



CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

P-BLOCK ELEMENTS

WARM UP EXERCISE

1. What do you mean by 'pnicogens' and 'pniconides'?



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2. Phosphorus does not occur free in nature-why?



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3. Name three important minerals of phosphorus. Give their formulas.



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4. Why is the atomic (covalent) radius of an element of nitrogen family smaller than the corresponding element of carbon family?



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5. There is a considerable increase in covalent radius from N to P, while there is a small increase in covalent radius from As to Bi-why?





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6. Explain why the ionisation enthalpies of the elements of group - 15 are much higher than those of group - 14.



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7. The elements of group - 15 possess less metallic character than those of group - 14, which increases down the group. Explain.



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8. Why is the melting point of phosphorous higher than that of nitrogen while the melting point of Bi is lower than that of Sb?



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9. The elements of group-15 exhibit catenation but to a lesser extent than elements of group-14-why?



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10. Which group - 15 elements is the essential constituent of amino acids, protein and nucleic acids?



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11. Which group - 15 elements do not exhibit allotropy?



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12. Explain why the tendency of group-15 elements to exhibit- 3 oxidation state decreases as we move down the group.



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13. On moving down the group , stability of +5 oxidation state of group - 15 elements decrease while that of +3 state increase - why ?



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14. What is the only compound of Bi having +5 oxidation state?
How does this compound react with hydrocarbons?



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15. Explain why nitrogen forms compounds having -3 to +5 oxidation states.



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16. Although nitrogen exhibits +5 oxidation state, it does not form pentahalides-why?



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17. Give an example of disproportionation reaction of H_3PO_3



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18. Bi(V) is a stronger oxidising agent than Sb(V) - why?



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19. Explain why the shape of NH_3 is pyramidal.



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20. The basic character of hydrides decrease as we move down the group from NH_3 to BiH_3 - why ?



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21. NH_3 is thermally very stable but BiH_3 - why >?



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22. The reducing character for the hydrides of group - 15 elements increase down the group from NH_3 to BiH_3 - why?



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23. Give an example where NH_3 acts as a reducing agent .



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24. The boiling point NH_3 is higher than that of PH_3 but lower than BiH_3 - why ?



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25. Which out of NH_3 and PH_3 is soluble in water ? Why



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26. How does the acidic character of the oxides of group - 15 elements change the group ? Why ?



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27. NCl_3 undergoes hydrolysis but NF_3 does not - why ?



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28. Explain why PF_3 is a stronger Lewis acid than PI_3 .



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29. The pentahalides of group -15 elements are thermally less stable than the corresponding trihalides - why ?



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30. What is the shape of PCl_5 in the vapour state ? Why ?



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31. In the solid state , PCl_5 exists in the ionic form as $[PCl_4]^+ [PCl_6]^-$. What are the shapes of these two ions ? Why ?



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32. What are the reasons for the anomalous behaviour of nitrogen ?



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33. Mention some characteristics in which nitrogen differs from the other members of the group .



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34. Give example of three salts that liberate dinitrogen ?



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35. How is N_2 prepared from air ?



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36. N_2 molecule is diamagnetic in nature - why ?



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37. N_2 is an inert gas - explain with reasons.



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38. What do you mean by chemical fixation of nitrogen ?



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39. Mention the compound obtained when N_2 reacts with Mg at higher temperature. Is it ionic or covalent ?



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40. How are NO and NH_3 prepared from dinitrogen ?



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41. What is nitrogen ? Why is it used as a fertilizer ?



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42. What is the active nitrogen ? Why is it active ? Give an example to prove that it is more reactive than ordinary N_2 .



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43. Mention two important uses of dinitrogen.



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44. Mention one important nitrifying bacteria.



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45. How is ammonia prepared in the laboratory ?



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46. Explain why ammonia cannot be dried by using concentrated H_2SO_4 , P_2O_5 or anhydrous $CaCl_2$.



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47. What happens when the compound obtained by the reaction between N_2 and Mg at higher temperature is heated with water ?



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48. Mention the favourable conditions for a high yield of ammonia when manufactured by Haber's process.



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49. Explain why liquid ammonia is used as a refrigerant.



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50. What is liquor ammonia ?



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51. Explain why ammonia acts as a Lewis base. Give an example.



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52. Give an example of a reaction in which the product obtained by the reaction between two gaseous substances is a solid.



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53. What happens when a glass rod dipped into ammonia solution is exposed to HCl gas ?



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54. Give an example of a reaction between ammonia and heavy metal ions.



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55. What happens when $NH_3(g)$ is passed over molten sodium ?



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56. Give an example of the reducing property of ammonia .



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57. Mention two tests for identification of ammonia .



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58. What are called amonal and amatol ?



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59. Name the oxide of nitrogen which is commonly known as " laughing gas ". Mention one of its important uses.



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60. NO(g) is paramagnetic but NO(l) is diamagnetic - why ?



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61. What is the oxidation state of nitrogen in dinitrogen trioxide ? Explain why the two $\text{N}=\text{O}$ bonds present in it differ in length .



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62. Which oxide of nitrogen may be called a mixed anhydride ?
Why ?



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63. Explain why NO_2 forms a dimer.



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64. Explain why N_2O_4 is diamagnetic .



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65. NO acts both as an oxidising as well as a reducing agent - why ?



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66. What are nitrosyls ? Give an example.



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67. Draw the resonance structures of N_2O_5 . Mention the covalency and oxidation state of nitrogen in it.



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68. Name the oxide of nitrogen formed on heating lead nitrate .



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69. Which oxide is the least stable one among the oxides of nitrogen?



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70. Write the reaction involved in laboratory preparation of HNO_3 .



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71. Write the reaction involved in each step of manufacturing HNO_3 by Ostwald's process. How can the acid formed by this process be concentrated ?



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72. What is the shape of nitric acid molecule?



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73. In aqueous solution nitric acid ionise to give two ions.



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74. Concentrated nitric acid kept in a laboratory bottle looks yellowish - why ?



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75. Give an example of a nitrate salt which is insoluble in water.



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76. Although nitric acid acts only as an oxidising agent, nitrous acid acts both as an oxidising as well as a reducing agent- why ?



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77. Comment on the action of HNO_3 on the metals above and below hydrogen in the electrochemical series. Give example.



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78. What are the two metals which produce dihydrogen with very dilute (1-2%) nitric acid ?



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79. Explain why iron and aluminium do not dissolve in conc. HNO_3



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80. What is aqua regia ? Explain why Au and Pt dissolve in aqua regia .



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81. What is TNT ? How can it be prepared?



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82. Mention a wet test for detection of nitrate ion (NO_3^-).



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83. What is the difficulty encountered in performing ring test with lead nitrate ? How can this difficulty be overcome ?



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84. Explain why white phosphorus is always kept under water.



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85. Mention the important difference in physical and chemical properties of white and red phosphorus.



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86. In match industry, red P is used instead of white P - why ?



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87. White phosphorus is a soft and low melting substance while red phosphorus is a hard and high melting substance - explain.



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88. What is phosphorescence?



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89. If the hand or any portion of the body comes in contact with white phosphorus, it should be washed with copper sulphate solution - why?



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90. Arrange white , red and black allotropic forms of phosphorus in order of increasing stability .



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91. Mention an important use of phosphorus.



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92. How can you prove that phosphine is basic nature ?



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93. The bond angles in PH_4^+ are greater than that in PH_3 - why ?



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94. What happens when white phosphorus is heated with a conc. NaOH solution in an inert atmosphere of carbon dioxide ?



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95. What are vortex rings ? Explain its formations.



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96. Which allotropic form of phosphorus is obtained when an aqueous solution of PH_3 is exposed to light ?



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97. State , with equation , what happens when phosphine is bubbled through an aqueous solution of silver nitrate .



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98. What is Holme's signal ?



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99. Explain the role of PH_3 in producing smoke screens in warfare.



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100. How will you prepare a sample of very pure phosphine gas ?



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101. How is PCl_5 prepared from white phosphorus ?



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102. PCl_3 fumes in moist air - explain.



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103. What happens when PCl_5 is heated ?



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104. Write the reaction involved in hydrolysis of PCl_5 in D_2O .



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105. How is triphenylphosphine (PPh_3) prepared from PCl_3 ?



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106. Mention the shape of ions obtained when PCl_5 reacts with BCl_3 .



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107. All the P - Cl bonds in PCl_5 are not equivalent - why ?



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108. What happens when PCl_5 is heated with finely divided silver ?



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109. Phosphorous acid (H_3PO_3) is a dibasic acid, even though it has two H - atoms - why?



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110. Explain- H_3PO_2 is a strong reducing agent.



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111. How many types of salts are formed by H_3PO_4 ? Why ?



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112. H_3PO_3 is a weaker reducing agent than H_3PO_4 - why ?



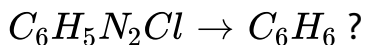
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113. Na_2HPO_3 is a normal salt - explain.



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114. Which oxoacid is used to carry out the conversion



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115. Which oxoacid produce pyrophosphoric acid on heating ?



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116. What happens , when silver nitrate solution is treated with hypophosphorous acid.



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117. Orthophosphorous acid is a tribasic acid but hypophosphoric acid is a monobasic acid - Explain.



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118. Orthophosphoric acid has no reducing property - why ?



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119. What is cyclotrimetaphosphoric acid ?



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120. The first ionisation enthalpies ($\Delta_i H_1$) of the elements of group - 16 are unexpectedly lower while their those of the corresponding elements of group-15 explain.



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121. The negative electron gain enthalpy of oxygen is less than that of sulphur . Explain



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122. The elements of group - 16 have higher electronegativity than the corresponding elements of group -15 - why ?



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123. Melting point of polonium is less than of tellhurium.



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124. Why are the elements of group - 16 called chalcogens?

Write their general valence shell electronic configuration .



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125. Why is dioxygen a gas but sulphur a solid at normal temperature ?



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126. Is CS_2 more stable than CSe_2 ? Explain.



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127. Sulphur has a stronger catenation tendency than oxygen - why ?



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128. Se and Te conduct electricity significantly only in the presence of light. Explain.



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129. Which group - 15 elements is radioactive ?



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130. Which of the group - 16 elements does not exhibit negative oxidation state ? Why ?



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131. Why does stability of + 6 oxidation state of group - 16 elements decrease down a group ?



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132. Why is H_2S less acidic than H_2Te ?



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133. Arrange the hydrides of the elements of group -16 in the order of increasing thermal stability and explain.



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134. Explain the structure of SO_3 molecule.



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135. SF_6 is used as gaseous electrical insulator - why ?



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136. Which one of SO_2 and SO_3 molecules is polar? Why?



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137. OF_6 does not exist - why ?



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138. TeF_6 undergoes hydrolysis readily whereas SF_6 does not why ?



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139. SF_4 acts as both Lewis acid Lewis base. Explain.



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140. Bond angle in H_2S is lower than in H_2O . Justify.



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141. At room temperature SO_2 is a gas but SeO_2 is a solid - explain.



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142. SO_2 possess both oxidising and reducing property, while SO_3 possess only oxidising property. Explain.



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143. Give reasons for the anomalous behaviour of oxygen.



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144. Mention some characteristics in which oxygen differs from other members of the family.



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145. Mention the effect of heat on each of the following compounds :

(i) $Pb(NO_3)_2$ (ii) Pb_3O_4 (iii) $K_2Cr_2O_7$ (iv) $KClO_3$ (v) BaO_2 .



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146. What are the main sources of large scale perparation of O_2 ?



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147. The reactions of dioxygen require initiation by external heating but when the reaction starts, it continues on its own. Explain.



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148. Give three reactions in which dioxygen oxidises a metal, a non-metal and a compound.



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149. Which one of the following does not react directly with dioxygen? Zn, Ti, Pt, Fe



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150. Why are hydrocarbons used as fuels?



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151. State with equations, what happens when sodium peroxide is treated with acid potassium permanganate solution.



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152. Mention two important uses of dioxygen.



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153. To which class does each of the following oxides belong ?

Why ?

(i) SO_2 (ii) Al_2O_3 (iii) NO (iv) Na_2O



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154. Fe_3O_4 reacts with acids to form two types of salts explain.



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155. Explain the periodic trend in acid-base behaviour of the oxides of third period elements.



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156. Arrange N_2O_5 , N_2O_3 and N_2O in order of increasing acidic strength and explain the order.



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157. Why is Na_2O_2 called peroxide whereas PbO_2 is called dioxide ?



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158. Superoxides are paramagnetic in nature. Give reason.



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159. How can it be proved that ZnO is an amphoteric oxide?



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160. Out of O_2 and O_3 which one is a stronger oxidising agent?

Why?



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161. Why silent electric discharge is used to convert O_2 into O_3 ?



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162. The two O-O bonds in ozone are equal in length-why?



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163. Give examples of oxidising action of O_3 where O_2 is not formed.



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164. What do you mean by 'trailing of mercury'?



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165. Highly concentrated ozone can be dangerous-why?



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166. Rubber corks or pipes cannot be used in an experiment involving ozone-why?



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167. Ozone cannot be prepared at higher temperatures , though the reaction is endothermic-explain.



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168. Explain why the density of rhombic sulphur is higher than that of monoclinic sulphur.



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169. How will you distinguish between rhombic sulphur and plastic sulphur with the help of a physical experiment?



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170. Write a reaction of SO_2 which exhibits its acidic character and a reaction which exhibits its reducing character.



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171. What happens when excess SO_2 is passed through transparent lime water ?



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172. Bleaching by SO_2 is temporary - why ?



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173. Which is the most important oxoacid of sulphur? Mention its oxidation state in that oxoacid.



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174. What is Marshall's acid?



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175. Write the reaction of the key step in the manufacture of sulphuric acid by contact process. Mention the effect of pressure and temperature on it.



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176. Sulphuric acid is a high boiling viscous liquid. Explain.



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177. Why does sugar turn black when concentrated H_2SO_4 is added to it?



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178. Why is conc. H_2SO_4 used to prepare more volatile acids from their corresponding salts ?



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179. Give a reaction of H_2SO_4 in which it exhibits oxidising nature.



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180. Give the geometry of H_2SO_4 . Explain.



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181. All S - O bonds in sulphate ions are equal in length - why ?



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182. What is oleum ?



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183. Which elements are called halogens ? Why ?



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184. Write general valence shell electronic configuration of halogens.



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185. Which elements of group - 17 is radiocative ?



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186. The radius of the halide ion is always greater than the corresponding halogen atom - why ?



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187. Why do halogens have high electron gain enthalpies $(-\Delta H)$?



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188. Halogens have high electronegativities - why ?



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189. Why do halogens exist as diatomic molecules ?



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190. Cl_2 is gas while Br_2 is a liquid at ordinary temperature - why ?



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191. Negative electron gain enthalpy of F_2 is less than that of Cl_2 . Why ?



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192. Explain with example , iodine has less non-metallic character than chlorine .



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193. Bond dissociation enthalpy of F_2 is less than that of Cl_2 - why?



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194. The colour of fluorine is pale yellow while that of bromine is reddish - brown - explain.



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195. Fluorine exhibits only -1 oxidation state whereas other halogens exhibit +1, +3, +5 and +7 oxidation states also. Explain.



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196. Explain , HF is a liquid but HCl,HBr and HI are gases at ordinary temperature .



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197. Boling point of which hydrogen halide is the highest and why ?



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198. HBr and HI cannot be preaped by treating bromide and iodide salts respectively with conc. H_2SO_4 - why ?



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199. Arrange the halogen hydrides in the order of increasing acidic strength. Explain the order.



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200. The bond angle in OF_2 is less than that in H_2O - why?



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201. Name the anhydride of iodic acid. Write its structure and one use.



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202. NO_2 forms dimer, but ClO_2 does not - why?



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203. Give reasons for the anomalous behaviour of fluorine.



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204. Mention the differences between F_2 and rest of the halogens.



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205. Which halogen hydracid cannot be kept in a glass bottle ?
Why ?



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206. The salt KHF_2 exists but $KHCl_2$ does not - why ?



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207. What is chlorine - water ? Why does chlorine water lose its yellow colour when left undisturbed ?



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208. Write balanced chemical equation for the reaction of Cl_2 with hot & conc. NaOH solution . Is this a disproportionation reaction ? Justify.



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209. Give reason for the bleaching action of Cl_2 .



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210. Fluorine is called super halogen' - why ?



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211. What is muriatic acid? Why is it called so?



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212. How is hydrogen chloride prepared in the laboratory? HCl gas cannot be dried with CaO , KOH or P_2O_5 . Explain.



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213. Give an example of the formation of a solid compound by the reaction between two gaseous substance.



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214. State ,with equations, what happens when :
concentrated hydrochloric acid is heated with $KMnO_4$.



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215. State ,with equations, what happens when :
dilute HCl is added to sodium bicarbonate solution.



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216. State ,with equations, what happens when :

$AgNO_3$ solution is added to dilute hydrochloric acid.



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217. Fluorine cannot serve as the central atom in polyatomic interhalogen compounds-why?



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218. ClF_3 exists but FCl_3 does not - why ?



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219. What are the shapes of BrF_3 , ClF_5 and IF_7 molecules ?



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220. IF_7 exists but ICl_7 does not - why ?



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221. What are the compounds obtained when the interhalogen compounds are hydrolysed ?



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222. Why is ICl more reactive than I_2 ?



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223. Give examples of an interhalogen cation and an anion.



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224. Predict the products expected to be obtained at the electrodes when ICl and ICl_3 are separately electrolysed.



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225. Write the general valence shell electronic configuration of noble gases (except He).



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226. Which noble gas may be obtained from ${}^{226}_{88}\text{Ra}$?



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227. Which is the second most abundant element of group-18 in the universe (next to hydrogen) ?



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228. Why are the noble gases monoatomic ? How do you prove it ?



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229. On the basis of molecular orbital theory prove that He_2 molecule does not exist.



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230. Then boiling points of noble gases are very low . Explain.



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231. what is the main commercial source of helium ?



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232. The noble gases cannot be liquefied easily - why ?



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233. Explain - noble gases are in general chemically inert.



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234. Name some stable compounds of Xe.



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235. How will you explain that XeF_4 has a square planar structure ?



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236. How will you explain that XeO_3 has a pyramidal geometry ?



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237. XeOF_4 cannot be stored in a glass bottle - why ?



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238. Explain the structure of XeOF_2 and XeO_3F_2 .



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239. Why is helium used in diving apparatus ?



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240. Why has it been difficult to study the chemistry of radon?



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241. Name the noble gas used in fluorescent lamps for advertising .



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242. Show that XeF_4 acts as a fluorinating agent.



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243. Xenon fluorides must be prepared in the absence of moisture - why ?



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VERY SHORT ANSWER TYPES (VSA)

1. Which one among group -15 elements is a typical metals ?



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2. What are pnictogens ?



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3. Which group - 15 elements has the lowest $\Delta_i H_1$?



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4. Why is the tendency of catenation of the group - 15 elements much less than that of carbons?



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5. Why does the stability of + 5 oxidation state decrease on moving down the group ?



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6. Which is the only compound of bismuth with +5 oxidation state ?



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7. Which group- 15 hydride is soluble in water and why ?



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8. Which of the group -15 elements exhibits maximum number of oxidation states ? Why ?



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9. Which is a stronger oxidising agent ? Sb (V), Bi (V).



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10. Which of the group-15 hydrides has the (1) highest thermal stability , (2) lowest boiling point,(3) highest reducing strength (4) highest basic strength ?



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11. Arrange the trioxide of the group - 15 elements in the order of decreasing acidity.



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12. Which halide of nitrogen does not undergo hydrolysis ?



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13. Arrange the trihalides of nitrogen in the order of increasing as Lewis base.



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14. What is the shape of an Ex_5 molecules ? Why does it behave as a Lewis acid?



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15. What type of multiple bond is formed (1) between N and O and (2) between P and O ?



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16. What is nitrolim ? Give one use .



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17. Liquid ammonia is used as a refrigerant - why ?



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18. What is amatol ?



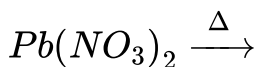
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19. Which oxide of nitrogen is used as an anaesthetic by dentists for minor operation ?



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20. Identify the oxides of nitrogen obtained in each of the following reactions :



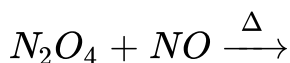
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21. Identify the oxides of nitrogen obtained in each of the following reactions :



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22. Identify the oxides of nitrogen obtained in each of the following reactions :



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23. Name an oxide of nitrogen that reacts with water to produce two acids .



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24. Why does conc. HNO_3 acquire a yellowish colour in the presence of sunlight ?



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25. Which compound is responsible for the brown ring obtained in the ring test for nitrate ions ?



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26. Arrange red, white and black phosphorus in the order of their decreasing stability or increasing reactivity .



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27. Which compound is involved in the formation of vortex ring or philosopher's ring ?



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28. How can you prove that PH_3 is basic in nature ?



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29. PCI_3 fumes in moist air - why ?



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30. Give example of oxoacids of phosphorus having the oxidation state of P (1) + 4 (2) + 3 and (3) + 5 each.



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31. Hypophosphorus acid has reducing property but phosphoric acid does not - why ?



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32. What happens when chloroform is allowed to react with concentrated HNO_3 ?



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33. Write the reaction between calcium cyanamide with steam.



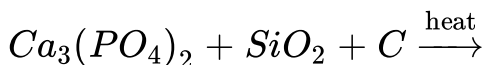
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34. Which compound reacts with NH_3 to give black precipitate ?



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35. Complete the chemical equation:



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36. Distingusih between HN_3 and NH_3 .



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37. Give two example of non-aqueous solvents.



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38. Write down the name of a nitrogenous fertilize.



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39. Which nitrogenous gas is used in the perparation of nitric acid by the Ostward's method?



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40. How can it easily proved that ammonia is alkaline in nature ?



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41. What is obtained when excess of ammonia solution is added to a $CuSO_4$ solution ?



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42. BH_4^- and NH_4^- ions are isolobal - explain.



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43. What happens when a mixture of $(NH_4)_2SO_4$ and $NaNO_3$ is heated ?



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44. Nitrous acid behave as an oxidant as well as a reductant - why ?



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45. Arrange N_2O_5 , N_2O_3 and N_2O_4 in the order of increasing acidic character .



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46. Among the group - 16 elements ,which one is a typical metal and radioactive ?



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47. Which elements are also known as chalcogens ? Why ?



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48. Name the two elements of group -16 which are metalloids and photosensitive.



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49. Out of N and O which one has a higher $\Delta_i H_l$? Why ?



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50. Which one of the group - 16 elements has the lowest negative electron gain enthalpy ?



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51. Out of CS_2 and CSe_2 which one less stable ? Why ?



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52. Sulphur has a stronger tendency for catenation than oxygen - why ?



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53. Arrange H_2S , H_2O and H_2Se in the order of increasing bond angle .



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54. Give example of two compounds in which oxidation state of oxygen are +2 and -1, respectively.



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55. In which compound an element exhibits its highest oxidation state ?



Watch Video Solution

56. Why does stability of +6 oxidation state decrease down the group ?



Watch Video Solution

57. Arrange the group - 16 hydrides in the order of increasing acidic strength.



Watch Video Solution

58. Out of H_2O and H_2S which one has a higher thermal stability ? Why ?



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59. Comment on the nature of two $S = O$ bonds in SO_2 .



Watch Video Solution

60. What is the geometry of SCI_2 ? Why?



Watch Video Solution

61. Out of SF_6 and TeF_6 , which one does not undergo hydrolysis? why?



Watch Video Solution

62. OF_6 has no existence - why?



Watch Video Solution

63. Sulphur disappears when boiled with an aqueous solution of Na_2SO_3 - Why ?



Watch Video Solution

64. What happens when H_2S is allowed to burn in a limited supply of air (O_2) ?



Watch Video Solution

65. What happens when an aqueous solution of SO_2 is heated in a sealed tube at 425K ?



Watch Video Solution

66. Name the type of bonds present in sulphuric acid anhydride.



Watch Video Solution

67. What happens when (1) H_2SO_4 is kept in an open vessel and (2) H_2SO_4 is kept in a closed vessel ?



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68. Why is PbO_2 called lead dioxide, not lead peroxide ?



Watch Video Solution

69. Super oxides possess paramagnetic properties - why ?



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70. Why is O_3 thermodynamically less stable than O_2 ?



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71. It is necessary to use a silent electric discharge in the preparation of ozone from dioxygen - why ?



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72. Out of rhombic and monoclinic sulphur which one is more stable and dense at room temperature ?



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73. What is fuming sulphuric acid ?



Watch Video Solution

74. Give the key reaction involved in the manufacture of sulphuric acid by contact process.



Watch Video Solution

75. Which mineral acid is used for the determination of melting points of organic compounds ?



Watch Video Solution

76. Explain why ozone (O_3) attacks rubber pipes.



Watch Video Solution

77. Give an example of an addition reaction of SO_2 .



Watch Video Solution

78. Give an example of a sulphur compound which contains a peroxo bond.



Watch Video Solution

79. Which is used as an oxoacid of sulphur which contains a peroxo bond.



Watch Video Solution

80. Which gas is used for determining the position of double or triple bond in unsaturated compound ?



Watch Video Solution

81. Which one among group - 17 elements is radioactive ?



Watch Video Solution

82. Which halogen exhibits electropositive character in some of its compounds?



Watch Video Solution

83. Fluorine does not show any +ve oxidation state - why ?



[Watch Video Solution](#)

84. Which one of the hydrogen halides is a liquid at ordinary temperature ?



[Watch Video Solution](#)

85. Arrange the halogens in the order of decreasing negative electron gain enthalpy.



[Watch Video Solution](#)

86. Arrange the halogens in the order of decreasing negative electron gain enthalpy.



[Watch Video Solution](#)

87. Arrange the hydrogen halides in their order of increasing reducing power.



Watch Video Solution

88. Arrange the hydrogen halides in the order of increasing thermal stability ?



Watch Video Solution

89. Chlorine -water on standing loses its yellow colour - why ?



Watch Video Solution

90. Which halogen hydracid cannot be stored in a glass bottle ?

Why ?



Watch Video Solution

91. Which halogen form only one oxacid ?



Watch Video Solution

92. HF is the weakest halogen hydracid even though fluorine is the most electronegative halogen - explain.



Watch Video Solution

93. Write the compound of bleaching powder and mention its two important properties.



Watch Video Solution

94. Which hydrogen halide forms HX_2^- ions ? Why ?



Watch Video Solution

95. Arrange F_2 , Cl_2 , Br_2 and I_2 in the order of increasing bond dissociation enthalpy.



Watch Video Solution

96. Give two examples of interhalogen cation and two of interhalogen anion.



Watch Video Solution

97. Name the substance obtained at the cathode and at the anode when fused ICl is subjected to electrolysis.



Watch Video Solution

98. Why is iodine more soluble in KI solution than in water ?



Watch Video Solution

99. Mention the structure of ClF_3 , ClF_5 & IF_7 molecules.



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100. Mention the state of hybridisation of the central Cl atom in the oxoacids of chlorine.



[Watch Video Solution](#)

101. Which one is the stronger oxoacid of chlorine ?



[Watch Video Solution](#)

102. What is called aqua regia ?



[Watch Video Solution](#)

103. Give example of two which react with HCl to give white precipitate .



Watch Video Solution

104. Give example of two salts which react with HCl to give white preipitate.



Watch Video Solution

105. Why the compounds of fluorine with oxygen are called fluorides of oxygen and not the oxides of fluorine ?



Watch Video Solution

106. Boiling points of interhalogen are little higher as compared to pure halogens - why ?



Watch Video Solution

107. Name the most abundant noble gas in air and the noble gas which is nearly absent in air.



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108. What is the main commercial source of helium ?



Watch Video Solution

109. What is the value of C_p / C_V of noble gas ?



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110. Which noble gas is obtained by α -decay of Ra-226?



[Watch Video Solution](#)

111. How is argon produced in the atmosphere?



[Watch Video Solution](#)

112. Which element has the lowest boiling point?



[Watch Video Solution](#)

113. Mention the intermolecular forces of attraction operating among inert gas atoms.



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114. Explain why the noble gases cannot be liquefied easily.




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115. Give an example of a fluorinating reagent.



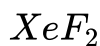
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116. Which compound of Xe is isostructural with  ion?



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117. Mention the state of hybridisation of Xe atom in each of the following compounds:



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118. Mention the state of hybridisation of Xe atom in each of the following compounds:



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119. Mention the state of hybridisation of Xe atom in each of the following compounds:



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120. Mention the state of hybridisation of Xe atom in each of the following compounds:



Watch Video Solution

121. Mention the state of hybridisation of Xe atom in each of the following compounds:



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122. Give examples of two reactions, one in which xenon fluoride acts as fluoride ion donor and the other in which it acts as fluoride ion acceptor.



Watch Video Solution

123. Mention the type of interaction responsible for the solubility of noble gases in water.



Watch Video Solution

124. Which out of He, Ne, Ar, Kr and Xe can be easily liquefied? Why?



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125. Which noble gas is used for filling balloons for meteorological observations?



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126. Which noble gas is used for the detection of meson particles?



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127. Which oxofluoride of xenon is octahedral?



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128. Which noble gas has the lowest boiling point compared to any other liquid?



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129. Neon is generally used for warning signals-why?



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SHORT ANSWER TYPE (SA)

1. Why N_2 is chemically inert? State conditon and reaction of N_2 and calcium carbide.



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2. Between white & red phosphorus which one is more reactive & why?





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3. N and Bi do not form pentachlorides but P does- why?



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4. PCl_5 exists as the ion-pair  PBr_5 exists as the ion pair  explain.



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5. H_3PO_3 acts as a reducing agent while H_3PO_4 does not. Explain. Mention the basicities of these two acids.



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6. In organic reactions PCl_5 acts as a chlorinating agent. Explain.





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7. NH_3 is a better complexing agent than PH_3 - why?



Watch Video Solution

8. Which among  and  has higher value of bond angle and why?



[View Text Solution](#)

9. How many types of salts are obtained when H_3PO_4 reacts with NaOH?



[Watch Video Solution](#)

10. Liquor ammonia bottles are to be opened only after cooling-why?



[Watch Video Solution](#)

11. Why does a hot Pt-wire becomes brighter when NH_3 gas is passed over it?



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12. Mention an observation which supports that +5 oxidation state of Bi is less stable than +3 oxidation state.



Watch Video Solution

13. NCl_3 is an endothermic compound while NF_3 is an exothermic compound. Explain.



Watch Video Solution

14. The electron gain enthalpy with negative sign is less for oxygen for sulphur. Explain.



Watch Video Solution

15. H_2S is acidic but H_2O is neutral in nature-why?



Watch Video Solution

16. Sulphur is paramagnetic in the vapour state-why?



Watch Video Solution

17. SF_6 exists but SH_6 has no existence-why?



Watch Video Solution

18. Explain why sulphuric acid has a high boiling point. How do chemists make practical use of the high , boiling point of this acid? Give examples.



Watch Video Solution

19. The bleaching action of SO_2 is temporary but that of Cl_2 is permanent-why?



View Text Solution

20. Arrange the hydrides of the elements of group-16 in the order of increasing thermal stability and explain the order.



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21. Why is the bond angle in H_2S less than that in H_2O ?



Watch Video Solution

22. Conc. H_2SO_4 cannot be used for drying HBr/HI -why?



Watch Video Solution

23. Sulphur exhibits +4 as well as +6 oxidation states but oxygen exhibits none-explain.



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24. How can you prepare dilute H_2SO_4 concentrated H_2SO_4 in the laboratory?



Watch Video Solution

25. Which out of SF_6 and TeF_6 will undergo hydrolysis at a faster rate and why?



Watch Video Solution

26. H_2S and H_2 cannot be dried by passing it through conc. H_2SO_4 - why?



Watch Video Solution

27. Why is ozone used for purifying air in crowded places like cinema halls, underground railway stations, tunnels, slaughter houses?



Watch Video Solution

28. How can O_3 be measured quantitatively?



View Text Solution

29. Explain why the bond dissociation enthalpy of F_2 is less than that of Cl_2 .



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30. Why do chlorine, bromine and iodine exhibit +3, +5 and +7 oxidation states in addition to -1 and +1 oxidation states?



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31. Fluorine cannot be prepared by chemical oxidation of F^- ion-explain.



View Text Solution

32. It is not possible to prepare HI by the action of conc. H_2SO_4 on KI. Explain.



Watch Video Solution

33. State, with equation, what happens when Cl_2 reacts with cold NaOH solution.



Watch Video Solution

34. HF is a weaker acid than HI, even though fluorine is more electronegative than iodine-explain.



Watch Video Solution

35. IF_7 exists but BrF_7 does not-why?



Watch Video Solution

36. Explain why the negative electron gain enthalpy is less for fluorine than for chlorine.



Watch Video Solution

37. Arrange the oxoacids of chlorine in the order of increasing acidic strength and explain the orders.



Watch Video Solution

38. Arrange the oxoacids of chlorine in the order of increasing oxidising power and explain the orders.



Watch Video Solution

39. What do you mean by pseudo halide ions and pseudo halogens? Give examples.



Watch Video Solution

40. Identify the interhalogen compound with which ClO^- ion is isoelectronic. Does it behave as a Lewis acid?



Watch Video Solution

41. ICl is more reactive than I_2 -why?



Watch Video Solution

42. Explain the bent T-shaped structure of ClF_3 .



Watch Video Solution

43. Iodine forms I_3^- but fluorine does not form F_3^- -why?



Watch Video Solution

44. Arrange HOI , $HOCl$, $HOBr$ in the order of increasing acidic strength. Justify your answer.



Watch Video Solution

45. With the help of a reaction show that the reactivity of halogens decreases down the group from F to I .



Watch Video Solution

46. Perchloric acid is a stronger acid than sulphuric acid.
Explain.



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47. State, with equations, what happens when:

Xenon reacts with excess of F_2 at 673K under a pressure of 1 bar.



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48. State, with equations, what happens when:

XeF_4 reacts with KI.



Watch Video Solution

49. State, with equations, what happens when:

$XeOF_4$ is kept in a glass bottle.



Watch Video Solution

50. State, with equations, what happens when:

XeF_2 reacts with iodobenzene.



Watch Video Solution

51. State, with equations, what happens when:

XeF_6 is hydrolysed.



Watch Video Solution

52. State, with equations, what happens when:

Concentrated H_2SO_4 is added to barium perxenate.



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53. State, with equations, what happens when:

Xenon tetrafluoride reacts with SbF_5



Watch Video Solution

54. State, with equations, what happens when:

Xenon difluoride reacts with PF_5



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55. State, with equations, what happens when:

XeF_2 gas is passed through an aqueous solution of potassium bromate.



Watch Video Solution

56. State, with equations, what happens when:

$XeOF_4$ is reduced with H_2 .



Watch Video Solution

57. Why is the group to which the noble gases belong termed as zero group?



Watch Video Solution

58. The atomic sizes of noble gases are by far the largest in their respective periods-why?



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59. Most of the noble gas compounds are formed by xenon-why?



View Text Solution

60. State, the equations, what happens when :

Sodium azide is heated and the resulting gas is heated with metallic Mg.



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61. State, the equations, what happens when :

Gaseous CO_2 is reacted with liquid NH_3 at 453-473K under a pressure of 220 atmosphere.



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62. State, the equations, what happens when :

Metallic copper is reacted with dilute HNO_3 .



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63. State, the equations, what happens when :

$BiCl_5$ is heated for a long time in the presence of Cl_2 gas.



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64. State, the equations, what happens when :

Ammonium dichromate is heated.



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65. State, the equations, what happens when :

Benzene diazonium chloride is allowed to react with hypophosphorus acid.



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66. State, the equations, what happens when :

Orthophosphoric acid is heated.



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67. State, the equations, what happens when :

PH_3 gas is allowed to pass through $CuSO_4$ solution.



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68. State, the equations, what happens when :

Metallic Ca is reacted with P_4 and the resulting compound is heated with water.



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69. What happens when NaOH reacts with Phosphorous ?



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70. State, the equations, what happens when :

A freshly prepared solution of $FeSO_4$ is added to the aqueous solution of $NaNO_3$ and then conc. H_2SO_4 is added to the mixture dropwise along the walls of the test tube.



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71. State, the equations, what happens when :

Excess of ammonia solution is gradually added to a solution of $CuSO_4$



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72. An aqueous solution of a gas (X) -turns red litmus blue.

When excess of this solution is added to copper sulphate

solution, it turns deep blue. When this solution is added to $FeCl_3$ solution, a brownish precipitate soluble in HNO_3 is obtained. Identify the gas (X) and write balanced equations for each of the reaction involved.



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73. Identify: Two metals which react with HNO_3 to give H_2 .



Watch Video Solution

74. Identify: An organic compound which reacts with HNO_3 to form an explosive.



Watch Video Solution

75. Identify: A nitrogen containing gas which produces hysteric laughter.



Watch Video Solution

76. Identify: An water insoluble nitrate.



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77. Identify: An oxoacid of P which possesses strong reducing property.



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78. Identify: Gr-15 hydride which has highest boiling point.



[Watch Video Solution](#)

79. Identify: A nitrogen trihalide which does not undergo hydrolysis.



[Watch Video Solution](#)

80. Identify: A metal which dissolves in aqua regia.



[Watch Video Solution](#)

81. Identify: A tetrabasic oxoacid of P in which its oxidation state is +4.



[Watch Video Solution](#)

82. Identify: An oxide of nitrogen which reacts with water to produce two acids.



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83. P reacts with Cl_2 to form two types of halides (A and B). The halide A is a yellowish-white powder and the halide B is a colourless oily liquid. Identify A and B and predict the products obtained on their hydrolysis.



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84. State, with equations, what happens when Carbon disulphide is burnt in dioxygen.



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85. State, with equations, what happens when Acetylene is burnt in air.



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86. State, with equations, what happens when Dilute HCl is added to Al_2O_3 .



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87. State, with equations, what happens when O_3 gas is passed through an aqueous solution of KI.



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88. State, with equations, what happens when Ozone is allowed to react with moist phosphorus.

 Watch Video Solution

89. State, with equations, what happens when $SnCl_2$ is allowed to react with O_3 in the presence of conc. HCl.

 Watch Video Solution

90. State, with equations, what happens when SO_2 gas is passed through an orange coloured $K_2Cr_2O_7$ solution acidified with H_2SO_4 .

 Watch Video Solution

91. State, with equations, what happens when SO_2 gas is passed through an aqueous solution of $FeCl_3$.



Watch Video Solution

92. State, with equations, what happens when SO_2 gas is allowed to react with phosphorus pentachloride.



Watch Video Solution

93. State, with equations, what happens when SO_3 gas is passed through conc. H_2SO_4 .



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94. Concentrated H_2SO_4 is added to each of the five test tubes containing (i) NaBr, (ii) sugar, (iii) sulphur powder, (iv) KCl and (v) copper turnings. The test tubes are then heated. Identify in which of the test tubes the following changes will be observed.

The observations are: evolution of a colourless gas.

Support your answer with the help of a chemical equation in this case.



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95. Concentrated H_2SO_4 is added to each of the five test tubes containing (i) NaBr, (ii) sugar, (iii) sulphur powder, (iv) KCl and (v) copper turnings. The test tubes are then heated. Identify in which of the test tubes the following changes will be observed.

The observations are: evolution of a brown gas.

Support your answer with the help of a chemical equation in this case.



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96. Concentrated H_2SO_4 is added to each of the five test tubes containing (i) NaBr, (ii) sugar, (iii) sulphur powder, (iv) KCl and (v) copper turnings. The test tubes are then heated. Identify in which of the test tubes the following changes will be observed. The observations are: formation of a black substance.

Support your answer with the help of a chemical equation in this case.



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97. Concentrated H_2SO_4 is added to each of the five test tubes containing (i) NaBr, (ii) sugar, (iii) sulphur powder, (iv) KCl and (v) copper turnings. The test tubes are then heated. Identify in which of the test tubes the following changes will be observed. The observations are: disappearance of yellow powder along with liberation of a pungent colourless gas.

Support your answer with the help of a chemical equation in this case.



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98. Concentrated H_2SO_4 is added to each of the five test tubes containing (i) NaBr, (ii) sugar, (iii) sulphur powder, (iv) KCl and (v) copper turnings. The test tubes are then heated. Identify in which of the test tubes the following changes will be observed. The observations are: formation of a brown substance which on

dilution becomes blue.

Support your answer with the help of a chemical equation in this case.



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99. An aqueous solution of a gas 'A' gives the following reactions along with same observations:

It decolorises pink coloured acidified $KMnO_4$ solution.



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100. An aqueous solution of a gas 'A' gives the following reactions along with same observations:

When the solution is boiled with H_2O_2 , cooled and an aqueous

solution of $BaCl_2$ is added to the mixture, a white precipitate insoluble in dilute HCl is obtained.



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101. An aqueous solution of a gas 'A' gives the following reactions along with same observations:

When H_2S is passed through the solution, it becomes turbid.

Identify the gas 'A', and give equation of the reaction involved in each case.



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102. A pale yellow substance (A), when heated with conc. HNO_3 , produces a brown gas (B).



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103. (A) dissolves in sodium sulphite (Na_2SO_3) solution on heating and a clear solution of compound (C) is formed.



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104. This solution on acidification becomes turbid and a pungent smelling gas (D) is formed. (D) is also formed by burning (A) in air.



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105. Decolorises iodine solution. Identify (A) to (D) and give the reaction involved in each case.



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106. Gradual addition of KI solution to $Bi(NO_3)_3$ solution initially produces a dark brown precipitate which dissolves in excess of KI to give a clear yellow solution. Write the chemical equations for the above reactions.



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107. A liquid A is treated with Na_2CO_3 solution. A mixture of two salts B and C are produced in the solution. The mixture on acidification with H_2SO_4 and distillation produces the liquid A again. Identify A, B and C and write the equations involved.



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108. Identify the halogen (F, Cl, Br or I).

which has the lowest ionisation enthalpy,



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109. Identify the halogen (F, Cl, Br or I).

which is the strongest oxidising agent,



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110. Identify the halogen (F, Cl, Br or I).

which has the highest electronegativity,



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111. Identify the halogen (F, Cl, Br or I)

which has the highest ionisation enthalpy,



Watch Video Solution

112. Identify the halogen (F, Cl, Br or I)

which has the highest negative electron gain enthalpy



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113. Identify the halogen (F, Cl, Br or I)

which is a liquid at ordinary temperature



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114. Identify the halogen (F, Cl, Br or I)

which forms a hydrogen halide which is a low boiling liquid.



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115. Arrange the hydrogen halides in the increasing order of dipole moment.



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116. Arrange the hydrogen halides in the increasing order of thermal stability



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117. Arrange the hydrogen halides in the increasing order of reducing power



Watch Video Solution

118. Arrange the hydrogen halides in the increasing order of bond length



Watch Video Solution

119. Arrange the hydrogen halides in the increasing order of ionic character.



Watch Video Solution

120. State, with equations, what happens when :

Fluorine is allowed to react with water at ordinary temperature.



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121. State, with equations, what happens when :

An acidified KI solution is kept in open air.



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122. State, with equations, what happens when :

Concentrated H_2SO_4 is added to NaI.



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123. State, with equations, what happens when :

A mixture of I_2 and hydrazine is heated at 573K.



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124. State, with equations, what happens when :

F_2 gas is allowed to pass through a dilute (2%) solution of NaOH.



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125. State, with equations, what happens when :

A mixture of sodium chlorate and oxalic acid is heated at 363K



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126. State, with equations, what happens when :

Chlorine is allowed to react with dry slaked lime at 313K.



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127. State, with equations, what happens when :

A mixture of KI and F_2 is heated at 625K.



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128. State, with equations, what happens when :

BrF_5 is hydrolysed.



Watch Video Solution

129. State, with equations, what happens when :

Fused ICl is electrolysed.



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130. State, with equations, what happens when :

$K_2Cr_2O_7$ is heated with concentrated HCl.



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131. State, with equations, what happens when :

UO_2 is treated with BrF_3 .



Watch Video Solution

1. On what condition does chlorine bleach coloured materials by oxidation?



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2. Arrange aqueous solutions of hydrides of halogen in descending order of their acidity.



Watch Video Solution

3. Why fluorine does not form any oxyacid?



Watch Video Solution

4. Why HI and HBr cannot be prepared by adding conc. H_2SO_4 to their corresponding halide salts?



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5. Write with balanced equation what happens when. :
copper pyrites is heated in air and the produced gas is passed through aqueous solution of bromine.



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6. Write with balanced equation what happens when. :
Nitric acid vapour is passed over heated copper metal.



Watch Video Solution

7. Write with balanced equation what happens when. :

Calcium metal is dissolved in liquid ammonia and is evaporated.



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8. Balance the equation: $Na_2O_2 + Cl_2O_2 \rightarrow$



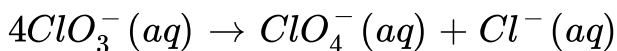
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9. Write with balanced equation what happens when potassium iodide solution is added to an aqueous solution of copper sulphate.



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10. Indicate the type to which the following reaction belongs:



- A. oxidation reaction
- B. reduction reaction
- C. disproportionation reaction
- D. decomposition reaction

Answer: C



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11. Fluorine is a strong oxidising agent than chlorine, even though its negative electron gain enthalpy is less than chlorine. Explain.



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12. Which one between N_2O and NO_2 molecules is more polar? Explain.

 Watch Video Solution

13. What is the hybridization state of xenon in $XeOF_4$. What is the shape of this molecule?

 Watch Video Solution

14. Which of the following gases has odour but no colour-

A. NO_2

B. SO_2

C. N_2

D. Cl_2

Answer: B



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15. First ionisation enthalpies of group-15 elements are, in general, greater than those of group-16 elements- explain.



Watch Video Solution

16. State with balanced chemical equation what happens when sulphur trioxide gas is passed through conc. Sulphuric acid.



Watch Video Solution

17. Explain why moist chlorine can bleach dry coloured articles but dry chlorine cannot.



Watch Video Solution

18. Write down the structure of SO_2 and state with reason whether it is polar or non-polar.



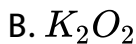
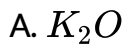
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19. Write down the name and formula of the stable paramagnetic allotrope among the allotropes of oxygen and sulphur.



Watch Video Solution

20. What is the formula of the oxide formed on burning potassium in oxygen-



Answer: C



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21. How will you distinguish chemically between HN_3 and NH_3 ?



Watch Video Solution

22. Write down the balanced chemical equation for the reaction of H_2S with aqueous solution of SO_2 and write the roles, (oxidant/reductant) of the reactants in the reaction.



Watch Video Solution

23. How does PCl_3 undergo hydrolysis?



Watch Video Solution

24. Write with balanced chemical equation, what happens when chlorine gas is passed through hot concentrated KOH solution.



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25. Write the thermal stability order of hydrogen halides.



Watch Video Solution

26. Which of the following is required to liberate bromine from aqueous solution of HBr -



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27. Write with balanced chemical equation, what happens when chlorine gas is passed into aqueous solution of sulphur dioxide.



Watch Video Solution

28. Write with balanced chemical equation, what happens when white phosphorus is boiled with caustic soda solution.



Watch Video Solution

29. Why helium does not form any compound?



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30. Give an example of mixed oxide. Why is it called mixed oxide?



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31. Draw the structure of H_2SO_3 ?



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SOLVED CBSE SCANNER

1. Which one of PCl_4^+ & PCl_4^- is not likely to exist, why?



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2. Explain the following giving an appropriate reason in each case.

O_2 and F_2 both stabilise higher oxidation states of metals but O_2 exceeds F_2 in doing so.



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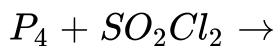
3. Explain the following giving an appropriate reason in each case.

Structure of xenon fluorides cannot be explained by valence bond approach.



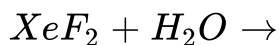
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4. Complete the following chemical reactions:



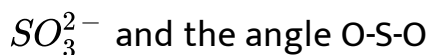
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5. Complete the following chemical reactions:



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6. Predict the shape and the asked angle (90° or more or less) in each of the following cases:



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7. Predict the shape and the asked angle (90° or more or less) in each of the following cases:

ClF_3 and the angle F-Cl-F



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8. Predict the shape and the asked angle (90° or more or less) in each of the following cases:

XeF_2 and the angle F-Xe-F



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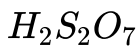
9. Write structures of the following molecules:

H_3PO_2



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10. Write structures of the following molecules:



Watch Video Solution

11. Write structures of the following molecules:



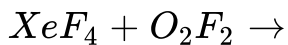
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12. Complete the following chemical equations:



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13. Complete the following chemical equations:



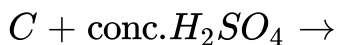
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14. Why does NH_3 act as a Lewis base?



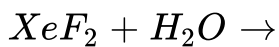
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15. Complete the following equations:



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16. Complete the following equations:



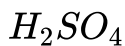
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17. Draw the structures:



Watch Video Solution

18. Draw the structures:



Watch Video Solution

19. Give reasons for the following:

$(CH_3)_3P = O$ exists but $(CH_3)_3N = O$ does not.



Watch Video Solution

20. Give reasons for the following:

Oxygen has less electron gain enthalpy with negative sign than sulphur.



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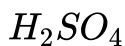
21. Give reasons for the following:

H_3PO_2 is a stronger reducing agent than H_3PO_3



Watch Video Solution

22. Draw the structures of the following:



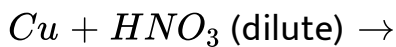
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23. Draw the structures of the following:



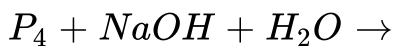
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24. Complete the following chemical reaction:



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25. Complete the following chemical reaction:



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26. Why does $R_3P = O$ exist but $R_3N = O$ does not? (R = alkyl group)



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27. Oxygen is gas whereas sulphur is solid at room temperature. Explain.



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28. Write balanced equations for the following reactions:

Chlorine reacts with dry slaked lime.



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29. Write balanced equations for the following reactions:

Carbon reacts with concentrated H_2SO_4



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30. Describe the contact process for the manufacture of sulphuric acid with special reference to the reaction conditions, catalyst used and the yield in the process.



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31. Explain the following:

Nitrogen is much less reactive than phosphorus.



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32. Explain the following:

NF_3 is an exothermic compound but NCl_3 is an endothermic compound.



Watch Video Solution

33. Elements of gr-16 generally show lower value of first ionisation enthalpy compared to the corresponding periods of gr-15. Why?



Watch Video Solution

34. What happens when- concentrated H_2SO_4 is added to CaF_2 ?



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35. What happens when- sulphur dioxide reacts with chlorine in the presence of charcoal?



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36. What happens when- ammonium chloride is treated with $Ca(OH)_2$?



Watch Video Solution

37. Draw the structure of the following:



Watch Video Solution

38. Draw the structure of the following:



Watch Video Solution

39. Answer the following:

Why is NH_3 more basic than PH_3 ?



Watch Video Solution

40. Answer the following:

Why are halogens strong oxidising agents?



Watch Video Solution

41. Answer the following:

Draw the structure of $XeOF_4$.



Watch Video Solution

42. Account for the following:

Ozone is thermodynamically unstable.



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43. Account for the following:

Solid PCl_5 is ionic in nature.



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44. Account for the following:

Fluorine forms only one oxoacid HOF.



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45. Draw the structure of- BrF_5



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46. Draw the structure of- XeF_4



[Watch Video Solution](#)

47. Compare the oxidising action of F_2 and Cl_2 by considering parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy.



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48. Write the conditions to maximise the yield of H_2SO_4 by contact process.



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49. Arrange the following in the increasing order of property mentioned:

H_3PO_3 , H_3PO_4 , H_3PO_2 (reducing character)



Watch Video Solution

50. Arrange the following in the increasing order of property mentioned:

NH_3 , PH_3 , AsH_3 , SbH_3 , BiH_3 (base strength)



Watch Video Solution

51. Write the structures of the following molecules:

$H_2S_2O_8$



Watch Video Solution

52. Write the structures of the following molecules:



Watch Video Solution

53. Give reasons:

Red phosphorus is less reactive than white phosphorus.



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54. Give reasons:

Sulphur shows greater tendency for catenation than oxygen.



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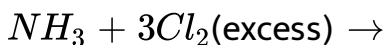
55. Give reasons:

ClF_3 is known but FCl_3 is not known.



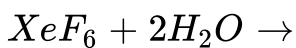
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56. Complete the following reactions:



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57. Complete the following reactions:



Watch Video Solution

58. What happens when- $(NH_4)_2Cr_2O_7$ is heated?

Write the equations.



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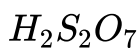
59. What happens when- H_3PO_3 is heated?

Write the equations.



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60. Draw the structures of the following:



Watch Video Solution

61. Draw the structures of the following:



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62. Give reasons:

Thermal stability decreases from H_2O to H_2Te .



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63. Give reasons:

Fluoride ion has higher hydration enthalpy than chloride ion.



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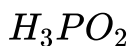
64. Give reasons:

Nitrogen does not form pentahalide.



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65. Draw the structures of the following:



Watch Video Solution

66. Draw the structures of the following:



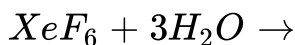
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67. Complete the following reaction :



Watch Video Solution

68. Complete the following reactions:



Watch Video Solution

69. What happens when-

conc. H_2SO_4 is added to Cu ?

Write the equations.



Watch Video Solution

70. What happens when-

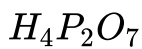
SO_3 is passed through water?

Write the equations.



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71. Draw the structures of the following:



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72. Draw the structures of the following:



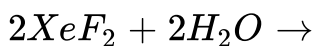
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73. Complete the following chemical equations:



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74. Complete the following chemical equations:



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75. What happens when-

HCl is added to MnO_2 ?

Write the equations involved.



Watch Video Solution

76. What happens when-

PCl_5 is heated?

Write the equations involved.



Watch Video Solution

77. Write the formula of the compound of phosphorus which is obtained when conc. HNO_3 oxidises P_4 .



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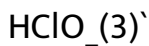
78. Draw the structures of the following:

H_2SO_3



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79. Draw the structures of the following:



Watch Video Solution

80. Give reasons for the following:

Red phosphorus is less reactive than white phosphorus.



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81. Give reasons for the following:

Electron gain enthalpies of halogens are largely negative.



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82. Give reasons for the following:

N_2O_5 is more acidic than N_2O_3 .



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83. Write the formula of the compound of sulphur which is obtained when conc. HNO_3 oxidises S_8 .



Watch Video Solution

84. Draw the structures of the following:

$H_2S_2O_8$



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85. Draw the structures of the following:



Watch Video Solution

86. Write the formula of the compound of iodine which is obtained when conc. HNO_3 oxidises I_2 .



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87. Draw the structures of the following:



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88. Draw the structures of the following:



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89. Among the hydrides of Gr-15 elements, which have the lowest boiling point?



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90. Among the hydrides of Gr-15 elements, which have the maximum basic character?



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91. Among the hydrides of Gr-15 elements, which have the highest bond angle?



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92. Among the hydrides of Gr-15 elements, which have the maximum reducing character?



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93. Give reasons:

H_3PO_3 undergoes disproportionation reaction, but H_3PO_4 does not.



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94. Give reasons:

When Cl_2 reacts with excess of F_2 , ClF_3 is formed and not $FeCl_3$.



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95. Give reasons:

Dioxygen is a gas while sulphur is a solid at room temperature.



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96. Draw the structures of the following:



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97. Draw the structures of the following:



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98. When concentrated sulphuric acid was added to an unknown salt present in a test tube a brown gas A was evolved. This gas intensified when copper turnings were added to this test tube. On cooling, gas A changed into a colourless solid B . Identify A and B.



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99. When concentrated sulphuric acid was added to an unknown salt present in a test tube a brown gas A was evolved. This gas intensified when copper turnings were added to this

test tube. On cooling, gas A changed into a colourless solid B .

Write the structures of A and B .



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100. When concentrated sulphuric acid was added to an unknown salt present in a test tube a brown gas A was evolved. This gas intensified when copper turnings were added to this test tube. On cooling, gas A changed into a colourless solid B . Why does gas A change to solid on cooling?



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101. Arrange the following in the decreasing order of their reducing character: HF, HCl, HBr, HI



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102. Complete the following reaction: $XeF_4 + SbF_5$ to



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SOLVED NCERT TEXTBOOK PROBLEMS

1. Though nitrogen exhibits +5 oxidation state it does not form pentahalide. Give reason.



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2. PH_3 has lower boiling point than NH_3 . Why?



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3. Why are pentahalides more covalent than trihalides?



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4. Why is BiH_3 the strongest reducing agent amongst all the hydrides of Group-15 elements?



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5. Write the reaction of thermal decomposition of sodium azide.



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6. Why is N_2 less reactive at room temperature?



Watch Video Solution

7. Why does NH_3 act as a Lewis base?



Watch Video Solution

8. Mention the conditions required to maximise the yield of ammonia.



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9. How does ammonia react with a solution of Cu^{2+} ?



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10. Why does NO_2 dimerise?



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11. What is the covalence of nitrogen in N_2O_5 ?



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12. In what way can it be proved that PH_3 is basic in nature?



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13. Bond angle in PH_4^+ is higher than that in PH_3 . Why?



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14. What happens when white phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2 ?



Watch Video Solution

15. Why does PCl_3 fume in moisture?



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16. Are all the five bonds in PCl_5 molecule equivalent? Justify your answer.



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17. What happens when PCl_5 is heated?



Watch Video Solution

18. Write a balanced equation for the hydrolytic reaction of PCl_5 in heavy water.



Watch Video Solution

19. How do you account for the reducing behaviour of H_3PO_2 on the basis of its structure?



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20. What is the basicity of H_3PO_4 ?



Watch Video Solution

21. What happens when H_3PO_3 is heated?



Watch Video Solution

22. Elements of group-16 generally show lower value of first ionisation enthalpy compared to the corresponding periods of group-15. Why?



Watch Video Solution

23. H_2S less acidic than H_2Te . Why?



Watch Video Solution

24. List the important sources of sulphur.



Watch Video Solution

25. Write the order of thermal stability of the hydrides of group-16 elements.



Watch Video Solution

26. Why is H_2O a liquid and H_2S a gas?



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27. Which of the following does not react with oxygen directly?

Zn, Ti, Pt, Fe



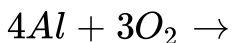
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28. Complete the following reactions:



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29. Complete the following reactions:



Watch Video Solution

30. Why does O_3 act as a powerful oxidising agent?



Watch Video Solution

31. How is O_3 estimated quantitatively?



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32. Which form of S shows paramagnetic behaviour?



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33. What happens when sulphur dioxide is passed through an aqueous solution of Fe (III) salt?



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34. Comment on the nature of two S-O bonds formed in SO_2 molecule. Are the two S-O bonds in this molecule equal?



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35. How is the presence of SO^{2-} detected?



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36. What happens when-Conc. H_2SO_4 is added to calcium fluoride.



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37. What happens when- SO_3 is passed through water.



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38. Mention three areas in which H_2SO_4 plays an important role.



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39. Write the conditions to maximise the yield of H_2SO_4 by Contact process.



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40. Why is $K_{a2} < K_{a1}$ for H_2SO_4 in water?



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41. Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table. Why?



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42. Although electron gain enthalpy of fluorine is less negative as compared to chlorine, fluorine is a stronger oxidising agent than chlorine. Why?



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43. Fluorine exhibits only -1 oxidation state whereas other halogens exhibit +1, +3, +5 and +7 oxidation states also. Explain.



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44. Considering the parameters such as bond dissociation enthalpy, electron gain enthalpy and hydration enthalpy, compare the oxidising power of F_2 and Cl_2 .



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45. Give two examples to show the anomalous behaviour of fluorine.



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46. Sea is the greatest source of some halogens. Comment.



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47. Write the balanced chemical equation for the reaction of Cl_2 with hot and concentrated NaOH. Is this reaction a disproportionation reaction? Justify.



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48. Give the reason for bleaching action of Cl_2 .



Watch Video Solution

49. Name two poisonous gases which can be prepared from chlorine gas.



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50. When HCl reacts with finely powdered iron, it forms ferrous chloride and not ferric chloride. Why?



Watch Video Solution

51. Deduce the molecular shape of BrF_3 on the basis of VSEPR theory.



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52. Why is ICl more reactive than I_2 ?



Watch Video Solution

53. Why are elements of Group-18 known as noble gases?



Watch Video Solution

54. Noble gases have very low boiling points. Why?



Watch Video Solution

55. Does the hydrolysis of XeF_6 lead to a redox reaction?



Watch Video Solution

56. Why is helium used in diving apparatus?



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57. Balance the equation: $XeF_6 + H_2O \rightarrow XeO_2F_2 + HF$



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58. Why has it been difficult to study the chemistry of Rn?



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NCERT EXERCISE QUESTIONS

1. Discuss the general characteristics of Group-15 elements with reference to their electronic configuration, oxidation state, atomic size, ionisation enthalpy and electronegativity.



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2. Why does the reactivity of N differ from phosphorus?



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3. Discuss trends in chemical reactivity of Gr-15 elements.



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4. Why does NH_3 form H-bond but PH_3 does not?



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5. How is nitrogen prepared in the laboratory? Write the chemical equations of the reactions involved.



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6. How is ammonia manufactured industrially?



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7. Illustrate how copper metal can give different products on reaction with HNO_3 .



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8. Give the resonating structures of NO_2 and N_2O_5



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9. The HNH angle value is higher than HPH, HAsH and HSbH angles. Why? [Hint: Can be explained on the basis of sp^3 - hybridisation in NH_3 and only s-p bonding between H and other elements of the group].



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10. Why does $R_3P = O$ exist but $R_3N = O$ does not (R = alkyl group)?



Watch Video Solution

11. Explain: NH_3 is basic while BiH_3 is only feebly basic.



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12. Nitrogen exists as diatomic molecule and phosphorus as P_4 . Why?



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13. Write main differences between the properties of white phosphorus and red phosphorus.



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14. Why does nitrogen show catenation properties less than phosphorus?



Watch Video Solution

15. Give the disproportionation reaction of H_3PO_3 .



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16. Can PCl_5 act as an oxidising as well as a reducing agent? Justify.



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17. Justify the placement of O, S, Se, Te and Po in the same group of the periodic table in terms of electronic configuration, oxidation state and hydride formation.



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18. Why is dioxygen a gas but sulphur a solid?



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19. Knowing the electron gain enthalpy values for $O \rightarrow O^-$ and $O \rightarrow O^{2-}$ as -141 and $702 \text{ kJ} \cdot \text{mol}^{-1}$ respectively, how can you account for the formation of a large number of oxides having O^{2-} species and not O^- ? (Hint: Consider lattice energy factor in the formation of compounds).



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20. Which aerosols deplete ozone?



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21. Describe manufacture of H_2SO_4 by contact process.



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22. How is SO_2 an air pollutant?



Watch Video Solution

23. Why are halogens strong oxidising agents?



Watch Video Solution

24. Explain why fluorine forms only one oxoacid, HOF.



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25. Explain why inspite of nearly the same electronegativity, oxygen forms hydrogen bonding while chlorine does not.



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26. Write two uses of ClO_2 .



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27. Why are halogens coloured?



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28. Write the reactions of F_2 and Cl_2 with water.



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29. How can you prepare Cl_2 from HCl and HCl from Cl_2 ? Write reactions only.



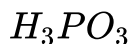
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30. What inspired N. Bartlett for carrying out reaction between Xe and PtF_6 ?



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31. What are the oxidation states of P in the following:



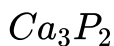
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32. What are the oxidation states of P in the following:



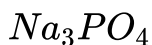
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33. What are the oxidation states of P in the following:



Watch Video Solution

34. What are the oxidation states of P in the following:



Watch Video Solution

35. What are the oxidation states of P in the following:



Watch Video Solution

36. Write balanced equations for the following:

NaCl is heated with sulphuric acid in the presence of MnO_2



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37. Write balanced equations for the following:

Cl_2 gas is passed into a solution of NaI in water.



[Watch Video Solution](#)

38. How are xenon fluorides XeF_2 , XeF_4 and XeF_6 obtained?



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39. With what neutral molecule is ClO^- isoelectronic? Is that molecule a Lewis base ?



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40. How are XeO_3 and XeOF_4 prepared?



Watch Video Solution

41. Arrange the following in the order of property indicated for each set: $\text{F}_2, \text{Cl}_2, \text{Br}_2, \text{I}_2$ - increasing bond dissociation enthalpy.



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42. Arrange the following in the order of property indicated for each set: HF, HCl, HBr, HI - increasing acid strength.



Watch Video Solution

43. Arrange the following in the order of property indicated for each set: NH_3 , PH_3 , AsH_3 , SbH_3 , BiH_3 - increasing base strength.



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44. Which one of the following does not exist? 1. XeO_4 2. NeF_2
3. XeF_2 4. XeF_6



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45. Give the formula and describe the structure of a noble gas species which is isostructural with: ICl_4^-



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46. Give the formula and describe the structure of a noble gas species which is isostructural with: IBr_2^-



Watch Video Solution

47. Give the formula and describe the structure of a noble gas species which is isostructural with: BrO_3^-



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48. Why noble gases have comparatively large atomic sizes?



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49. List the uses of neon and argon gases.



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HIGHER ORDER THINKING SKILL (HOTS) QUESTIONS

1. Give the composition of Devarda's alloy. Which gas is evolved when it reduces nitrates in alkaline solutions?



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2. Why does molten PCl_5 conduct electricity?



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3. Arrange the following as directed:

As_2O_3 , P_2O_3 , N_2O_3 (decreasing acid strength)



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4. Arrange the following as directed:

NI_3 , NBr_3 , NCl_3 , NF_3 (increasing Lewis base strength)



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5. Arrange the following as directed:

N_2O_5 , N_2O_4 , N_2O_3 , NO (increasing acid strength)



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6. Arrange the following as directed:

PF_3 , PCl_3 , PBr_3 , PI_3 (decreasing Lewis acid strength)



Watch Video Solution

7. Give the equations for the preparation of N_2O from the following: NH_3 , O_2 , Pt and H_2O .



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8. Name the compounds of group-15 elements which are covalent in the vapour state but ionic in the solid state.



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9. CN^- ion is known but CP^- ion is unknown-why?



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10. Phosphorus shows greater tendency for catenation than nitrogen. Explain.



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11. Draw structures of the ions responsible for the electrical conductance of molten PCl_5 .



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12. $KMnO_4$ should not be dissolved in conc. H_2SO_4 . Why?



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13. When H_2S is passed through an acidified solution of an inorganic mixture (which contains no group-II cation), yellowish turbidity appears. Explain.



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14. In the manufacture of H_2SO_4 by the contact process, SO_3 is not directly dissolved in water-- why?



Watch Video Solution

15. A large number of oxides can be formed with O^{2-} species but not with O^- species-explain.

[Given,

$$\Delta_{eg}H_{O \rightarrow O^-} = -141 \text{ kJ} \cdot \text{mol}^{-1}, \Delta_{eg}H_{O \rightarrow O^{2-}} = 702 \text{ kJ} \cdot \text{mol}^{-1}$$

]



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16. SF_4 undergoes hydrolysis but SF_6 does not-why?



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17. Why does liquid oxygen stick to the magnet but liquid nitrogen does not?



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18. Sulphur dioxide is a stronger reducing agent in alkaline medium than in acidic medium-explain.



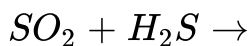
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19. Why the ozone layer is depleted by chlorofluoro-carbons (CFC's) which have been used as aerosol propellants and refrigerants? Illustrate with example.



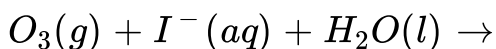
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20. Complete the following equations:



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21. Complete the following equations:



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22. Complete the following equations:



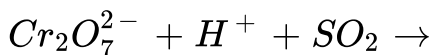
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23. Complete the following equations:



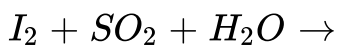
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24. Complete the following equations:



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25. Complete the following equations:



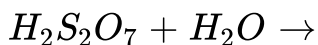
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26. Complete the following equations:



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27. Complete the following equations:



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28. Write down a chemical reaction in support of the fact that sulphuric acid has low volatility.



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29. In concentrated sulphuric acid, HNO_3 behaves as a base.

Write the ionisation steps.



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30. Br_2 reacts with alkali under cold conditions to give bromide and hypobromite. It reacts with alkali at room temperature and above to produce bromide and bromate. However, iodine reacts with alkali at all conditions to give iodide and iodate. Explain.



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31. What is Wj's reagent? Mention one important use.



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32. ClF_3 exists but $ClCl_3$ does not-why?



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33. Explain: covalent fluorides are chemically more inert than other covalent halides.



Watch Video Solution

34. KHF_2 exists while $KHCl_2$, $KHBr_2$, KHI_2 do not-why?



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35. What is the geometry and hybridisation of the central atom of the following molecules/ions?



Watch Video Solution

36. What is the geometry and hybridisation of the central atom of the following molecules/ions?



Watch Video Solution

37. What is the geometry and hybridisation of the central atom of the following molecules/ions?



Watch Video Solution

38. What is the geometry and hybridisation of the central atom of the following molecules/ions?



Watch Video Solution

39. What is the geometry and hybridisation of the central atom of the following molecules/ions?



Watch Video Solution

40. What is the geometry and hybridisation of the central atom of the following molecules/ions?



[Watch Video Solution](#)

41. What is the geometry and hybridisation of the central atom of the following molecules/ions?

[Watch Video Solution](#)

42. What is the geometry and hybridisation of the central atom of the following molecules/ions?

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43. When moist blue litmus paper is dipped in a solution of hypochlorous acid, it first turns red and then it gets decolorised. Explain.



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44. Explain why I_2 can displace Cl_2 from $KClO_3$ but not from KCl .



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45. Arrange the following as directed:

$HOCl$, $HClO_2$, $HClO_3$, $HClO_4$ (increasing thermal stability)



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46. Arrange the following as directed:

F^- , Cl^- , Br^- , I^- (increasing reducing power)



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47. Arrange the following as directed:

F^- , Cl^- , Br^- , I^- (increasing nucleophilicity)



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48. Arrange the following as directed:

F^- , Cl^- , Br^- , I^- (decreasing nucleophilicity in protic solvent)



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49. Arrange the following as directed:

F_2 , Cl_2 , Br_2 , I_2 (increasing reactivity towards H_2O)



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50. Arrange the following as directed:

$HOCl$, $HOBr$, HOI (increasing tendency of O-H bond cleavage heterolytically)



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51. Arrange the following as directed:

I_2 , HI , HIO_4 , ICl (increasing oxidation state of iodine)



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52. The dipole moment of a violet solution of iodine in cyclohexane is zero. When benzene, dioxane or pyridine is added to it, its colour changes and the dipole moment of I_2 in the presence of these solvents becomes 1.8, 3.0 and 4.5D, respectively. Explain.



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53. When Cl_2 is passed through KI solution, the solution becomes brown in colour. However, when excess of Cl_2 is used, the solution becomes colourless. Explain.



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54. Which neutral molecules are isoelectronic with .



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55. Explain why NI_3 acts as an explosive.



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56. Helium and neon do not form compounds with fluorine-why?



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57. How can XeF_4 be estimated?



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58. Suggest the most suitable noble gas for each of the following uses:

for providing the least expensive inert atmosphere



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59. Suggest the most suitable noble gas for each of the following uses:

a liquid refrigerant through which we can achieve the lowest temperature



Watch Video Solution

60. Suggest the most suitable noble gas for each of the following uses:

in testing, metal casting and in radiation therapy.



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61. Hydrolysis of XeF_6 is not a redox reaction-explain.



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62. Which is the only known halide of krypton ? How can it be prepared?



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63. Helium and neon do not form clathrate compounds with quinol-why?



Watch Video Solution

64. Give an example each of oxidative and reductive fluorinations caused by XeF_2 .



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65. Unlike xenon, helium does not form any chemical compound. Explain.



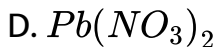
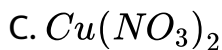
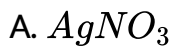
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66. Xenon does not form fluorides such as XeF_3 and XeF_5 - why?



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1. Which one of the following compounds does not liberate NO_2 on heating-



Answer: B



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2. Which of the following is not correct at room temperature and pressure-

A. P_4O_{10} is a white solid substance

B. SO_2 is a colourless gas

C. SO_3 is a colourless gas

D. NO_2 is a brown coloured gas

Answer: C



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3. The number of acidic proton in H_3PO_3 is-

A. 0

B. 1

C. 2

D. 3

Answer: C



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4. When chloric acid is heated, it produces-

A. $HClO_4$, Cl_2 , O_2 and H_2O

B. $HClO_2$, Cl_2 , O_2 and H_2O

C. $HClO$, Cl_2O and H_2O_2

D. Cl , $HClO$, Cl_2O and H_2O

Answer: A



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5. 'Sulphan' is-

- A. a mixture of SO_3 and H_2SO_5
- B. 100% conc. H_2SO_4
- C. a mixture of gypsum and conc. H_2SO_4
- D. 100% oleum (mixture of 100% SO_3 & 100 % H_2SO_4)

Answer: B



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6. Chlorine reacts with red hot calcium oxide to yield-

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

Answer: D



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7. The compounds through which nitric acid is obtained from ammonia are-

- A. nitric oxide and nitrogen dioxide
- B. nitrogen and nitric oxide
- C. nitric oxide and dinitrogen pentoxide
- D. nitrogen and nitrous oxide

Answer: A



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8. The bond angle of NF_3 (102.3°) is less than that of NH_3 (107.2°) because-

- A. F is larger in size compared to H
- B. N is larger in size compared to F
- C. opposite polarity of nitrogen in the two molecules
- D. smaller size of H compared to N

Answer: C



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9. The experimentally determined shape of XeF_6 is distorted octahedral. However, according to VSEPR theory its shape is-

- A. octahedral

B. pentagonal bipyramidal

C. tetragonal bipyramidal

D. trigonal bipyramidal

Answer: B



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10. The hydrides of the first elements in group 15-17, namely NH_3 , H_2O and HF respectively show abnormally high values for melting and boiling points. This is due to-

A. small size of N, O and F

B. the ability to form extensive intermolecular H-bonding

C. the ability to form extensive intramolecular H-bonding

D. effective van der Waals interaction

Answer: B



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11. Among the following observations, the correct one that differentiates between SO_3^{2-} and SO_4^{2-} is-

A. both form precipitate with $BaCl_2$, SO_3^{2-} dissolves in HCl

but SO_4^{2-} does not

B. SO_3^{2-} forms precipitate with $BaCl_2$, SO_4^{2-} does not

C. SO_4^{2-} forms precipitate with $BaCl_2$, SO_3^{2-} does not

D. both form precipitate with $BaCl_2$, SO_4^{2-} dissolves in HCl

but SO_3^{2-} does not

Answer: B



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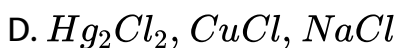
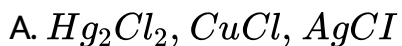
12. Ionisation potential of inert gases decrease with increase in atomic size. Xenon react directly with fluorine to form binary compounds. The correct statement (s) are -

- A. only the heavy inert gases form such compounds
- B. this occurs because of high ionisation of inert gases
- C. this occurs due to formation of compounds with electronegative ligands
- D. the compounds become stable because of complete electron octet

Answer: A



13. Which set of salts are completely insoluble in water -

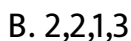
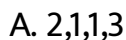


Answer: B



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14. The number of lone pairs of electrons on the central atoms of H_2O , $SnCl_2$, PCl_3 and XeF_2 respectively are-



C. 3,1,1,3

D. 2,1,2,3

Answer: A



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15. The brown solution obtained when nitric oxide (NO) is absorbed in cold ferrous sulphate ($FeSO_4$) solution is due to formation of -

A. paramagnetic $[Fe(H_2O)_5(NO)]SO_4$

B. diamagnetic $[Fe(H_2O)_5(N_3)]SO_4$

C. paramagnetic $[Fe(H_2O)_5(NO)_3](SO)_4$

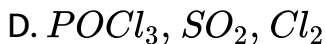
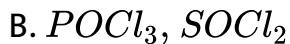
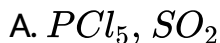
D. diamagnetic $[Fe(H_2O)_4(SO_4)]NO_3$

Answer: A



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16. The compounds obtained when sulphuryl chloride (SO_2Cl_2) reacts with phosphorus (P_4) are -

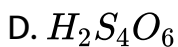
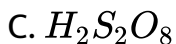
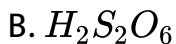
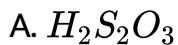


Answer: A



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17. The acid in which $O - O$ bonding is present is -

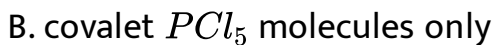
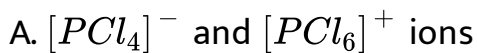


Answer: C



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18. In solid state, PCl_5 exists as -



C. $[PCl_4]^+$ and $[PCl_6]^-$ ions

D. covalent P_2Cl_{10} molecules only

Answer: C



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19. The boiling points of HF, HCl, HBr and HI follow the order -

A. $HF > HCl > HBr > HI$

B. $HF > HI > HBr > HCl$

C. $HI > HBr > HCl > HF$

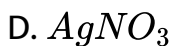
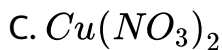
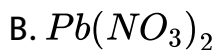
D. $HCl > HF > HBr > HI$

Answer: B



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20. Nitrogen dioxide is not produced on heating -



Answer: A



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21. Compound X is tested and the result are shown in the table .



Which ions are present in compound X -

- A. ammonium ions are sulphite ions
- B. ammonium mixture of KI and $NaIO_3$
- C. sodium mixture of NaI and KI
- D. ammonium ions and sulphate ions

Answer: A



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22. Which of the following solutions will turn violet when a drop of lime juice is added to it -

- A. a solution of NaI
- B. a solution mixture of KI and $NaIO_3$
- C. a solution mixture of NaI and KI

D. a solution mixture of KIO_3 and $NaIO_3$

Answer: B



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23. Of the following compounds, which one is the strongest Bronsted acid in an aqueous solution -

A. $HClO_3$

B. $HClO_2$

C. $HOCl$

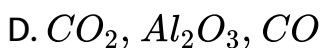
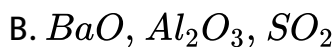
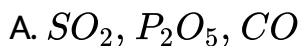
D. $HOBr$

Answer: A



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24. Which of the set of oxides are arranged in the proper order of basic, amphoteric, acidic -



Answer: B



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25. What phosphorus, P_4 has the following characteristic-



B. 4P - P single bonds

C. 4 lone - pair of electrons

D. P-P-P angle of 60°

Answer: C



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26. $[X] + \text{dil. } H_2SO_4 \rightarrow [Y]$, colourless suffocating gas
 $[Y] + K_2Cr_2O_7 + H_2SO_4 \rightarrow$ Green colouration of solution .

Then [X] and [Y] are -

A. SO_3^{2-} , SO_2

B. Cl^- , HCl

C. S^{2-} , H_2S

D. CO_3^{2-} , CO_2

Answer: A



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27. Cl_2O_7 is the anhydride of -

A. $HOCl$

B. $HClO_2$

C. $HClO_3$

D. $HClO_4$

Answer: D



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28. At room temperature , the reaction between water and fluoroine produces -

- A. HF and H_2O_2
- B. HF, O_2 and F_2O_2
- C. F^\ominus , O_2 and H^\ominus
- D. HOF and HF

Answer: C



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JEE - MAIN

1. The structure of IF_7 is -

- A. trigonal bipyramidal
- B. octahedral
- C. pentagonal bipyramidal
- D. square pyramidal

Answer: C



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2. Which of the following statements regarding sulphur is incorrect -

- A. the vapour at 200°C consists mostly of S_8 rings
- B. at 600°C the gas mainly consists of S_2 molecules

C. the oxidation state of sulphur is never less than + 4 in its compounds

D. S_2 molecule is paramagnetic

Answer: C



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3. Which of the following statements is wrong -

A. nitrogen cannot form $d\pi - d\pi$ bond

B. single $N - N$ bond is weaker than single P - P bond

C. N_2O_4 has two resonance structures

D. the stability of hydrides increases from NH_3 to BiH_3 in group - 15 of the periodic table

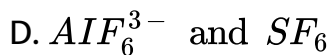
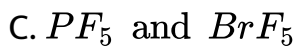
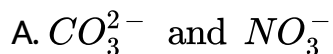
Answer: D



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4. Which two species of the following pairs are not isoelectronic

-

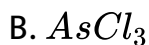


Answer: C



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5. In which of the following molecules, the bond angle is the lowest -



Answer: C



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6. Which of one the following statements is incorrect -

A. in the solid state , the colour of O_3 is blackish - violet

B. ozone is a diamagnetic gaseous substance

C. ONCl and ONO^\ominus are not isoelectronic

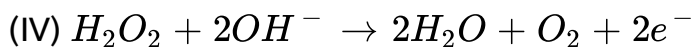
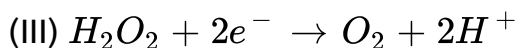
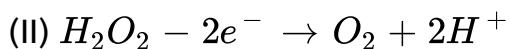
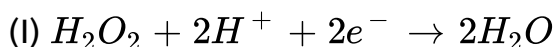
D. O_3 is a bent or angular molecule

Answer: D



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7. In which of the following reaction H_2O_2 acts as a reducing agent -



A. (II),(IV)

B. (I),(II)

C. (III) , (IV)

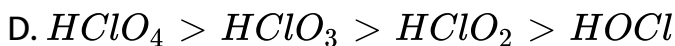
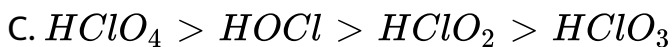
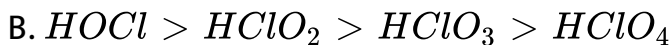
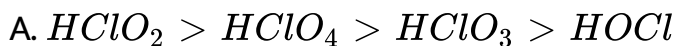
D. (I),(III)

Answer: A



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8. Among the following oxoacids, the correct decreasing order of acid strength is -



Answer: D



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9. Which of the following properties is not shown by NO -

- A. its bond order is 2.5
- B. it is diamagnetic in gaseous state
- C. it is a neutral oxide
- D. it combines with oxygen to form NO_2

Answer: B



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10. Which one of the following elements has the highest melting point -

A. He

B. Ne

C. Kr

D. Xe

Answer: D



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11. Which one is the most reactive -

A. Cl_2

B. Br_2

C. I_2

D. ICI

Answer: D



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12. Statement - 1 : The main constituents of air is nitrogen and oxygen . However, nitrogen does not react with oxygen to form nitrogen oxides.

Statements - 2 : It requires much higher temperature for the reaction between nitrogne and oxygen to take place.

A. both the two statements are correct and the statements

2 is the correct reason of the statemenet 1.

B. both the tow statements are correct , but the statement 2

is not the correct reason of the s statement 1.

C. the statement 1 is not correct, but the statement 2 is correct.

D. both the statements are wrong.

Answer: A



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13. The pair in which phosphorus atoms have a formal oxidation state of + 3 is -

A. orthophosphorous and pyrophosphorus acids

B. pyrophosphorus and hypophosphoric acids

C. orthophosphorus and hypophosphoric acids

D. pyrophosphorus and pyrophosphoric acids

Answer: A



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14. The reaction of zinc dilute and concentrated nitric acid, respectively produces -

A. N_2O and NO_2

B. NO_2 and NO

C. NO and N_2O

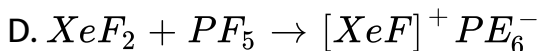
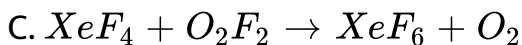
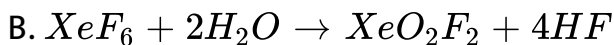
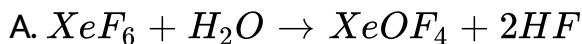
D. NO_2 and N_2O

Answer: A



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15. Which of the following reaction is an example of a redox reaction -

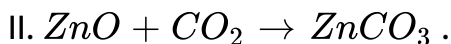
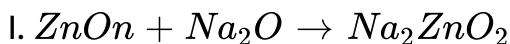


Answer: C



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16. In the following reaction, ZnO is respectively acting as a/an -



A. acid and acid

B. base and acid

C. acid and base

D. base and base

Answer: C



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17. The product obtained when chlorine gas reacts with cold and dilute aqueous NaOH are -

A. Cl^- and ClO^-

B. Cl^- and ClO_2^-

C. ClO^- and ClO_2^-

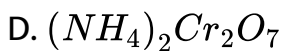
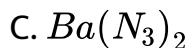
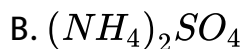
D. ClO_2^- and ClO_3^-

Answer: A



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18. The compound that does not produce nitrogen gas by the thermal decomposition is -



Answer: B



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19. Total compound is present in bleaching powder as a disinfectant -

A. 9

B. 12

C. 3

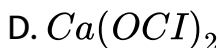
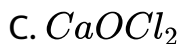
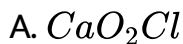
D. 6

Answer: A



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1. Which compound is present in bleaching powder as a disinfectant -



Answer: D



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2. Which one of the following statements is not applicable to the oxoacids of phosphorus -

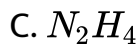
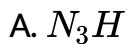
- A. in each oxoacid, tetrahedral 4 coordinated phosphorous atom is present
- B. in each oxoacid, there is at least one $\text{P} = \text{O}$ unit and one $\text{P} - \text{OH}$ group
- C. orthophosphoric acid is used to prepare triple super phosphate
- D. hypophosphorous acid is a diprotic acid

Answer: D



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3. In which of the following compounds the oxidation state of nitrogen is the highest -



Answer: A



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4. The change of oxidation state of chlorine that take place when Cl_2 is allowed to react with hot and concentrated NaOH solution are -

A. 0 to -1 and 0 to + 3

B. 0 to + 1 and 0 to -3

C. 0 to +1 and 0 to - 5

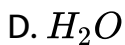
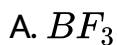
D. 0 to -1 and 0 to + 5

Answer: D



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5. The central atom of which compound contains three bond - pairs one lone pair -

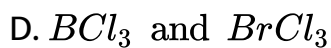
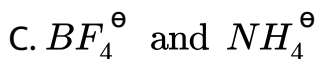
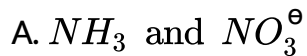


Answer: C



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6. Which pairs is isostructural -

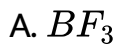


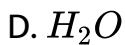
Answer: C



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7. Which one is a polar compound -



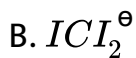
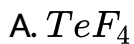


Answer: B



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8. Which one is isostructural with XeF_2^-

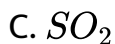
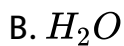


Answer: B



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9. In which of the following compounds, there is no π - bond -

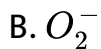


Answer: B



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10. Which one is paramagnetic species -



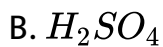
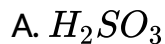


Answer: B



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11. Which one of the following is most acidic -



Answer: D



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12. The gas X is obtained on combustion of sulphide . It is a colourless gas with pungent , suffocating odour. It is harmful to our respiratory organs and is a constituent of acid rain. Its aqueous solution is acidic, it is a reducing agent and its aqueous solution is available . X is -

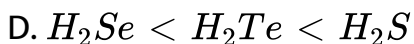
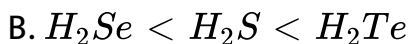


Answer: C



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13. Acidity of diprotic acids in aqueous solutions increases in the order -

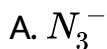


Answer: B



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14. Which one of the following species has planar triangular shape -





Answer: B



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15. The variation of the boiling point of the hydrogen halides is in the order $\text{HF} > \text{HI} > \text{HBr} > \text{HCl}$. What explains the higher boiling point of hydrogen fluoride -

A. the electronegativity of fluorine is much higher than for other elements in the group

B. there is a strong hydrogen bonding between HF molecules

C. there is a strong hydrogen bonding between HF molecules

D. the effect of nuclear shielding is much reduced in fluorine which polarises the HF molecule .

Answer: D



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16. Which of the statements give below is incorrect -

A. Cl_2O_7 is an anhydride of perchloric acid

B. O_3 molecule is bent

C. ONF is isoelectronic with O_2N^-

D. OF_2 is an oxide of fluorine

Answer: A



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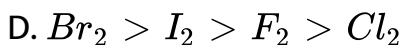
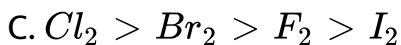
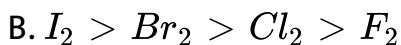
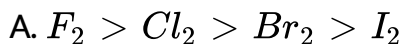
17. Strong reducing behaviour of H_3PO_2 is due to -

- A. persence of one - OH group and two P - H group
- B. high electron gain enthalpy of phosphour
- C. high oxidation state of phosphours
- D. presence of two - OH group and one P - H bond



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18. Which one of the following order is correct for the bond dissociation enthalpy of halogen molecules -

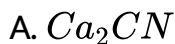


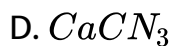
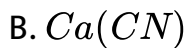
Answer: C



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19. The product obtained as a result of a reaction of nitrogen with CaC_2 is -





Answer: C



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20. Which one of the following statements is correct when SO_2 is passed through acidified $K_2Cr_2O_7$ solution -

A. green $Cr_2(SO_4)_3$ is formed .

B. the solution turns blue

C. the solution is decolourised

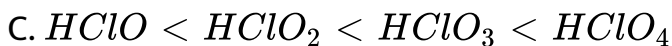
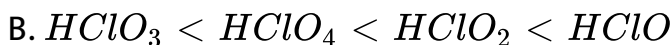
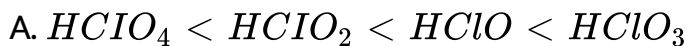
D. SO_2 is reduced

Answer: A



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21. Among the following , the correct order of acidity is -



Answer: C



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22. Which is the correct statement for the give acids -

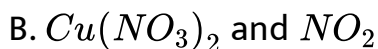
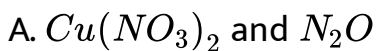
- A. phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.
- B. phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid
- C. both are diprotic acids
- D. both are triprotic acids

Answer: B



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23. When copper is heated with conc. HNO_3 it produces-



C. $Cu(NO_3)_2$ and NO

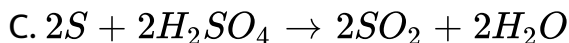
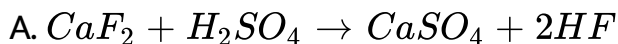
D. $Cu(NO_3)_2$ NO and NO_2

Answer: B



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24. Hot concentrated sulphur acid is a moderately strong oxidising agent. Which of the following reactions does not show oxidising behaviour -

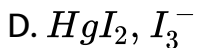
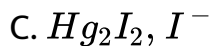
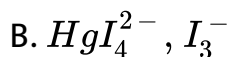
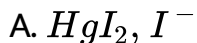


Answer: A



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25. $HgCl_2$ and I_2 both when dissolved in water containing I^- ions the pair of species formed is -

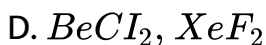
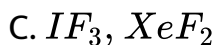
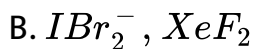
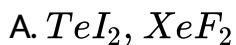


Answer: B



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26. Which of the following pairs of compounds is isoelectronic and isostructural -

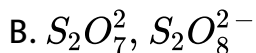
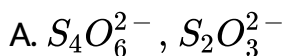


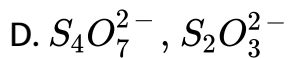
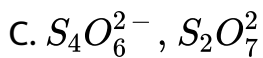
Answer: B



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27. In which pair of ions both the species contain S - S bond -



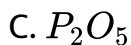
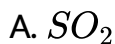


Answer: A



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28. Name the gas that can readily decolourise acidified $KMnO_4$ solution -



Answer: A



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29. In the structure of ClF_3 , the number of lone pairs of electrons on central atom Cl is -

A. 3

B. 1

C. 4

D. 2

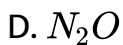
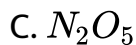
Answer: D



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30. Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to the natural and

human activity 0

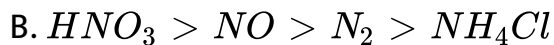
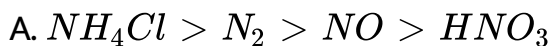


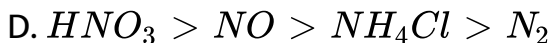
Answer: C



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31. The correct order of N - compound in its decreasing order of oxidation states is -





Answer: B



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32. Which of the following statements is not true for halogens -

A. chlorine has the highest electron gain enthalpy

B. all form monobasic oxyacids

C. all but fluorine show positive oxidation states

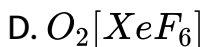
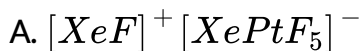
D. all are oxidising agents

Answer: C



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33. First compound of Xe synthesised was -

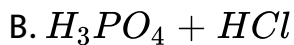
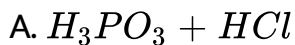


Answer: A



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34. PCl_3 on hydrolysis give fumes of -



C. H_3PO_2 and H_3PO_3

D. $H_3PO_2 + HCl$

Answer: A



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35. Which of the following is the correct statements for PH_3 -

A. it is less poisonous than NH_3

B. it is less basic than NH_3

C. electronegative of $PH_3 > NH_3$

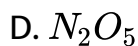
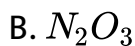
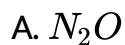
D. it does not show reducing properties.

Answer: B



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36. N - N bond length is minimum is -



Answer: A



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37. $S_2O_8^{2-}$ has -



C. O- O bridge

D. all S - O bond lengths are same

Answer: C



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38. How many P = O bonds present in $(HPO_3)_3^-$

A. 0

B. 3

C. 6

D. 9

Answer: B



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39. Which of the following statements is not true for hydrolysis of XeF_6 -

A. $XeOF_4$ and is formed

B. XeO_2F_2 is formed

C. it is a redox reaction

D. XeO_3 is formed

Answer: C



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40. Which is correct regarding acidity -

A. $H_2S < H_2Se$

B. $H_2S > H_2Se$

C. $H_2Se > H_2Te$

D. none of these

Answer: A



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41. Which halogen forms only one oxoacid (HOX).

A. F

B. Cl

C. Br

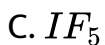
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Answer: A



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42. Enrichment of U^{235} is done by -

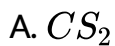


Answer: B



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43. Rhombic sulphur dissolves best in -



B. H_2O

C. ethanol

D. ether

Answer: A



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44. The true statement for the acids of phosphorus,

H_3PO_2 , H_3PO_3 and H_3PO_4 is -

A. the order of their acidity is $H_3PO_4 > H_3PO_3 > H_3PO_2$

B. all of them are reducing in nature

C. all of them are tribasic acid

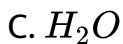
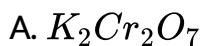
D. the geometry of phosphorus is tetrahedral in all the three

Answer: D



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45. Which of the following can be oxidised by SO_2 -



D. all of these

Answer: B



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46. Large difference in boiling points is observed in -

A. N and P

B. P and As

C. As and Sb

D. Sb and Bi

Answer: C



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47. Best reagent for the conversion of $AgNO_3$ to Ag -

A. $HClO_4$

B. H_3PO_2

C. HIO_4

D. I_2

Answer: B



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48. For which of the following elements it is difficult to disproportionate in +3 oxidation state -

A. N

B. As

C. Sb

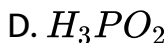
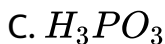
D. Bi

Answer: D



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49. Which of the following oxoacids of phosphorous is a reducing agent and a monobasic as well -



Answer: D



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50. Which of the following contains atleast one lone - pair in all of its halides -



B. Se

C. Cl

D. N

Answer: A



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51. Which of the following is true for N_2O_5 -

A. it is paramagnetic

B. it is an anhydride of HNO_2

C. it is a brown gas

D. it exists in solid state in the form of $[NO_2^+][NO_3^-]$

Answer: D



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52. Which of the following statements is incorrect -

- A. α - black phosphorus is formed by heating red phosphours
- B. β - black phosphorus does not burn in air upto 875K
- C. white phosphorus readily catches fire in air to give dense fumes of P_4O_{10}
- D. red phosphorus does not react with caustic alkalis

Answer: B



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1. When conc. H_2SO_4 is added to a chloride salt, white fumes are evolved but in the case of iodide salts brown fumes are evolved. This is because -

- A. HI is reduced to yield I_2 by H_2SO_4
- B. The colour of HI is brown
- C. HI is oxidised to gives I_2
- D. HI becomes converted to HIO_3 .

Answer: C



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2. In qualitative analysis, a black precipitate is obtained when H_2S is passed through an acidified aqueous solution of a salt . A blue coloured solution is obtained on boiling the precipitate with dilute HNO_3 . The substance obtained on addition of excess of ammonia solution to this blue solution is -

- A. deep blue precipitate of $Cu(OH)_2$
- B. deep blue solution of $[Cu(NH_3)_4]^{2+}$
- C. deep blue solution of $Cu(NO_3)_2$
- D. deep blue solution of $Cu(OH)_2 \cdot Cu(NO_3)_2$

Answer: B



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3. How many single and double bonds are present in cyclotrimetaphosphoric acid ?

- A. 3 double bond and 9 single bonds
- B. 6 double bonds and 6 single bonds
- C. 3 double bonds and 15 single bonds
- D. zero double and 12 single bonds .

Answer: C



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4. Which one of the following elements is able to form $p\pi - d\pi$ bond -

- A. carbon

B. nitrogen

C. phosphorous

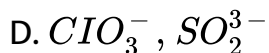
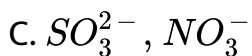
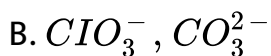
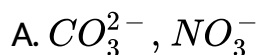
D. boron

Answer: C



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5. In which of the following ionic pairs, the two ions are isoelectronic and isostructural.



Answer: A



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6. Hydrogen-affinity of halogens decreases down the group from F to I . Which one of the hydrogen halides has the highest bond dissociation enthalpy -

A. HF

B. HCl

C. HBr

D. HI

Answer: A



Watch Video Solution

7. A gas is evolved when white phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2 .

Which one of the following statements about the gas is correct

-

A. the gas is highly poisonous and its odour is similar to that of rotten fish

B. the aqueous solution of the gas dissociates in the presence of light

C. the gas is more basic than NH_3

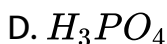
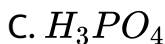
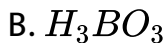
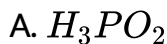
D. the gas is less basic than NH_3

Answer: A



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8. Which one of the following acids form 3 types of salts -



Answer: C



Watch Video Solution

9. The strong reducing property of H_3PO_2 is due to -

A. low oxidation state of phosphorus

B. presence of two - OH groups and one P - H bonds

C. present one - OH group and two P - H bonds

D. high electron gain enthalpy of phosphorus

Answer: C



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10. When lead nitrate is heated , oxides fo nitrogen and lead are obatined . These oxides are -

A. N_2O , PbO

B. NO_2 , PbO

C. NO , PbO

D. NO , PbO_2

Answer: B



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11. Which one of the following elements does not exhibit allotropy -

A. nitrogen

B. bismuth

C. antimony

D. arsenic

Answer: A



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12. The highest covalency of nitrogen is -

A. 3

B. 5

C. 4

D. 6

Answer: C



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13. Which of the following statements is not correct -

A. the N-N single bond is stronger than the P-P single bond

B. PH_3 acts as a ligand in forming addition compounds with transition metals

C. NO_2 is paramagnetic

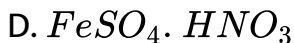
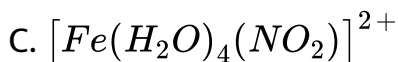
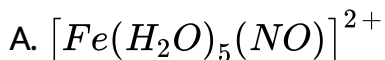
D. the covalency of nitrogen in N_2O_4 is 4

Answer: A



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14. The substance responsible for the appearance of a brown ring in the ring test for NO_3^- ions is -

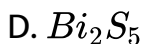
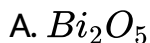


Answer: A



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15. The elements of group-15 form compounds in +5 oxidation state. However, bismuth forms only one compound in +5 oxidation state. The compound is -



Answer: B



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16. The substances obtained on heating ammonium dichromate and barium azide separately are-

A. N_2 in both the case

B. N_2 from ammonium dichromate and NO from barium azide

C. N_2O from ammonium dichromate and N_2 from barium azide

D. N_2O from ammonium dichromate and NO_2 from barium azide

Answer: A



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17. In the manufacture of HNO_3 NO is prepared by the catalytic oxidation of ammonia . The number of moles of NO obtained from 2 moles of NH_3 is -

A. 2

B. 3

C. 4

D. 6

Answer: A



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18. The oxidation number of the central atom of the anion of the compound NaH_2PO_2 is -

A. +3

B. +5

C. +1

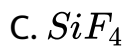
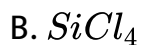
D. -3

Answer: C



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19. Which one of the following is not tetrahedral in shape -

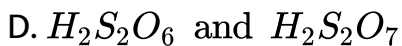
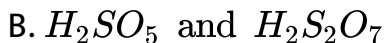
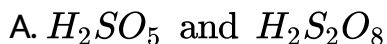


Answer: C



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20. Which one of the following is a peroxyacid of sulphur -



Answer: A



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21. Hot and concentrated H_2SO_4 is a strong oxidising agent. It oxidises both metals and non-metals. Which one of the following elements forms two gaseous products on oxidation with conc. H_2SO_4 -

A. Cu

B. S

C. C

D. Zn

Answer: C



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22. A black compound of Mn reacts with a halogen acid to form a greenish yellow gas. When NH_3 reacts with excess of that gas, an unstable trihalide is obtained. The change of oxidation state of nitrogen in this process is -

A. -3 to $+3$

B. -3 to 0

C. -3 to $+5$

D. 0 to -3

Answer: A



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23. Preparation of xenon compounds by Neil Bartlett is based on the compound $O_2^+ [PtF_6]^-$ because -

A. O_2 and Xe are similar in size

B. the electron gain enthalpy of O_2 and Xe are the same

C. the ionisation enthalpies of O_2 and Xe are the same

D. both Xe and O_2 are gases

Answer: C



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24. In the solid state, PCl_5 is -

A. covalent solid

B. octahedral

C. an ionic solid which contains octahedral $[PCl_6]^+$ ion and tetrahedral $[PCl_4]^-$ ions

D. an ionic solid which contains tetrahedral $[PCl_4]^+$ ion and octahedral $[PCl_6]^-$ ions

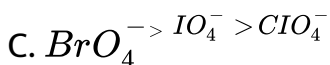
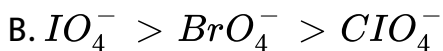
Answer: D



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25. Reduction potential values of some Ions are given below.

Arrange them in order of decreasing oxidising power-

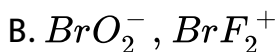
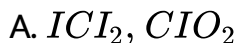


Answer: C



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26. Which one of the following pair is isoelectronic -



C. ClO_2 , BrF

D. CN^- , O_3

Answer: B



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MULTIPLE CHOICE QUESTION

1. H chlorine gas is passed through hot NaOH solution, two changes are observed in the oxidation number of chlorine during the reaction. These are ____ and ____.

A. 0 to +5

B. 0 to -3

C. 0 to -1

D. 0 to +1

Answer: A::C



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2. Which of the following options are not in accordance with the property mentioned against them -

A. $F_2 > Cl_2 > Br_2 > I_2$ (oxidising power)

B. $MI > MBr > MCl > MI$ (ionic character)

C. $F_2 > Cl_2 > Br > I_2$ (bond dissociation enthalpy)

D. $HI < HBr < HCl < HF$ (H - X bond strenght)

Answer: B::C



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3. Which of the following are correct for P_4 molecule of white phosphorus -

- A. it has 6 lone pair of electrons
- B. it has six P- P single bonds
- C. it has three P - P single bonds
- D. it has four lone pairs of electrons

Answer: B::D



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4. Which of the following statements are correct -

- A. among halogens, radius ratio between iodine and fluorine is maximum
- B. leaving F-F bond, all halogens have weaker X - X bond than X - X' bond in interhalogens
- C. among interhalogen compounds, maximum number of atoms are present in iodine fluoride
- D. interhalogen compounds are more reactive than halogen compounds

Answer: A::C::D



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5. Which of the following statements are correct for SO_2 -

- A. it acts as bleaching agent in moist conditions
- B. its molecule has linear geometry
- C. its dilute solution is used as disinfectant
- D. it can be prepared by the reaction of dilute H_2SO_4 with metal sulphide

Answer: A::C



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6. Which of the following statements are correct -

- A. all the three N- O bond lengths in HNO_3 are equal
- B. all P- Cl bond lengths in PCl_5 molecule in gaseous state are equal

C. P_4 molecule in white phosphorus have angular strain

therefore, white phosphorus have angular strain

therefore, white phosphorus is very reaction

D. PCl_5 is ionic in solid state in which cation is tetrahedral

and anion is octahedral

Answer: C:D



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7. Which of the following orders are correct as per the properties mentioned against each-

A. $As_2O_3 < SiO_2 < P_2O_3 < SO_2$ (acid strength)

B. $AsH_3 < PH_3 < NH_3$ (enthalpy of vapourisation)

C. $S < O < Cl < F$ (more negative electron gain enthalpy)

D. $H_2O > H_2S > H_2Se > H_2Te$ (thermal stability)

Answer: A



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8. Which of the following statements are correct-

A. S-S bond is present in $H_2S_2O_8$

B. in peroxosulphuric acid (H_2SO_5) Sulphur is in +6 oxidation state

C. iron powder along with Al_2O_3 and K_2O is used as a catalyst in the preparation of NH_3 by Haber's process

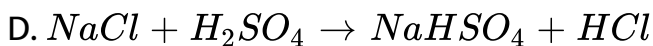
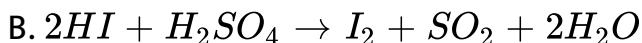
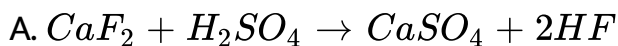
D. change in enthalpy is positive for the preparation of SO_3 by catalytic oxidation of SO_2

Answer: A



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9. In which of the following reactions conc. H_2SO_4 is used as an oxidising reagent -



Answer: B



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10. Which of the following statements are true -

- A. only type of interactions between particles of noble gases are due to weak dispersion force
- B. ionisation enthalpy of molecular oxygen is very close to that of xenon
- C. hydrolysis of XeF_6 is a redox reaction
- D. xenon fluorides are not reactive

Answer: A



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SHORT ANSWER TYPE

1. In the preparation of H_2SO_4 by Contact Process, why is SO_3 not absorbed directly in water to form H_2SO_4 ?



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2. Write a balanced chemical equation for the reaction showing catalytic oxidation of NH_3 by atmospheric oxygen.



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3. Write the structure of pyrophosphoric acid.



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4. PH_3 forms bubbles when passed slowly in water but NH_3 dissolves. Explain why ?



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5. In PCl_5 phosphorus is in sp^3 hybridised state but all its five bonds are not equivalent. Justify your answer with reason.



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6. Why is nitric oxide paramagnetic in gaseous state but the solid obtained on cooling it is diamagnetic?



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7. Explain why CIF_3 exists but FClI_3 does not



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8. Out of H_2O and H_2S , which one has higher bond angle and why ?



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9. SF_6 is known but SCl_6 is not . Why ?



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10. On reaction with Cl_2 phosphorous forms two types of halides 'A' and 'B'. Halide A is yellowish - white powder but halide

'B' is colourless only liquid. Identify A and B and write the formulas for their hydrolysis products.



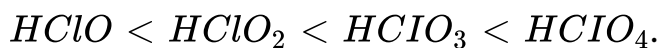
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11. In the ring test of NO_3^- ion, Fe^{2+} ion reduces nitrate ion to nitric oxide, which combines with Fe^{2+} to form brown complex. Write the reactions involved in the formation of brown ring.



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12. Explain why the stability of oxoacids of chlorine increases in the order given below.



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13. Explain why ozone is thermodynamically less stable than oxygen .



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14. P_4O_6 reacts with water according to equation $P_4O_6 + 6H_2O \rightarrow 4H_3PO_3$. Calculate the volume of 0.1 M NaOH solution required to neutralise the acid formed by dissolving 1.1 g of P_4O_6 in H_2O .



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15. White phosphorus reacts with chlorine and the product hydrolyses in the presence of water, Calculate the mass of HCl

obtained by the hydrolysis of the product formed by the reaction of 62 g of white phosphorus with chlorine in the presence of water.



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16. Name three oxoacids of nitrogen . Write the disproportion reaction of that oxoacids of nitrogen in which nitrogen is in +3 oxidation state .



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17. Nitric acid forms an oxide of nitrogen on reaction with P_4O_{10} . Write the reaction involved . Also write the reasoning structures of the oxides of nitrogen formed.



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18. Phosphorus has three allotropic forms - (i) white phosphorus (ii) red phosphorus and (iii) black phosphorus. Write the difference between white and red phosphorus on the basis of structure and reactivity .



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19. Give an example to show the effect of concentration of nitric acid on the formation of oxidation product .



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20. PCl_5 reacts with finely divided silver on heating and a white silver salts is obtained , which dissolved on adding excess

aqueous NH_3 solution . Write the reactions involved to explain what happens .



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21. Phosphorus form a number of oxoacids . Out of these oxoacids phosphinic acid has strong reduction showing its reducing behaviour .Write its structure and also write a reaction showing its reducing behaviour.



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MATCHING TYPE

1. 



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ASSERTION - REASON TYPE

1. Assertion (A) : N_2 is less reactive than P_4 .

Reason (R) : Nitrogen has more electron gain enthalpy than phosphorus.

- A. (A) and (R) both are correct statements and (R) is correct explanation for (A).
- B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).
- C. (A) is correct statement but (R) is wrong statement.
- D. (A) and (R) both are incorrect statements.

Answer: C



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2. Assertion (A) : HNO_3 makes iron passive.

Reason (R) : HNO_3 forms a protective layer of ferric nitrate on the surface of iron.

- A. (A) and (R) both are correct statements and (R) is correct explanation for (A).
- B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).
- C. (A) is correct statement but (R) is wrong statement.
- D. (A) and (R) both are incorrect statements.

Answer: C



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3. Assertion (A) : HI cannot be prepared by the reaction of KI with concentrated H_2SO_4 .

Reason (R) : HI has lowest H - X bond strength among halogen acids .

A. (A) and (R) both are correct statements and (R) is correct explanation for (A).

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) and (R) both are incorrect statements.

Answer: B



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4. Assertion (A) : both rhombic and monoclinic sulphur exist as S_8 but oxygen exists as O_2 .

Reason (R) : Oxygen forms $p\pi - p\pi$ multiple bond due to small size and small bond length but $p\pi - p\pi$ bonding is not possible in sulphur .

- A. (A) and (R) both are correct statements and (R) is correct explanation for (A).
- B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).
- C. (A) is correct statement but (R) is wrong statement.
- D. (A) and (R) both are incorrect statements.

Answer: A



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5. Assertion (A) : NaCl reacts with concentrated H_2SO_4 to give coloured fumes with pungent smell. But on adding MnO_2 the fumes become greenish - yellow.

Reason (R) : MnO_2 oxidises HCl to chlorine gas which is greenish -yellow.

Reason (R) : MnO_2 oxidises HCl to chlorine gas which greenish- yellow.

- A. (A) and (R) both are correct statements and (R) is correct explanation for (A).
- B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).
- C. (A) is correct statement but (R) is wrong statement.
- D. (A) and (R) both are incorrect statements.

Answer: A



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6. Assertion(A) : SF_6 cannot be hydrolysed but SF_4 can be .

Reason (R) : Six F atoms in SF_6 prevent the attack of H_2O on sulphur atom of SF_6 .

- A. (A) and (R) both are correct statements and (R) is correct explanation for (A).
- B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).
- C. (A) is correct statement but (R) is wrong statement.
- D. (A) and (R) both are incorrect statements.

Answer: A



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7. An amorphous solid A burns in air to form a gas B which turns lime water milky . The gas is also produced during roasting of sulphide ore. This gas decolourises acidified aqueous $KMnO_4$ solution and reduces Fe^{3+} to Fe^{2+} . Identify the solid 'A' and the gas B and write the reactions involved .



[View Text Solution](#)

8. On heating lead (II) nitrate gives a brown gas 'A' . The gas 'A' on cooling changes to colourless solid 'B'. Solid 'B' on heating with NO change to a blue solid 'C'. Identify 'A' , 'B' and 'C' and also write reactions involved and draw the structures of 'B' and 'C'.



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9. On heating compound 'A' gives a gas 'B' which is a constituent of air. This gas when treated with 3 mol of hydrogen (H_2) in the presence of a catalyst gives another gas 'C' which is basic in nature. Gas 'C', on further oxidation in moist condition gives a compound 'D' and also give necessary equations of the steps involved .



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MCQ(SINGLE CORRECT TYPE)

1. The catalyst used in the manufacture of ammonia by Haber's process is -

A. Fe/Mo

B. P_2O_5

C. Pt

D. NiO

Answer: A



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2. If acidified $KMnO_4$ solution is added dropwise into sodium peroxide solution the gas evolved is -

A. dinitrogen

B. dioxygen

C. dihydrogen

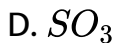
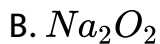
D. hydrogen peroxide

Answer: B



Watch Video Solution

3. Which one of the following oxides reacts with water to produce oxygen -

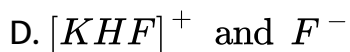
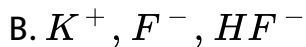
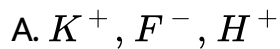


Answer: B



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4. The ions present in KHF_2 are -



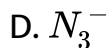
Answer: C



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5. Which one of the following ions is not a pseudohalogen-





Answer: B



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6. The geometrical shape of ClO_3^- ion is -

A. trigonal pyramidal

B. tetrahedral

C. trigonal planar

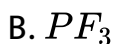
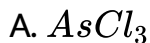
D. trigonal bipyramidal

Answer: B



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7. Which one of the following does not undergo hydrolysis-

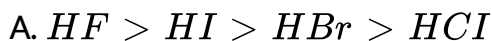


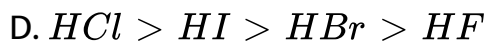
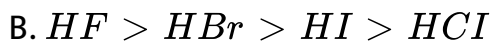
Answer: D



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8. Which one of the following is the correct sequence of their melting points-



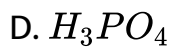
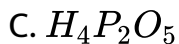
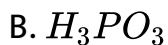
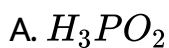


Answer: A



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9. In which one of the following P - H bond is absent -



Answer: D



Watch Video Solution

10. Hydrolysis of XeF_4 and $CaNCN$ gives respectively-

- A. XeO_3 and $CaCO_3$
- B. XeO_2 and $CaCN_2$
- C. $XeOF_3$ and $CaCN_2$
- D. $XeOF_2$ and $CaCO_3$

Answer: D



Watch Video Solution

11. Which one of the following exists as a molecule in the gaseous state and remains ionised in the solid state -

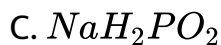
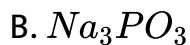
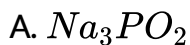


Answer: A



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12. The salt produced by the neutralisation of hypophosphorous acid with NaOH is -



D. Na_2HPO_2

Answer: C



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13. The percentage of π - character of the P - P bonds present in P_4 is -

A. 25

B. 33

C. 50

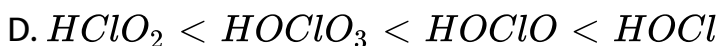
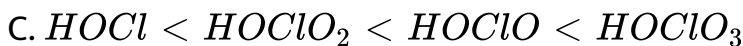
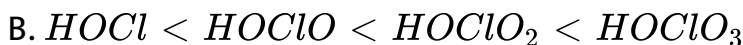
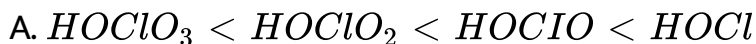
D. 75

Answer: D



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14. Which one of the following represents the correct sequence of acidic character -



Answer: B



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15. $\text{P}_4 + 3\text{NaOH} + 3\text{H}_2\text{O} \rightarrow 3\text{NaH}_2\text{PO}_2 + \text{PH}_3$ is a -

A. disproportionation reaction

- B. neutralisation reaction
- C. double decomposition reaction
- D. pyrolytic reaction

Answer: A



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16. A compound reacts with excess nitric acid and ammonium molybdate to give a yellow precipitate and with $AgNO_3$ a red precipitate. The compound is -

- A. orthophosphate
- B. pyrophosphate
- C. metaphosphate
- D. hypophosphate

Answer: A



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17. Liver of sulphur is a mixture of -

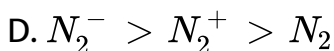
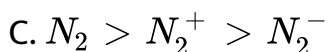
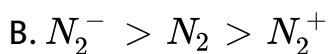
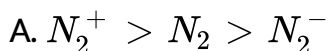
- A. potassium chloride and potassium thiosulphate
- B. potassium carbonate and potassium thiosulphate
- C. potassium nitrate and potassium thiosulphate
- D. potassium thiosulphate and potassium disulphide

Answer: D



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18. Which one of the following represents the correct sequence of bond order -



Answer: C



Watch Video Solution

19. In contact with conc. HNO_3 skin turns yellow because -

A. protein is converted to xanthoprotein

B. HNO_3 acts as a dehydrating agent

C. nitrocellulose is produced

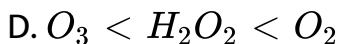
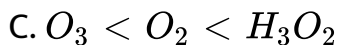
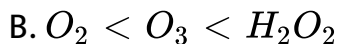
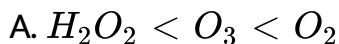
D. HNO_3 serves as an oxidising agent

Answer: A



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20. The correct sequence of O - O bond order in O_2 , H_2O_2 and O_3 is -



Answer: B



[Watch Video Solution](#)

21. The colour of the gas evolved by the reaction between chloroplatinic acid and ammonia is -

A. white

B. yellow

C. green

D. violent

Answer: B



[Watch Video Solution](#)

22. The number of S - S bonds in sulphur trioxide trimer (S_3O_9) is -

A. 3

B. 2

C. 1

D. 0

Answer: D



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23. The colour of a flower is bleached by the reducing action of a gas and by the oxidising action of another gas. The gases are -

A. CO and CO_2

B. H_2S and Br_2

C. SO_2 and Cl_2

D. NH_3 and SO_3

Answer: C



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24. The most stable noble gas hydrate is -

A. $Kr - 4H_2O$

B. $Kr.6H_2O$

C. $Xe.4H_2O$

D. $Xe.6H_2O$

Answer: A



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25. Which of the following nitrogen oxides is ionic -

- A. nitrogen trioxide
- B. nitrogen pentoxide
- C. dinitrogen tetroxide
- D. nitric oxide

Answer: B



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26. The hybridisation state of iodine in ICl_2^- is -

- A. sp^3d
- B. sp^3d^2
- C. sp^2

D. sp^3

Answer: B



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27. The number of lone pair of electrons on the Xe - atom in XeF_2 , XeF_4 and XeF_6 molecules are respectively -

A. 3,2,1

B. 4,3,2

C. 2,3,1

D. 3,2,0

Answer: A



View Text Solution

28. Which one of the following does not give any precipitate on reaction with lead acetate -

A. HI

B. HBr

C. HCl

D. HF

Answer: B



Watch Video Solution

29. In Fischer - Ringe's method , which of the following is used to separate the mixture of noble gases from air -

A. 90 % CaC_2 + 10 % $CaCl_2$

B. coconut charcoal

C. sodalime + potash solution

D. 90 % $CaCO_3$ + 10% urea

Answer: A



Watch Video Solution

30. The bottle of liqure ammonia is cooled before opening the cork because it -

A. is a mild explosive

B. is a corrosive liquid

C. is harmful to lung

D. exerts high vapour pressure

Answer: D



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31. With increase in the number of - OH group in H_2PO_2 , H_3PO_3 and H_3PO_4 acidic nature -

A. gradually increases

B. gradually decreases

C. remains the same

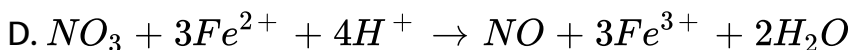
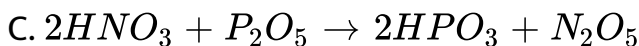
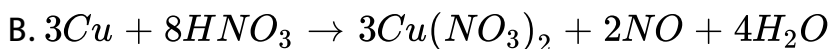
D. no difference

Answer: C



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32. In which of the following reactions HNO_3 , does not act as an oxidising agent -



Answer: C



Watch Video Solution

33. The main reason behind fluorine to be the strongest oxidising agent is its -

- A. electron affinity
- B. ionisation enthalpy
- C. hydration enthalpy
- D. bond dissociation energy

Answer: C



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34. In spite of the presence of unpaired electron, ClO_2 does not form dimer because -

- A. the unpaired electron gets delocalised
- B. the unpaired electron gets delocised over chlorine
- C. two $Cl - O$ bonds are of unequal lengths

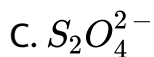
D. $p_x - p_x$ bond is present in chlorine

Answer: A



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35. Which of the following is basic as well as reducing.



Answer: A



Watch Video Solution

36. Which one of the following is used as the photosensitive substance in xerox machines -

A. Hg

B. black P

C. Se

D. Te

Answer: C



Watch Video Solution

37. Which is not correct -

A. XeF_2 is a strong oxidant

B. under high pressure Xe react with F_2 to give XeF_2

C. alkaline hydrolysis of XeF_2 gives Xe and O_2

D. there are 2 bond pairs and 3 lone pairs in XeF_2

Answer: A



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38. In which one of the following $d\pi - p\pi$ bond is present -

A. NO_3^- , NO_2^- , N^{3-} , CN^-

B. P_2O_3 , P_2O_4 , PO_4^{3-}

C. NH_3 , PH_3 , BiH_3

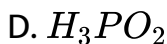
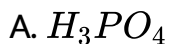
D. CO , NO , CO_2

Answer: B



View Text Solution

39. Which one of the following is known as glacial phosphoric acid -

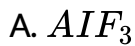


Answer: B



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40. Which of the following is used to prepare UF_6 from a sample of ${}_{92}^{235}U$ —

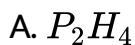


Answer: C



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41. In impure state , phosphine is not combustible due to the presence of -



D. P_2O_5

Answer: A



View Text Solution

42. Which of the following statements is not correct -

A. on heating , $Pb(NO_3)_2$ gives NO_2

B. NO_2 is a brown coloured gas

C. NO_2 is diamagnetic in nature

D. NO_2 readily forms dimer N_2O_4

Answer: C



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43. At -100°C , coconut charcoal absorbs the mixture of -

- A. He and Kr
- B. Ar, Kr and Xe
- C. Kr and Xe
- D. He and Ne

Answer: B



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44. In the reaction, $\text{IO}_3^- + a\text{I}^- + b\text{H}^+ \rightarrow c\text{H}_2\text{O} + d\text{I}_2$ -

- A. $a = 5, b = 6, c = 3, d = 3$
- B. $a = 5, b = 3, c = 6, d = 3$
- C. $a = 3, b = 5, c = 3, d = 6$

D. $a = 5, b = 6, c = 5, d = 5$

Answer: A



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45. Order of nucleophilic character of I^- , Cl^- , Br^- is -



Answer: B



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46. $CuSO_4$ is treated with excess KI and then $Na_2S_2O_3$ is added to the reaction mixture. Which of the following is not correct -

- A. Cu_2I_2 is produced
- B. CuI_2 is produced
- C. $Na_2S_2O_3$ is oxidised
- D. I_2 gets reduced

Answer: B



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47. The oxidation state of Fe in the brown ring

$[Fe(H_2O)_5NO]^{2+}$ is -

A. 0

B. +1

C. +2

D. +3

Answer: B



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48. Hypochlorous acid undergoes disproportionation reaction to produce -

A. HClO_3 and Cl_2O

B. HClO_2 and HClO_4

C. HCl and Cl_2O

D. HCl and $HClO_3$

Answer: D



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49. Euchlorine is a mixture of -

A. Cl_2 , Cl_2O

B. Cl_2 , ClO_2

C. ClO_2 , Cl_2O

D. None of these

Answer: D



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50. The available chlorine content of a sample of bleaching powder is 49. If 10g of this sample is treated with HCl, volume of evolved Cl_2 (at STP) will be -

- A. 1.5L
- B. 3.0L
- C. 15.0L
- D. 150L

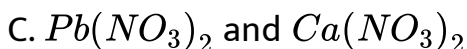
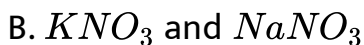
Answer: A



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MCQ(MORE THAN ONE CORRECT TYPE)

1. Which of the following nitrate pairs produce the same gaseous substance on thermal decomposition -

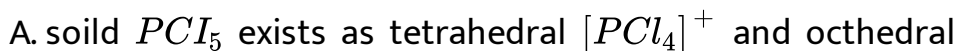


Answer: B



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2. Which of the following statements are incorrect -



B. P_2O_3 and P_2O_5 exists as monomers

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

D. solid N_2O_5 exists as $NO_2^+ NO_3^-$

Answer: B



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3. The compound X reacts with ozone in aqueous medium to form Y. Ozone reacts with Y to form . If Z is an oxidising agent, then X, Y and Z are respectively -

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

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

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

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

Answer: B



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4. Which of the following gases make a piece of filter paper soaked in acidified potassium dichromate solution green -

A. CO_2

B. NO

C. SO_3

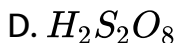
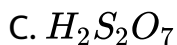
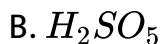
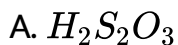
D. SO_2

Answer: B



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5. In which of the following compounds peroxo linkage ($-O-O-$) is present -

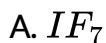


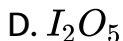
Answer: B::D



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6. In which of the following, cationic is present -





Answer: B



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7. Which statements regarding XeF_6 are correct -

A. it undergoes partial hydrolysis to yield to $XeOF_4$

B. it reacts with silica to produce $XeOF_4$

C. it is obtained by reaction between XeF_4 and O_2F_2

D. it reacts with XeO_3 to form $XeOF_4$

Answer: A



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8. Which of the following statements regarding inter-halogen compounds of the type AB_x are correct -

A. the value of x may be 1,3,5 and 7

B. A is more electronegative than B

C. FBr_3 has no existence

D. ClF_3 and IF_5 and distorted from their normal shapes
and that can be explained by VSEPR theory

Answer: A,C



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VERY SHORT ANSWER - TYPE QUESTIONS

1. Write the electronic configuration of Bi with noble gas core.



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2. Write names of two important minerals of phosphorus.



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3. Which one among the pnictogen is a typical metal ?



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4. Which group - 15 elements has the lowest ionisation enthalpy ?



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5. Which one of group - 15 elements has the lowest boiling point?



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6. Which of the group - 15 hydrides is the strongest base ?



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7. PCl_5 exists but NCI_5 does not. Why ?



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8. Which one of group -15 hydrides is the stronger boiling points?



Watch Video Solution

9. Which nitrogen halide does not undergo hydrolysis ?



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10. Explain why N_2 is very less reactive at normal temperature .



Watch Video Solution

11. Explain why NO_2 forms dimer .



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12. H_3PO_2 possess reducing property - why ?



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13. How can it be proved that PH_3 possess basic property ?



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14. $R_3P = O$ exists but $R_3N = O$ does not - why ?



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15. How does PCl_5 exist in the solid state ?



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16. Phosphoric acid is syrupy liquid - why ?



[Watch Video Solution](#)

17. Explain why BiH_3 is the strongest reducing agent among the hydrides of group - 15 elements.



[Watch Video Solution](#)

18. Which group-16 elements has the highest electronegativity ?



[Watch Video Solution](#)

19. Which of the group-15 hydrides has the highest electronegativity ?



Watch Video Solution

20. H_2S is more acidic than H_2O why ?



Watch Video Solution

21. Mention the shape of SF_6 molecule.



Watch Video Solution

22. Unlike sulphur , oxygen does not exhibit + 4 and = 6 states - why ?



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23. Give example of two compounds one in which the oxidation state of oxygen is +2 and the other in which it is -1.



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24. Given an example of a salts which produces dioxygen when heated.



Watch Video Solution

25. Explain why SO_2 possesses considerable reducing property.



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26. What is oleum ?



Watch Video Solution

27. Prove that fluorine is a stronger oxidising agent than chlorine.



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28. Give an example of a compound where oxidation state of Cl is + 7.



Watch Video Solution

29. Explain why HF is the weakest among the halogen hydrides even though fluorine is the highest electronegative element



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30. Explain why fluorine does not form F_3^- ions.



Watch Video Solution

31. Name a poisonous gas which can be prepared from Cl_2 gas.



Watch Video Solution

32. Which halogen hydride cannot be stored in a glass vessel?



Watch Video Solution

33. Which oxoacid of chlorine is the strongest one?



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34. Give an example of an interhalogen compound which is pentagonal bipyramidal in shape.



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35. Which noble gas compound is isostructural with IBr_2^- ?



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1. Due to ____, nitrogen does not form pentahalides.



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2. In the gaseous state, nitric oxide is ____ but in the liquid state it is ____.



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3. ____ is formed on dehydration of HNO_3 by P_4O_{10} .



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4. H_3PO_3 is a _____ acid.



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5. Only compound of Bi with +5 oxidation state is _____.



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6. Among conc. H_2SO_4 , P_2O_5 , CaO and $CaCl_2$, only _____ can be used for drying NH_3 gas in the laboratory.



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7. _____ out of Bi(V) and Sb(V) is stronger oxidising agent.



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8. _____ is the most abundant among all the elements.



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9. ____ is a photosensitive element.



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10. The central S-atom of SF_6 molecule is ____ hybridised.



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11. Superoxides exhibit ____ .



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12. The oxidation state of sulphur in Marshall's acid is ____.



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13. Due to _____ conc. H_2SO_4 is a high boiling liquid.



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14. _____ is the most reactive among the halogens.



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15. The F-F bond dissociation enthalpy is ____ than the Cl-Cl bond dissociation enthalpy.



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16. HF is a ___ acid than HI.



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17. Iodine exhibits an oxidation state of _____ in the third excited state.



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SHORT ANSWER-TYPE QUESTIONS

1. Nitrogen is a gas while phosphorus is a solid-why?



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2. White phosphorus is more reactive than red phosphorus-why?



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3. Give an example of the formation of a solid product by the reaction between two gaseous substances.



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4. Liquid ammonia is widely used as a refrigerant-why?



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5. H_3PO_3 acts as a reducing agent but H_3PO_4 does not why?



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6. NCl_3 undergoes ready hydrolysis but NF_3 does not why?



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7. Give an example of a disproportionation reaction of H_3PO_3 .



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8. What is Holme's signal?



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9. At room temperature, H_2O is a liquid but H_2S is a gas why?



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10. Explain why ozone is a strong oxidising agent.



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11. Na_2O_2 is called peroxide but PbO_2 is called dioxide why ?



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12. Rubber cork is not used in any experiment involving - why ?



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13. How can dilute H_2SO_4 be prepared from concentrated H_2SO_4 ?



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14. State what happens when cone. H_2SO_4 is added to cane sugar.



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15. OF_6 does not exist-why?



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16. Identify X in the reaction: $Cl_2 + 2X^- \rightarrow 2Cl^- + X_2$ and explain.



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17. Arrange $HClO$, $HClO_3$, $HClO_4$ and $HClO_4$ in order of increasing oxidising power and explain the order.



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18. Iodine is liberated when Cu^{2+} reacts with KI but chlorine is not liberated when Cu^{2+} is allowed to react with KCl. Why?



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19. What can be used to remove iodine stain from clothes and why?



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20. F is a non-metal but I exhibits some metallic property why?



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21. Interhalogen compounds are more reactive halogens-why?



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22. The noble gases are almost chemically inert-why ?



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23. Explain why xenon can be liquefied more easily than helium.



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ADDITIONAL QUESTIONS (STATE WITH EQUATIONS, WHAT HAPPENS WHEN)

1. Excess of ammonia solution is added to $CuSO_4$ solution.



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2. Excess of Cl_2 gas is allowed to react with ammonia.



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3. CO_2 gas is passed through liquid ammonia at 473K under a pressure of 200 atmosphere.



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4. NO gas is passed through acidified $KMnO_4$ solution.



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5. Metallic Mg is reacted with very dilute (1-2%) and cold HNO_3 .



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6. Conc. HNO_3 is added to $FeSO_4$ solution in presence of H_2SO_4 .



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7. Aqua regia is added to gold.



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8. White phosphorus is added to silver nitrate solution.



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9. Phosphorus acid is heated.



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10. Phosphine gas is passed through silver nitrate solution.



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11. H_3PO_3 is added to $KMnO_4$ solution acidified with H_2SO_4 .



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12. Phosphonium iodide is heated with concentrated KOH solution.



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13. O_3 gas is passed through KI solution.



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14. O_3 gas is passed through acidified $FeSO_4$ solutions.



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15. Propene is reacted with O_3 and the resulting compound is decomposed with Zn / H_2O



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16. SO_2 gas is passed through a clear solution of lime water.



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17. H_2S is passed through hot and concentrated H_2SO_4 .



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18. Concentrated H_2SO_4 is added to cane sugar .



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19. F_2 gas is passed through 2% NaOH solution.



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20. A mixture of NaCl, MnO_2 and concn. H_2SO_4 is heated .



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21. HCl is added to bleaching powder.



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22. Cl_2 gas is passed through acidified $FeSO_4$ solution.



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23. SO_2 gas is passed through chlorine - water .



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24. Cl_2 gas is passed through hot and concentrated NaOH solution.



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25. Cl_2 gas is passed through cold and dilute $Ca(OH)_2$ solution.



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26. H_2S gas is passed through chlorine -water .



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27. Potassium bromide is heated with F_2 gas at 625K.



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28. Hydrofluoric acid is stored in glass bottle.



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29. A mixture of F_2 gas and an excess of xenon gas is heated at 673K under a pressure of 1 bar.



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30. SiO_2 is reacted with XeF_6 .



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31. Concentrated H_2SO_4 is added to barium perxenate.



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32. $XeOF_4$ is stored in a glass bottle.



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33. XeO_2F_2 is hydrolysed.



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PROBLEMS REALATED TO IDENTIFICATION OF COMPOUNDS -

1. When conc. H_2SO_4 is added into an unknown salt taken in a test- tube a, brown gas A is evolved . The colour of the gas in intensified when Cu - turning are added into the test-tube . When A is cooled , colourless gas A B is obtained . Identify A and B and write the reaction involved.



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2. A metal (A) burns in dinitrogen to give an ionic compound (B). (B) reacts with water to give (C) and (D). When CO_2 gas is passed through the that solution, the solution becomes transparent again. When the gas (D) is passed through $CuSO_4$ solution the solution becomes deep blue in colour. Identify (A), (B), (C) and (D) give the reactions involved.



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3. A greenish yellow gas (B) is obtained when a mixture of a black powder (A), NaCl and conc H_2SO_4 is heated. When gas (B) is passed through liquor ammonia, N_2 gas is liberated. When one of the compounds obtained by passing the gas (B) through hot KOH solution is heated with (A), O_2 is obtained. Identify (A) & (B) and write the reactions involved.



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4. When a white waxy solid (A) is heated in an inert atmosphere, it is converted into its allotropic form (B). (A) reacts with very dilute solution of its allotropic form with very dilute solution of KOH to form a highly poisonous gas (C) having smell of rotten fish. (C) reacts with excess of chlorine to form (D) which on hydrolysis produces the compound (E). Identify (A), (B), (C), (D) and (E) and give the reaction involved.



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5. When a mixture of $K_2Cr_2O_7$ and NH_4Cl is heated, a colourless gas is evolved which is neither combustible nor a supporter of combustion. However, Mg continued to burn in it. When the gas (A) is reacted with calcium carbide in it. When the gas (A) is reacted with calcium carbide in electric furnace, a

solid (B) is obtained. (B) undergoes slow hydrolysis forming an insoluble compound (C) and the solution of the compound (D). (D) turns Nessler's reagent brown. Identify (A) to (D). Write the reactions involved.



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ARRANGE DIRECTED AND GIVE REASONS -

1. H_2O , H_2S , H_2Se , H_2Te (decreasing boiling point)



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2. BrO_4^- , IO_4^- , ClO_4^- (decreasing oxidising power)



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3. HF , HCl , HBr , HI (increasing acid strenght)



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4. F , Cl , Br , I (increasing acid strenght)



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5. NH_3 , PH_3 , AsH_3 , SbH_3 (increasing thermal stability)



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6. $HClO$, $HClO_2$, $HClO_4$ (increasing acid strenght)



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7. Br_2 , Cl_2 , F_2 , I_2 (decreasing bond dissociation enthalpy)



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8. He, Ne, Ar, Kr (decreasing boiling point)



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9. H_2O , H_2S , H_2Te , H_2Se (decreasing bond angle)



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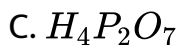
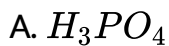
10. H-F, H-Cl, H-Br, H - I (increasing dipole moment)



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PRACTICE SET 7 (CHOOSE THE CORRECT ALTERNATIVE) : -

1. Which one of the following is known as glacial phosphoric acid -

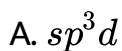


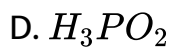
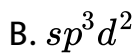
D.



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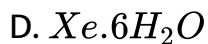
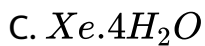
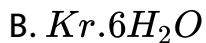
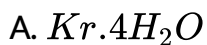
2. The hybridisation of ICI^- is





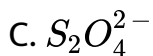
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3. The most stable noble gas hydrate is -



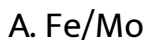
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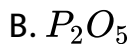
4. Which of the following is basic



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5. The catalyst used in the manufacture ammonia by Haber's process is -





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PRACTICE SET 7 (ANSWER THE FOLLOWING QUESTIONS) : -

1. Why does $R_3P = O$ exist but $R_3N = O$ does not (R = alkyl group) ?



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2. H_2S is acidic but H_2O is neutral in nature - why ?



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3. Fluorine cannot be prepared by oxidation of F^- ion - explain.



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4. Interhalogen compounds are more reactive than halogen - why ?



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5. Most of the noble gas compounds are by formed by xenon - why ?



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6. Why is the group to which the noble gases belong termed as zero group ?



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7. NH_3 is a better complexing agent than PH_3 - why ?



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8. Why N_2 is chemically very inert at room temperature ?



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9. During manufacture of H_2SO_4 by contact process, why is SO_3 not directly dissolved in water ?



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10. Which oxofluoride of xenon is octahedral ?



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11. HF is weaker acid than HI. Explain.



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12. Phosphorus shows greater tendency for catenation than nitrogen. Explain



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13. Hydrolysis of XeF_6 is not a redox reaction - explain.



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14. KHF_2 exists while $KHCl_2$, $KHBr_2$, KHI_2 do not - Why ?



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15. Though nitrogen exhibits + 5 oxidation state is cannot form pentahalide . Explain



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16. Bleaching by SO_2 is not premanent but that of Cl_2 is permanent. Explain.



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17. Write down the order of oxidising power of the oxoacids of chlorine.



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