 2s^2, 2p^6, 3s^1$
Z	$1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^5$

Which line of properties (A, B, C or D) correctly lists properties of the hydrides of these elements?

A.

Hydride of X

Hydride of Y

Colourless gas insoluble in H_2O Silver/grey solid, react with H_2

B.

Hydride of X

Hydride of Y

Colourless liquid no reaction with H_2O Silver/grey solid, form H_2

C.

Hydride of X

Hydride of Y

Colourless gas found naturally Does not conduct electricity in the

D.

Hydride of X

Hydride of Y

Non-polar compound reacts with Cl_2 in light

Silver/grey ionic sol

Answer: A



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Comprehension-14

1. The noble gases have closed-shell electronic configuration and are monoatomic gases under normal conditions. The low boiling points of the lighter noble gases are due to weak dispersion forces between the atoms and the absence of other Interatomic Interactions.

The direct reaction of xenon with fluorine leads to a series of compounds with oxidation numbers +2,+4 and +6. XeF_4 reacts violently with water to give XeO_3 The compound of xenon exhibit rich stereochemistry and their geometries can be deduced considering the total number of

electron pairs in the valence shell.

XeF_4 and XeF_6 are expected to be:

- A. oxidizing
- B. reducing
- C. unreactive
- D. strongly basic

Answer: A



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2. Questions given below are based on electronic configurations of the elements. The three elements X, Y and Z with the electronic configuration shown below all form hydrides:

Element	Electronic Configuration
X	$1s^2, 2s^2, 2p^2$
Y	$1s^2, 2s^2, 2p^6, 3s^1$
Z	$1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^5$

Which of the following exists as gas ?

- A. X_2
- B. Y_2
- C. Z_2
- D. All of these

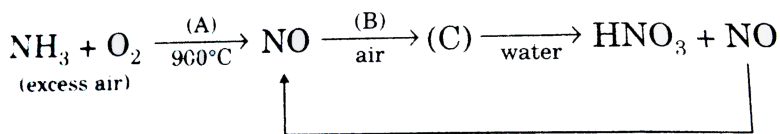
Answer: C



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Comprehension -14

1. The following flow diagram represents the industrial preparation of nitric acid from ammonia:



Which line of entry describes the undefined reagents, products, products and reaction conditions?

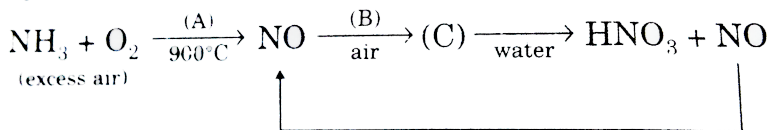
- A. *A* *B* *C*
 Catalyst *R. T.* (25°C) NO_2
- B. *A* *B* *C*
 Catalyst *R. T.* (25°C) N_2O
- C. *A* *B* *C*
 Catalyst High pressure NO_2
- D. *A* *B* *C*
 High pressure Catalyst NO_2

Answer: A

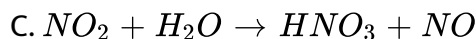
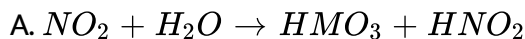
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Comprehension -15

1. The following flow diagram represents the industrial preparation of nitric acid from ammonia:



Formation of HNO_3 when (C) is dissolved in H_2O reaction not observed in this step.



D. None of the above

Answer: D

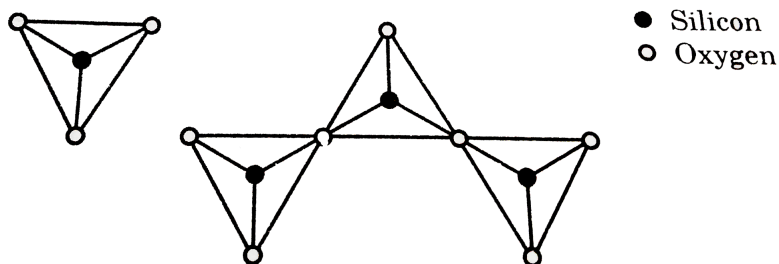
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Comprehension-15

1. Read the following short write-up and answer the questions at the end of it.

The name 'silica' covers an entire group of minerals, which have the general formula SiO_2 , the most common of which is quartz. Quartz is a framework silicate with SiO_4 tetrahedra arranged in spirals. The spirals can turn in a clockwise to anticlockwise direction—a feature that results in there being two mirror images, optically active, varieties of quartz.

The following pictures represent various silicate anions. Their formulae are respectively



Answer: B



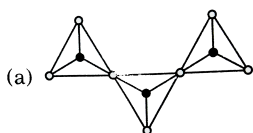
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Comprehension-16

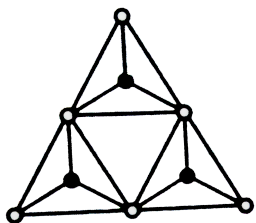
1. Read the following short write-up and answer the questions at the end of it.

The name 'silica' covers an entire group of minerals, which have the general formula SiO_2 , the most common of which is quartz. Quartz is a framework silicate with SiO_4 tetrahedra arranged in spirals. The spirals can turn in a clockwise to anticlockwise direction—a feature that results in there being two mirror images, optically active, varieties of quartz.

$Si_3O_9^{6-}$ (having three tetrahedral units) is represented as:



A.



B.

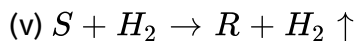
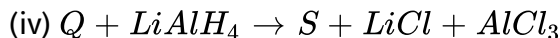
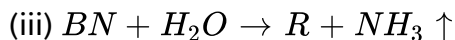
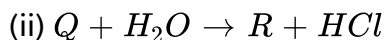
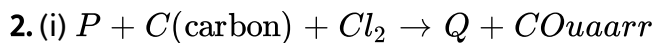
C. Both (a) and (b)

D. none of these

Answer: B



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(P,Q,R,S and T do not represent their chemical symbols)

Q. Compound Q has:

(I) zero dipole moment.

(II) a planar trigonal structure

(III) an electron deficient compound

(IV) a lewis base

Chose the correct code:

A. K,N

B. K,M,N

C. K,L,M

D. K,L,M,N

Answer: C



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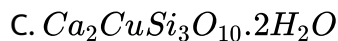
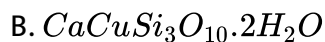
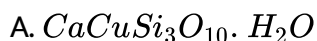
Comprehension-17

1. Read the following short write-up and answer the questions at the end of it.

The name 'silica' covers an entire group of minerals, which have the general formula SiO_2 , the most common of which is quartz. Quartz is a framework silicate with SiO_4 tetrahedra arranged in spirals. The spirals

can turn in a clockwise to anticlockwise direction-a fracture that results in there being two mirror images, optically active, varieties of quartz.

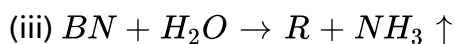
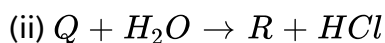
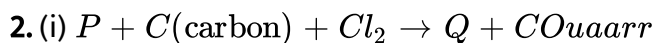
The silicate anion in the mineral kionite is a chain of three SiO_4 tetrahedra that share corners with adjacent tetrahedra. The mineral also contains Ca^{2+} ions, Cu^{2+} ions, and water molecules in a 1:1:1 ratio mineral is represented as :

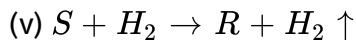
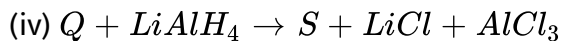


D. None of the above

Answer: C

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(P,Q,R,S and T do not represent their chemical symbols)

Q. Compound T is used as a/an:

A. oxidising agent

B. complexing agent

C. bleaching agent

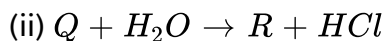
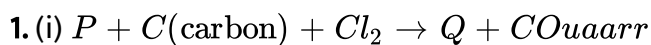
D. reducing agent

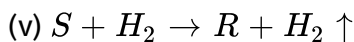
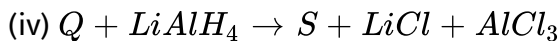
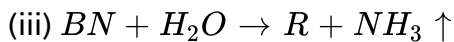
Answer: D



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Comprehension-18





(P,Q,R,S and T do not represent their chemical symbols)

Q. Compound S is:

(I) an odd e^- compound

(II) $(2c - 3e^-)$ compound

(III) a electron deficient compound

(IV) a sp^2 hybridized compound

Choose the correct code:

A. M

B. K,M

C. L,M,N

D. K,L,N

Answer: A



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Match the Column Type

Column-I		Column-II	
(a)	ClO_2	(p)	Produces two acids with water
(b)	SO_2Cl_2	(q)	Does not change oxidation state on hydrolysis
(c)	P_4O_{10}	(r)	Good dehydrating agent
(d)	NO_2	(s)	Paramagnetic
		(t)	$p\pi-d\pi$ bonds are present

1.



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Column-I (Hydrolysis of substrates)		Column-II (Products of hydrolysis and nature of hydrolysis)	
(a)	ICl_3	(p)	HIO_4
(b)	I_2O_7	(q)	HIO_2
(c)	IF_5	(r)	HIO_3

2.

(d)	I_2O_6	(s)	Disproportionation
		(t)	Non-redox



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3. Match the following columns

Column-I		Column-II (Products and nature of hydrolysis)	
(a)	XeF_6	(p)	Xe
(b)	XeF_2	(q)	O_2
(c)	XeF_4	(r)	HF
(d)	XeOF_4	(s)	XeO_3
		(t)	Redox hydrolysis

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4. Match the following columns

Column-I		Column-II	
(a)	Coal gas contains	(p)	CO
(b)	Water gas contains	(q)	H_2
(c)	Producer gas contains	(r)	CH_4
(d)	Synthesis gas contains	(s)	CO_2
		(t)	N_2

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5. Match the following columns

Column-I (X & Y)		Column-II (Product formed)
673 K, 1 bar	(p)	$\text{XeF}_2(s)$
873 K, 7 bar	(q)	$\text{XeF}_4(s)$
873 K, 60-70 bar	(r)	$\text{XeF}_6(s)$



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6. Match the following columns

Column-I		Column-II (Used in)
(A) Ne	(p)	Discharge tubes and fluorescent bulbs
(B) Ar	(q)	Light bulbs designed for special purpose
(C) He	(r)	Arc welding of metals or alloys
(D) Xe	(s)	NMR spectrometers and MRI systems

- A. $A \ B \ C \ D$
 $s \ q \ p \ r$
- B. $A \ B \ C \ D$
 $q \ s \ r \ p$
- C. $A \ B \ C \ D$
 $p \ r \ s \ q$
- D. $A \ B \ C \ D$
 $r \ p \ q \ s$

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

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7. Match the following columns

Column-I (Isostructural with)		Column-II	
(A)	ICl_4^-	(p)	XeF_2
(B)	IBr_2^-	(q)	XeF_4
(C)	BrO_3^-	(r)	XeF_6
		(s)	XeO_3

A. $A \ B \ C$
 $q \ s \ r$

B. $A \ B \ C$
 $q \ p \ s$

C. $A \ B \ C$
 $p \ q \ r$

D. $A \ B \ C$
 $r \ p \ q$

Answer: A::B::C

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8. Match the following columns

Column-I		Column-II	
(A)	Borax $\xrightarrow{\Delta}$	(p)	SiO ₂
(B)	B ₂ H ₆ + H ₂ O \longrightarrow	(q)	H ₂ SiO ₃
(C)	B ₂ H ₆ + Excess of NH ₃ $\xrightarrow{\Delta}$	(r)	BN
(D)	SiCl ₄ $\xrightarrow[\text{(ii) } 1000^\circ\text{C}]{\text{(i) } \text{H}_2\text{O}}$	(s)	NaBO ₂ + B ₂ O ₃
		(t)	H ₃ BO ₃

- A. A B C D
p r s t
- B. A B C D
q r s t
- C. A B C D
s t r q
- D. A B C D
s t r p

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



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9. Match the following columns

Column-I (Reagents)		Column-II (Product/Nature of reaction)	
(a)	$Zn + \text{dil. HNO}_3 \rightarrow$	(p)	Redox reaction
(b)	$Zn + \text{conc. H}_2\text{SO}_4 \rightarrow$	(q)	Metal sulphate/thionate
(c)	$\text{H}_2\text{S} + \text{conc. H}_2\text{SO}_4 \rightarrow$	(r)	Acidic oxide
(d)	$\text{FeCl}_3 + \text{Na}_2\text{S}_2\text{O}_3 \rightarrow$	(s)	White/yellow turbidity
		(t)	Yellowish white/green colouration

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10. Match the following Columns

Column-I (Acid)		Column-II (Reagent)	
(a)	H_3PO_4	(p)	Red P_4 + alkali
(b)	$\text{H}_4\text{P}_2\text{O}_6$	(q)	$\text{PCl}_3 + \text{H}_3\text{PO}_3$
(c)	$\text{H}_4\text{P}_2\text{O}_5$	(r)	$\text{P}_4\text{O}_{10} + \text{H}_2\text{O}(\text{excess})$
(d)	$(\text{HPO}_3)_n$	(s)	Phosphorous acid + Br_2 , heat in a sealed tube
		(t)	White P_4 + alkali

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11. Match the following columns

Column-I (Reaction)		Column-II (Product)	
(a)	$\text{Ag} \xrightarrow{\text{dil. HNO}_3}$	(p)	NO_2
(b)	$\text{S} \xrightarrow{\text{conc. HNO}_3}$	(q)	NO
(c)	$\text{Zn} \xrightarrow{\text{dil. HNO}_3}$	(r)	N_2O
(d)	$\text{Cu} \xrightarrow{\text{conc. HNO}_3}$	(s)	N_2O_5

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12. Match the following columns

Column-I		Column-II	
(a)	BF_4^-	(p)	All atoms are <i>p</i> -block members
(b)	BeF_4^{2-}	(q)	Central atom is sp^3 hybridised
(c)	SiO_2	(r)	Three dimensional network structure
		(s)	Molecule having 's' as well as <i>p</i> -block members

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13. Match the following columns

Column-I		Column-II	
(a)	$\text{BBr}_3 + \text{H}_2 \longrightarrow \text{B}$	(p)	Borax head test
(b)	$\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O} + \text{CuSO}_4 \longrightarrow \text{Cu}(\text{BO}_2)_2$	(q)	Reduction
(c)	$\text{AlCl}_3 + \text{H}_2\text{O} \longrightarrow \text{HCl}$	(r)	White fumes
(d)	$\text{Cr}_2\text{O}_3 + \text{Al} \longrightarrow \text{Cr}$	(s)	Hydrolysis

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14. Match the following columns

Column-I (Chemical reaction)		Column-II (Name of process)	
(a)	$4\text{NH}_3 + 5\text{O}_2 \xrightarrow{800^\circ\text{C}/\text{Pt}} 4\text{NO} + 6\text{H}_2\text{O}$	(p)	Contact process
(b)	$4\text{HCl} + \text{O}_2 \xrightarrow{230^\circ\text{C}/\text{CuCl}_2} 2\text{Cl}_2 + 2\text{H}_2\text{O}$	(q)	Ostwald's process
(c)	$2\text{SO}_2 + \text{O}_2 \xrightarrow{450-500^\circ\text{C}/\text{V}_2\text{O}_5} 2\text{SO}_3$	(r)	Deacon's process
(d)	$2\text{N}_2 + 3\text{H}_2 \xrightarrow{\text{Fe}+\text{Mo}} 2\text{NH}_3$	(s)	Haber's process

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15. Match the following columns

Column-I		Column-II	
(a)	Dry ice	(p)	Used as an antidote for CO-poisoning
(b)	Carbongene	(q)	Used as non-stick coating
(c)	Carborundum	(r)	Used as refrigerant
(d)	Teflon	(s)	Used as abrasive

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16. Match the following columns

Column-I		Column-II	
(a)	SnCl_2	(p)	Used in printing technology
(b)	Butter of tin	(q)	Used for gilding purpose (in joining gold pieces)
(c)	Mosaic gold	(r)	Reducing agent
(d)	Pink salt	(s)	Mordant

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Column-I		Column-II	
(a) Fe	(p)	Produces NO with 20% HNO ₃	
(b) Cu	(q)	Produces NH ₄ NO ₃ with 6% HNO ₃	
(c) Pb	(r)	Produces NO ₂ with 70% HNO ₃	
(d) Sn	(s)	Produces NH ₄ NO ₃ with 20% HNO ₃	

17.



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18. Match the following Columns

Column-I (Reactions)		Column-II (Correct statements)	
(a) XeF ₂ + PF ₅ →	(p)	Fluoride of Xe acts as fluoride acceptor	
(b) XeF ₄ + Pt →	(q)	Fluoride of Xe undergoes disproportionation	
(c) XeF ₄ + H ₂ O →	(r)	Fluoride of Xe acts as fluorinating agent	
(d) XeF ₆ + CsF →	(s)	Fluoride of Xe acts as fluoride donor	



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19. Match the following columns

Column-I (Substances)		Column-II (Can be prepared by)	
(a)	O_3	(p)	Acidification of BaO_2 with H_2PO_4
(b)	Bleaching powder	(q)	Birkeland Eyde process
(c)	H_2O_2	(r)	Dry O_2 is passed through a silent electrical discharge
(d)	HNO_3	(s)	Cl_2 gas is passed through slaked lime

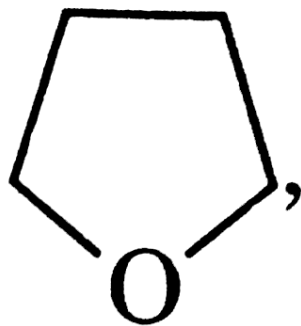
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Column-I		Column-II	
(a)	$Bi^{3+} \longrightarrow (BiO)^+$	(p)	Heat
(b)	$[AlO_2]^- \longrightarrow Al(OH)_3$	(q)	Hydrolysis
(c)	$SiO_4^{4-} \longrightarrow Si_2O_7^{6-}$	(r)	Acidification
(d)	$(B_4O_7^{2-}) \longrightarrow [B(OH)_3]$	(s)	Dilution by water

20.

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1. Find the number of reagents which would lead to unsymmetrical cleavage of diborane.



$\text{CH}_3\text{NH}_2, \text{NH}_3, (\text{CH}_3)_2\text{NH}, (\text{CH}_3)_3\text{N},$
 N_2H_4

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2. Find the number of species which undergo hydrolysis at room temperature.

$\text{CCl}_4, \text{SiCl}_4, \text{BCl}_3, \text{NF}_3, \text{PCl}_5, \text{PCl}_3, \text{SF}_6, \text{SO}_2\text{Cl}_2$

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3. Consider the ions : $S_2O_3^{2-}$ (X) and $S_2O_4^{2-}$ (Y). How many statements are correct regarding (X) and (Y). (d stands for bond length) ,brgt (a)

$d_{s-s} : X < Y$

(b) $d_{s-o} : X < Y$

(c) Average oxidation state of S in (X) is less than that in (Y).

(d) In both (X) and (Y), the central S atom is sp^3 hybridised.

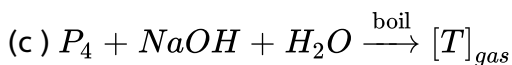
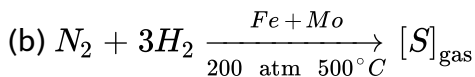
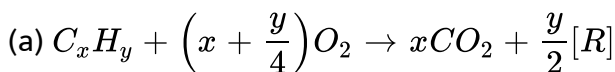
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4. Beryllium chloride exists as polymeric chain having formula $(BeCl_2)_n$.

If a compound $K_x(Be_4Cl_{10})$ has finite chain, find the value of x.

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5. For the given reactions:



The % ratio of valence electron of central atom vs total valence shell electrons is 62.5% in [S] and 27.77% in [T] and central atom of [S] and [T] belongs to same group then what is the correct order of increasing bond angle of [R]=1, [S]=2 and [T]=3? ,brgt [If your answer is $1 < 2 < 3$ then write 0123.]

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6. Find the total number of species which would undergo disproportionation in alkaline medium.

NO_2 , $Cr_2O_7^{2-}$, Cl_2O_6 , Br_2 , P_4 , S_8 , Al_2O_3

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7. Find the sum of triangular BO_3 unit and BO_4 tetrahedral unit in borax.

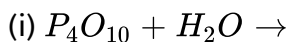
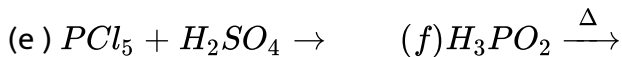
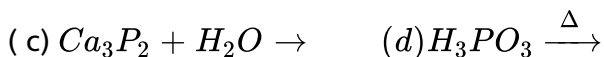
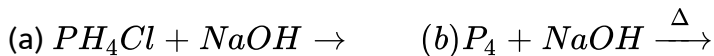
[If your answer is $6BO_3$ unit and $3BO_4$ unit then write $6+3=9$]

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8. Total number of CN^- ion that are present in $ICN(liq.)$

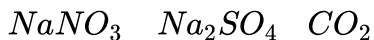
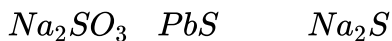
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9. How many of the following reaction would produce phosphine gas ?

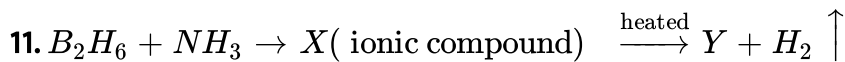


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10. How many of the following compounds will decolourize the colour of acidified $KMnO_4$?



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Find total number of sp^3 hybridised atoms per Y molecule.

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12. Find the number of σ bond and lone pair respectively in hydrated borax.

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13. Find the total number of compounds which produce N_2 gas on heating.

NH_4NO_3 , NH_4NO_2 , CH_3COONH_4 , $(NH_4)_2CO_3$, NH_4IO_3 , $(NH_4)_2Cr_2O_7$

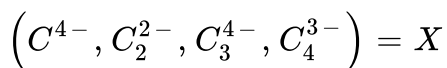
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14. How many of the following have zero dipole moment?

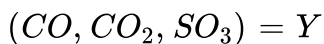
CCl_4 , C_2O_3 , C_3O_2 , CO , CS_2 , CO_2 , C_2H_2 , C_2H_4 , CH_2Cl_2 , C_2H_2

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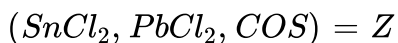
15. (a) Number of ions which are regarded as ionic carbides amongst



(b) When oxalic acid is heated with conc. H_2SO_4 it produces number of different gases amongst



(c) Number of molecules having V-shaped structure amongst



Find $X+Y+Z$.

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16. Please help Santa and Banta to decode the lock of their car XYZTU

Code	XeF_2	XeF_4	XeF_6	XeO_3	$XeOF_4$	XeO_2F_2
	1	2	3	4	5	6

(a) No. of compound having planar shape = T

(b) Code of the compound which is linear = Z

(c) Code of the compound which has distorted octahedral shape = X

(d) Code of the compound which is pyramidal = Y

(e) Code of the compound which is square pyramidal = U

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17. Find the number of compounds among the following whose hydrolysis is a non-redox reaction.

XeF_2 , XeF_4 , XeF_6 , XeO_2F_2 , $XeOF_4$, Xe , XeO_3

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18. In how many of the following non-metal shows -3 oxidation state ?

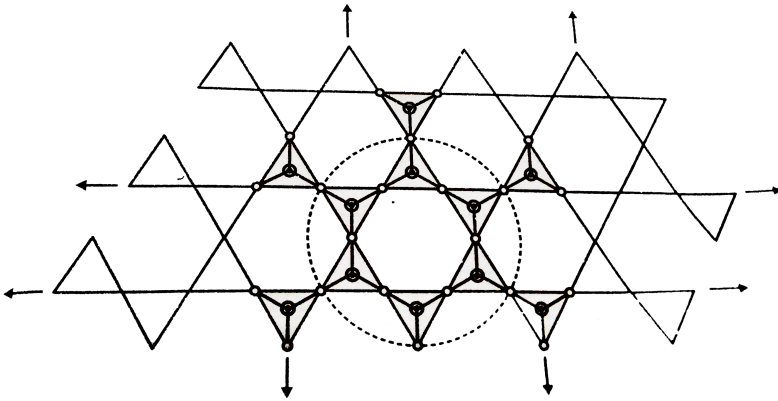
Ca_3N_2 , Ca_3P_2 , Na_3As , Zn_3Sb_2 , Mg_3Bi_2 , NaN_3 , $Ba(N_3)_2$, Mg_3N_2

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19. Find the total number of elements which show allotropy.

C, N, P, As, Sb, Bi, O, Si, Se

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20.

How many stoal effective number of O-atoms, Si-atoms and changes that are present respectively in enclosed area by dotted line in the above given 2-D sheet silicate?

[If your answer are 24,9 and 5 then write the answer as 2495.]

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21. How many $S - O - S$, $S - S$ bonds and total number of lone pair are present respectively in the trimer of SO_3

[If your answer are 2,4 and 10 respectively then write the answer as 2410].

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22. Find the number of compounds which liberate NO_2 gas as one of the products on heating

NH_4NO_3 , NH_4NO_2 , $Ca(NO_3)_2$, $Zn(NO_3)_2$, $Hg(NO_3)_2$, $AgNO_3$, $LiNO_3$,

[If your answer is 4 then write the answer as 0004.]

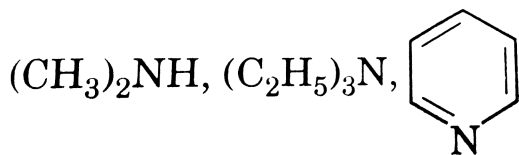
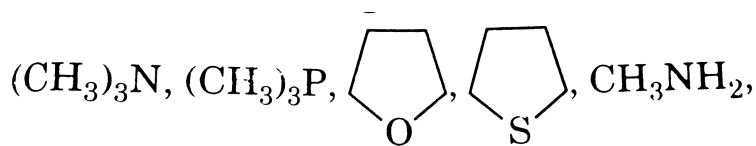
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23. Find the total number of species which would undergo disproportionation in alkaline medium.

NO_2 , $Cr_2O_7^{2-}$, Cl_2O_6 , Br_2 , P_4 , S_8 , Al_2O_3

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24. How many of the following reagent would cause symmetrical cleavage in diborane?

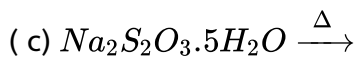
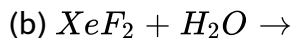
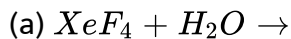


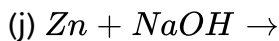
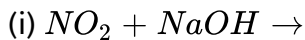
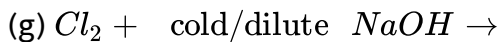
[If your answer is 2 then write the answer as 0002].



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25. How many of the following show(s) disproportionation reaction ?





[If your answer is 2 then write the answer as 0002.]

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26. If the number of silicon atoms is restricted to 23 only, what would be the number of oxygen atoms and magnitude of negative charges respectively in the structure of pyroxene (single chain silicate)?

[If your answer are 11 and 12 respectively then write the answer as 1112.]

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27. Which of the following oxides are amphoteric?

$MgO, CaO, FeO, Cu_2O, Ag_2O, Al_2O_3, PbO, SnO, ZnO. BeO, Na_2O, Cs_2O$

[If your answer is 2 then write the answer as 0002.]

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28. Two molecules of oil of vitriol (ic-acid of sulphur) – $H_2O + O \rightarrow (X)$.

How many sp^3 hybridised atoms are present in compound (X)?

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29. How many species do not exist?

$PH_3, PH_5, PCl_5, PBr_5, SiF_6^{2-}, SF_6, Al_2F_6, PbI_4, NCl_5, AlCl_3, OF_2, OH$

[If your answer is 5 then write the answer as 0005.]

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30. Which of the following has $3C-4e^-$ bond?

$Al_2, Cl_6, Al_2Br_6, I_2Cl_6, Fe_2Cl_6, BCl_3, BF_3, Si_2H_6, Si_2Cl_6, C_2Cl_6$

[If your answer is 2 then write the answer as 0002.]

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31. How many of the following compounds have peroxy linkage?



[If your answer is 2 then write the answer as 0002.]



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32. How many number of molecules have sp^3d hybridisation of central atom in their transition state during hydrolysis process?



[If your answer is 5 then write the answer as 0005.]



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