



CHEMISTRY

BOOKS - MBD CHEMISTRY (ODIA ENGLISH)

CHEMICAL BONDING AND MOLECULAR STRUCTURE

Question Bank

1. Write the structure of a compound with a coordinate bond.



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2. What is the shape of BCl_3 molecule and what type of hybridisation exhibited by B-atom in BCl_3 ?



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3. What type of hybridisation takes place in carbon atom for the formation of graphite ?



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4. H_2O is a liquid while hydrogen sulphide is a gas at room temperature. Give reasons.



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5. What is the shape of NH_3 molecule and it is due to what type of hybridisation ?



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6. What is the bond angle in SO_2 molecule ?



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7. What is the shape of NH_3 molecule ?



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8. Which of the halogens forms hydrogen bond ?



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9. Name the type of overlapping and type of bond in forming HF molecule ?



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10. What type of hybridisation takes place in carbon atom for the formation of graphite ?



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11. Why is carbon tetrachloride immiscible in H_2O ?



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12. What is the shape of carbondioxide molecule ?



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13. What is the bond angle in SO_2 molecule ?



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14. What is the shape of BCl_3 molecule ?



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15. How many sigma and pi-bonds are there in a molecule of acetylene ?



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16. What type of hybridisation takes place in the formation of CO_2 molecule ?



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17. What is the bond angle between two hybrid bonds in sp^2 hybridisation



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18. What is the bond angle in the molecule of ammonia ?



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19. Which of the following has largest size ?



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20. What is the shape of NH_3 molecule ?



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21. Mention the hybrid state of sulphur in H_2S molecule ?



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22. What is the bond angle in NH_4^+ ion ?



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23. What is the bond angle between two hybrid bonds in sp^2 hybridisation ?



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24. Compare the dipole moments of the following pairs of compounds ? CO_2 , SO_2



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25. Compare the dipole moments of the following pair of compounds : $CHCl_3$, CCl_4



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26. Give shapes of the following : NH_4^+



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27. Give shapes of the following : H_3O^+



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28. Write a note on sp^2 hybridisation.



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29. Describe two characteristic properties' of electrovalent compounds.



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30. Why hydrofluoric acid is the weakest of all the halogen acids ?



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31. Why H_2O molecules remain associated in the liquid form ?



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32. What do you understand by hydrogen bond ?



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33. H_2O is a liquid while hydrogen sulphide is a gas at room temperature. Give reasons.



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34. Why three p-orbitals of each of the two atoms cannot form more than one sigma bond ?



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35. How many sigma and pi-bonds are there in ethylene ?



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36. What is the bond angle and shape of CO_2 ?



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37. In which reaction the reactants has. less energy than the products ?



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38. What is the shape of methane molecule ?



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39. Among the compounds, NH_3 , HF and CH_4 in which the hydrogen bonding is most prominent and why ?



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40. What are sigma and Pi-bonds ?



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41. What do you understand by hydrogen bond ?



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42. How do you account for the fact that H_2O is a liquid and H_2S is a gas at room temperature ?



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43. What do you understand by hydrogen bond ?



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44. What are sigma and pi-bonds ?



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45. What are sigma and pi-bond's ? What is the bond angle and shape of the methane

molecule ?



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46. What is the shape of methane molecule ?



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47. What are overlapping orbitals of carbon and oxygen in CO ?



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48. Why CO_2 is non-polar but SO_2 is polar ?



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49. Draw the orbital diagram of CO_2 and indicate the orbitals used by the element.



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50. What is the order of increasing bond angle of the following ? What is the theory involved

? H_2O , NH_3 , CH_4



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51. Discuss with examples the directional properties of covalent bonds.



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52. Explain the term hybridisation. What is meant by sp^3 and sp^2 hybrid orbitals ?



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53. Write a note On electronegativity.



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54. Explain with example the terms electrovalency, covalency and coordinate valence.



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55. Write a note on hydrogen bond.



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56. What is covalent bond ? Explain why the covalent bonds between , oxygen and hydrogen atoms in H_2O molecule are polar.



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57. What is hydrogen bond ? How does it influence the properties of compounds ? Explain with two examples.



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58. Explain electrovalency and covalency with two suitable examples of each.



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59. What is hybridisation ? State the conditions for its formation. Name the hybridisation that the central atom undergoes in the formation of

BCl_3 , H_2O , CH_4 and SO_2



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60. Explain electrovalency and covalency with two suitable examples of each.



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61. Explain with example the terms electrovalency, covalency and coordinate valence.



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62. Write short notes on: Electrovalent bond



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63. Write short notes on: Covalent bond



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64. Write a note on hydrogen bond.



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65. Write notes on: Born-Haber Cycle.



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66. Write notes on: Born-Haber Cycle.



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67. Draw the molecular orbital energy level diagram for H_2 and discuss its stability, bond order and magnetic character.



68. When a chemical bond is formed, the energy of the system:

A. Increases

B. decreases

C. does not change

D. sometimes increases and sometimes decreases

Answer: B



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69. The bond formed by sidewise overlapping of atomic orbitals is:

- A. sigma bond
- B. pi bond
- C. coordinate bond
- D. ionic bond

Answer: B



70. A CO_2 molecule contains:

A. 2 σ – bonds and 1 π – bond

B. 4 π – bonds

C. 2 σ and 2 π – bonds

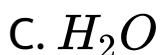
D. 4 σ – bonds

Answer: C



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71. Which of the following molecule does not have dipole moment greater than zero ?



Answer: D



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72. The liner structure is not assumed by:

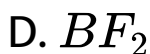
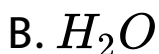


Answer: A



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73. Which of the following species contains two lone pairs and two bond pairs around the central atom ?



Answer: B



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74. The formation of adduct between NH_3 and BF_3 involves the formation of:

- A. ionic bond
- B. covalent bond
- C. coordinate bond
- D. hydrogen bond

Answer: C



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75. According to VSEPR theory. The most probable shape of the molecule having 4 electron pairs around the central atom is:

A. hexahedral

B. tetrahedral

C. octahedral

D. linear

Answer: B



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76. The correct description of bonds in C_2H_2

Molecule is:

A. sp^3d

B. sp^3

C. sp^2

D. sp

Answer: B



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77. The shape of ClO_3^- ion is:

- A. tetrahedral
- B. trigonal planar
- C. triangular pyramidal
- D. trigonal bipyramidal

Answer: B



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78. The bond length between sp hybrid carbon and other carbon is minimum in:

A. propane

B. butane

C. propene

D. propyne

Answer: D



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79. The number and type of bonds between two carbon atoms in calcium carbide are:

A. one σ , one π

B. one σ , two π

C. two σ , one π

D. one σ , $1\frac{1}{2}\pi$

Answer: B



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80. The maximum number of hydrogen bonds in which water molecule can participate is:

A. 1

B. 2

C. 3

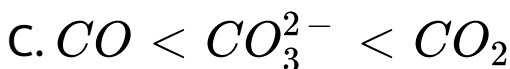
D. 4

Answer: D



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81. The correct order of C-O bond length among CO , CO_3^{2-} , CO_2 is:



Answer: A



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82. In which o the following bond angle around the central atom is maximum ?

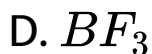


Answer: B



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83. Which of the following has not a lone pair ?



Answer: D



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84. What is the hybridization of nitrogen in

NH_3 ?

A. sp

B. sp^2

C. sp^3

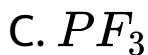
D. dsp^2

Answer: C



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85. Among the following molecule which is an electron deficient compound ?



Answer: B



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86. Bond type between O and B in

$BH_3 \leftarrow (OC_2H_5)_2$ is:

A. coordinate

B. covalent

C. ionic

D. hydrogen

Answer: A



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87. The state of hybridisation of boron and oxygen in boric acid (H_3BO_3) are respectively:

A. sp^3 and sp^2

B. sp^2 and sp^3

C. sp^2 and sp^2

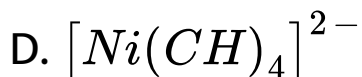
D. sp^3 and sp^3

Answer: B



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88. Which one the following has a regular tetrahedral structure ?



Answer: A



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89. Total number of lone pair of electrons in

$XeOF_4$ is:

A. 0

B. 1

C. 2

D. 3

Answer: B



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90. What is the bond angle in NH_4^+ ion ?



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91. Mention the hybrid state of sulphur in H_2S molecule ?



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92. What is the bond angle between two hybrid bonds in sp hybridisation ?



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93. What are overlapping orbitals of carbon and oxygen in CO ?



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94. What is the shape of ammonia molecule ?



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95. What is the bond angle in the molecule of ammonia ?



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96. Why metallic sodium is soft ?



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97. What is the bond angle between two hybrid bonds in sp^2 hybridisation



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98. What is the shape of the 'p' orbital ?



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99. How many sigma and pi-bonds are there in a molecule of acetylene ?



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100. What type of hybridisation takes place in the formation of CO molecule ?



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101. What type of hybridisation takes place in carbon atom for the formation of graphite ?



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102. What is the shape of BCl_3 molecule ?



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103. What is the maximum number of electrons that can remain in a molecular orbital ?



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104. Why is carbon tetrachloride immiscible in H_2O ?



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105. What is the shape of carbondioxide molecule ?



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106. Which of the halogens forms hydrogen bond ?



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107. Name the type of overlapping and type of bond in forming HF molecule ?



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108. What type of hybridisation takes place in carbon atom for the formation of graphite ?



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109. Among CO, CN⁻ and NO, _____ and _____ have bond order equal to that of N_2 .



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110. Arrange the species, N_2^- , N_2 , N_2^+ and N_2^{2-} the increasing order of their stability and bond order.



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111. Among CCl_4 , BF_3 , NH_3 and CO_2 ,

Which one has net dipole moment and why ?



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112. Among HCl , NCI_3 , CCl_4 and $CHCl_3$, the molecule showing zero dipole moment is ____.



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113. Between $BeCl_2$ and $SnCl_2$ which one has greater polarity and dipole moment ?



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114. Among CO , CN^- and NO , which are isoelectronic species ?



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115. Among N_2 , CO , NO and CN^- , which one is paramagnetic ?



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116. What is the bond angle in H_2O ?



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117. Among H_2 , N_2 , O_2 , and F_2 , which one is paramagnetic and why ?



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118. What is the shape of BCl_3 molecule and what type of hybridisation exhibited by B-atom in BCl_3 ?



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119. Among NH_3 , CH_4 and H_2O Which one shows least bond angle and why



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120. What is dipole moment of a molecule ?



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121. What is the unit of dipole moment of a molecule ?



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122. What is the value of 1 Debye ?





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123. Among O_2 , O_2^+ , O_2^- and O_2^{2-} , which is most reactive ?



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124. $BeCl_2$ is insoluble in water, because ____.



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125. Strongest hydrogen bond exhibited in ____.

A. $\text{H-F} \cdots \cdots \text{H}$,

B. $\text{H-O} \cdots \cdots \text{H}$,

C. $\text{H-N} \cdots \cdots \text{H}$,

D. $\text{H-S} \cdots \cdots \text{H}$.

Answer:



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126. What is the shape of ozone molecule ?



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127. Compare the dipole moments of the following pairs of compounds ? CO_2 , SO_2



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128. Compare the dipole moments of the following pair of compounds : $CHCl_3$, CCl_4



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129. What is the angle between two adjacent sp^2 hybrid orbitals ?



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130. Give shapes of the following : H_3O^+



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131. Write the lewis structure of H_2SO_4 molecule.



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132. Write the molecular orbital configuration of O_2 .



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133. Why is sigma bond stronger than pi bond ?



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134. HF is less volatile than HCl. Explain.



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135. Write the electron dot structure of hydronium ion.



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136. What is odd-electron molecule ? Give one example.



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137. Draw the orbital diagram of CO_2 and indicate the orbitals used by the element.



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138. What is the order of increasing bond angle of the following ? What is the theory involved ? H_2O , NH_3 , CH_4



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139. Iodine is a solid whereas other halogens are gases. Give reasons .



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140. Metals are good conductor of electricity.

Give reasons.



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141. Why hydrofluoric acid is the weakest of all the halogen acids ?



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142. Why is $AlCl_3$ not ionic ?



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143. Synthetic clothes dry up quicker than cotton clothes / Give reasons.



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144. Why CO_2 is non-polar but SO_2 is polar ?



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145. Why three p-orbitals of each of the two atoms cannot form more than one sigma bond ?



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146. What is the bond angle and shape of methane molecule ?



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147. How do you account for the fact that H_2O is a liquid and H_2S is a gas at room temperature ?



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148. Write a note on hydrogen bond.



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149. What is the shape of NH_3 molecule ?



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150. Draw the structure of ammonium ion showing the different bonds present in it .



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151. What is the shape of methane molecule ?



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152. Among the compounds, NH_3 , HF and CH_4 in which the hydrogen bonding is most prominent and why ?



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153. What is a π bond ? Explain with example.



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154. Give one example of each molecule with SP^2 and SP^3 hybrid bond.



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155. Explain why H_2O is polar molecule but CO_2 is not ?



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156. Among the compounds, NH_3 , HF and CH_4 in which the hydrogen bonding is most prominent and why ?



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157. Which of the following is an ionic compound ?



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158. Draw the structure of ammonium ion showing the different bonds present in it .



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159. What is the bond angle and shape of CO_2 ?



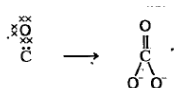
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160. Why H_2O molecules remain associated in the liquid form ?



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161. Write the electronic structure of CO_3^{-2} and NH_4^+ ions with lines and arrows.





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162. What type of hybridisation would account in the following cases ?

BF_3 is planar with $\angle Cl - B - Cl = 120^\circ$



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163. What type of hybridisation would account in the following cases ?

$BeCl_2$ is linear with $\angle Cl - Be - Cl = 180^\circ$



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164. AB, CD, EF are three compounds having electronegativity difference between the atoms are 1.8, 1.5 and 0.1 respectively. Which one is more polar and which one is more covalent?



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165. Write down the molecular orbital configuration of NO^+ and NO^- .



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166. Explain why HF is more polar than HCl .



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167. What is the state of hybridisation of central atom in the following molecules $BeCl_2$ and CCl_4 ?



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168. The hydrogen bonding in ammonia is less pronounced than in water. Why ?



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169. Distinguish between bonding and antibonding orbitals.



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170. Write the molecular orbital configuration of O_2 .

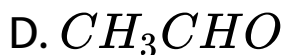
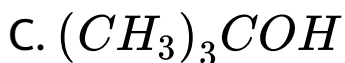


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171. The compound in which carbon atom uses only its sp^3 - hybrid orbitals for bond formation is :

A. $HCOOH$

B. $(H_2N)_2CO$



Answer: C



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172. The paramagnetic behaviour of O_2 molecules is best explained by :

A. Molecular orbital theory

B. Resonance theory

C. VSEPR theory

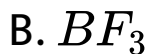
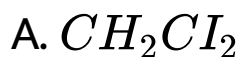
D. Valence bond theory

Answer: A



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173. The molecule which has zero dipole moment is :





Answer: B



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174. A covalent bond is formed between the atoms by the overlapping of orbitals containing :

A. Single electron

B. Paired electron

C. Single electron with parallel spin

D. Single electron with opposite spin

Answer: D



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175. Length of hydrogen bond ranges from 2.5

\AA to :

A. 3.0\AA

B. 2.75 \AA

C. 2.6 \AA

D. 3.2 \AA

Answer: B



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176. A regular hexagonal crystalline lattice of ice is mostly formed by :

A. Ionic bond

B. Hydrogen bond

C. Covalent bond

D. Metallic bond

Answer: B



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177. In which of the following gaseous molecules, the ionic character of the covalent bond is greatest :

A. HCl

B. HBr

C. HI

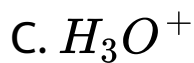
D. HF

Answer: D



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178. sp^3 -hybridisation is important in describing the bonding in :



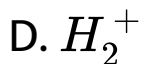
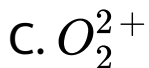
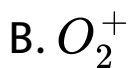
D. All of these

Answer: D



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179. The species which does not show paramagnetism is:

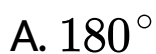


Answer: C



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180. H-B-H bond angle in BH_4^- is:



B. 120°

C. 109°

D. 90°

Answer: C



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181. Which of the following is paramagnetic ?

A. N_2

B. H_2

C. O_2

D. CI_2

Answer: C



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182. The nature of bonding in diamond is :

A. Ionic

B. Covalent

C. Metallic

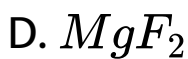
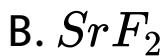
D. Coordinate

Answer: B



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183. Which is least soluble in H_2O .

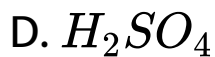


Answer: B



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184. Which is non-polar?



Answer: C



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185. The electronegativity values of C, H, O, N and S are 2.5, 2.1, 3.5, 3.0 and 2.5 respectively. Which of the following bonds is most polar?

A. C-H

B. N-H

C. S-H

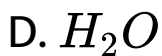
D. O-H

Answer: D



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186. Which species has lone pair on central atom?



Answer: D



187. The shape of a molecule which has 3 bond pairs and one lone pair is:

- A. Octahedral
- B. Pyramidal
- C. Triangular planar
- D. Tetrahedral

Answer: B



188. The compound showing maximum covalent character is :



Answer: C



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189. Which contains ionic as well as covalent bonds?

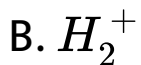


Answer: B



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190. The bond order order is maximum in:



Answer: A



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191. Which has zero dipole moment?

A. ClF

B. PCl_3

C. SiF_4

D. CFCl_3

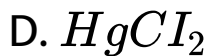
Answer: C



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192. The molecule with zero dipole moment is:

A. SO_2

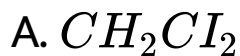


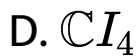
Answer: D



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193. The molecule with largest dipole moment is:



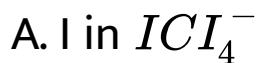


Answer: C



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194. The hybridisation of P in PO_4^{3-} is same as in :



B. S in SO_3

C. N in NO_3^-

D. S in SO_4^{2-}

Answer: D



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195. The number of sigma and pi bonds in 1 - butene 3 - yne are:

A. 5 sigma and 5 pi

B. 7 sigma and 3 pi

C. 8 sigma and 2 pi

D. 6 sigma and 4 pi

Answer: B



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196. For which of the following hybridisation the bond angle is maximum:

A. sp_2

B. sp

C. sp^3

D. dsp^2

Answer: B



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197. The type of bond formed between H^+ and NH_3 in NH_4^+ ion is:

A. Ionic

B. Covalent

C. Dative

D. Hydrogen

Answer: C



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198. CO_2 has the same geometry as:

(A) $HgCl_2$

(B) NO_2

(C) SnCl_4

(D) C_2H_2 .

A. A and C

B. B and D

C. A and D

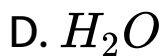
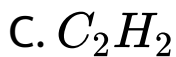
D. C and D

Answer: C



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199. Which is not linear?



Answer: D



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200. Which has the minimum bond energy?

A. H-Br

B. H-I

C. I-I

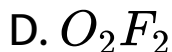
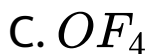
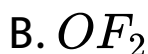
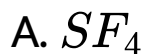
D. H-H

Answer: C



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201. A molecule which can not exist theoretically is:



Answer: C



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202. Hydrogen bonding is maximum in :

- A. Ethanol
- B. Diethyl ether
- C. Ethyl chloride
- D. Triethyl amine

Answer: A



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203. According to Fajan's rule polarisation is more when:

A. Small cation and large anion

B. Small cation and small anion

C. Large cation and large anion

D. Large cation and small anion

Answer: A



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204. The bond order of CO molecule on the basis of molecular orbital theory is :

A. Zero

B. 2

C. 3

D. 1

Answer: C



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205. Bond order of N_2^- anion is:

A. 3

B. 2

C. 2.5

D. 1.5

Answer: C



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206. A sp^3 - hybrid orbital contains:

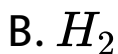
- A. $1/4$ s-character
- B. $1/2$ s-character
- C. $2/3$ s-character
- D. $3/4$ s-character

Answer: A



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207. Multiple covalent bonds exist in the molecule of :



Answer: C



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208. The orbitals of same energy level providing the most efficient overlapping are:

A. $sp^3 - sp^3$

B. $sp - sp$

C. $sp^2 - sp^2$

D. All

Answer: B



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209. Among the following bonds which has the most polar character :

A. C-O

B. C-Br

C. C-F

D. C-S

Answer: C



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210. Which cannot exist on the basis of MO theory ?



Answer: D



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211. Higher is the bond order, greater is:

A. Bond dissociation energy

B. Covalent character

C. Bond length

D. Paramagnetism

Answer: A



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212. In the formation of N_2^+ from N_2 , the electron is lost from:

A. A σ -orbital

B. A π -orbital

C. A σ^* -orbital

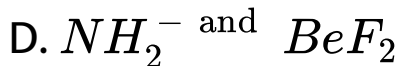
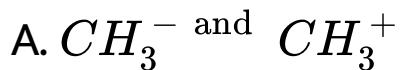
D. A π^* -orbital

Answer: A



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213. Which pair represents isostructural species?

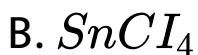
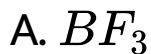


Answer: C



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214. Which is not an exception to octet rule ?

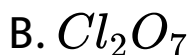
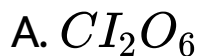


Answer: B



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215. Which of the following is paramagnetic ?



Answer: D



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216. In solid argon, the atoms are held together by:

- A. Ionic bonds
- B. Hydrogen bond
- C. van der Waals' forces
- D. Hydrophobic

Answer: C



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217. The total number of valency for PO_4^{3-} ion is :

A. 32

B. 16

C. 28

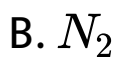
D. 30

Answer: A



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218. Which has maximum bond order?



Answer: B



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219. Among HX. The maximum dipole moment is of :

A. HF

B. HCL

C. HBr

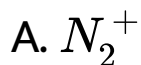
D. HI

Answer: A



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220. The bond order in O_2^+ IS equal to bond order in:



Answer: A



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221. In which of the following bond angle around the central atom is maximum ?



Answer: A



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222. Which explains that O- nitrophenol is more volatile than p- nitrophenol:

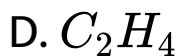
- A. Hyper conjugation
- B. Steric hindrance
- C. Hydrogen bonding
- D. Resonance

Answer: C



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223. Which contains a triple bond?



Answer: D



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224. The geometry of compounds formed by

sp^3d^2 - hybridisation is :

A. Square planar

B. Octahedral

C. Trigonal bipyramidal

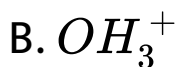
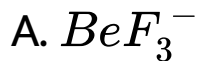
D. Pentagonal bipyramidal

Answer: B



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225. Which does not use sp^3 - hybrid orbitals in its bonding?



Answer: A



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226. In HCHO carbon atom has hybridisation:

A. sp

B. sp^2

C. sp^2

D. None

Answer: B



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227. The overlapping ability is maximum in case of :

A. sp^3 -hybrid orbital

B. sp - hybrid orbital `

C. sp^2 - hybrid orbital

D. Same in all cases

Answer: B



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228. A π -bond is formed by sideways overlapping of:

A. s-s orbitals

B. p-p orbitals

C. s-p orbitals

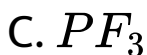
D. s-p-s orbitals

Answer: B



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229. Which one of the following has not triangular pyramidal shape ?



Answer: D



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230. Which compound shows hydrogen :

A. HCl

B. C_2H_6

C. RCH_2CHO

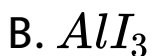
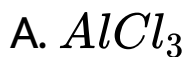
D. $\text{RCH}_2\text{NHCH}_3$

Answer: B



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231. Among the following bonds which has the most polar character :



Answer: B



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232. molecules of:

A. He

B. CH_4

C. CO_2

D. H_2O

Answer: D



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233. The diamagnetic molecules are:

A. B_2 , C_2 , N_2

B. O_2 , N_2 , F_2

C. C_2 , N_2 , F_2

D. B_2 , O_2 , N_2

Answer: C



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234. Which shows the highest lattice energy?

A. RbF

B. CsF

C. NaF

D. KF

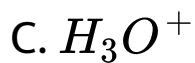
Answer: B



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235. Which one has a planar structure?





Answer: A



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236. Which one is the strongest bond?



D. Br-Cl

Answer: C



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237. PF_3 molecule is:

- A. Square planar
- B. Trigonal bipyramid
- C. Tetrahedral
- D. Trigonal pyramidal

Answer: D



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238. Which one is the strongest bond?

A. H - Cl

B. Cl-Cl

C. C-Cl

D. B-Cl

Answer: A



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239. Which one has a planar structure?



Answer: C



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240. What is the bond angle in the molecule of ammonia ?

A. $109^{\circ} 28'$

B. 90°

C. 107°

D. 105°

Answer: C



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241. CCl_4 is insoluble in water because :

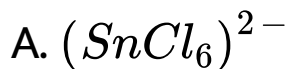
- A. CCl_4 is non-polar and water is polar
- B. Water is non -polar and CCl_4 is polar
- C. Water and CCl_4 both are polar
- D. None of these

Answer: A



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242. Which species does not exist ?



Answer: C



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243. Shape of molecules is decided by :

A. σ — *bond*

B. π — *bond*

C. Both σ and π -bonds

D. Neither σ nor π -bonds

Answer: A



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244. Which force is strongest ?

- A. Dipole-dipole forces
- B. Ion-ion forces
- C. Ion-dipole forces
- D. Ion- induced dipole forces

Answer: B



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245. The compound possessing most strongly ionic nature is :



Answer: D



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246. Which of the following bonds will be non-polar ?

A. N-H

B. C-H

C. F-F

D. O-H

Answer: C



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247. Which of the following bonds require the largest amount of energy to dissociate the bond concerned ?

A. H-H bond in H_2

B. C-H bond in CH_4

C. $N\equiv N$ bond in N_2

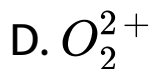
D. $O=O$ bond in O_2

Answer: C



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248. Which of the following is not isoelectronic ?



Answer: A



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249. Which can be described as a molecule with residual bonding capacity ?



Answer: D



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250. Which of the following is true ?

A. C-C

B. C -H

C. C-O

D. None

Answer: B



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251. The bonds present in N_2O_5 are :

- A. Ionic
- B. Covalent and coordinate
- C. Covalent
- D. Ionic and covalent

Answer: B



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252. The element which exists in both hard and soft form is :

A. Fe

B. Si

C. C

D. Al

Answer: C



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253. Resonance is not shown by :



Answer: D



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254. Which compound is non-polar ?

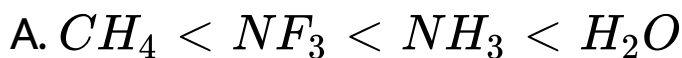


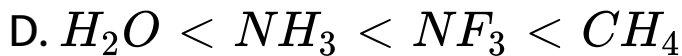
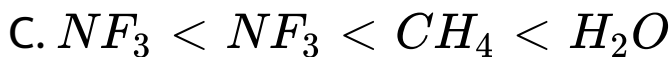
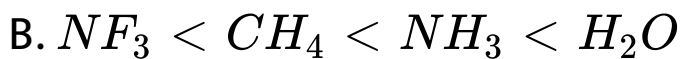
Answer: B



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255. The correct order of dipole moment is ?



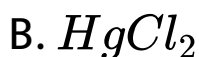


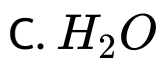
Answer: A



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256. CO_2 is isostructural with :



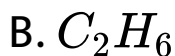


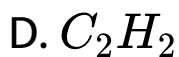
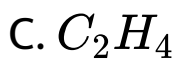
Answer: B



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257. Which of the following has shortest carbon-carbon bond length ?





Answer: D



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258. Among the following molecule which is an electron deficient compound ?





Answer: C



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259. The bond between atoms of two elements of atomic number 37 and 53 is :

A. Covalent

B. Ionic

C. Coordinate

D. Metallic

Answer: B



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260. As compared to ethylene, the bond distance between the two carbon atoms in acetylene is :

A. Longer

B. Shorter

C. Same

D. None

Answer: B



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261. Which ion has a higher polarising power ?

A. Mg^{2+}

B. Al^{3+}



Answer: B



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262. Which one is most polar ?



D. CH_3OH

Answer: D



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263. The internuclear distance in H_2 and Cl_2 molecules are 74 and 198 pm respectively. The bond length of H-Cl may be :

A. 272 pm

B. 70 pm

C. 136 pm

D. 248 pm

Answer: C



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264. Super octet molecule is :

A. ClF_3

B. PCl_3

C. NH_3

D. None of these

Answer: A



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265. The lowest bond energy exist in the following bonds for:

A. C-C

B. N-N

C. H-H

D. O-O

Answer: D



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266. Hydrogen bonding would not affect the boiling point of :

A. HI

B. NH_3

C. CH_3OH

D. H_2O

Answer: A



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267. Which is a good solvent for ionic and polar covalent compounds ?

A. H_2O

B. CH_3COOH

C. CCl_4

D. Liquid NH_3

Answer: A



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268. Which of the following molecules does not have a linear arrangement of atoms ?

A. C_2H_2

B. H_2S

C. $BeCl_2$

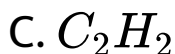


Answer: B



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269. which of the following molecules the central atom has sp^2 -hybridisation ?





Answer: B



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270. Which molecule is T shaped ?

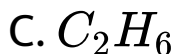
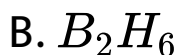


Answer: D



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271. Among the following molecule which is an electron deficient compound ?

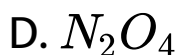


Answer: B



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272. In which of the following compound the bonds have the largest percentage of ionic character ?



Answer: B



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273. Which is highest melting point halide ?

A. NaCl

B. NaBr

C. NaF

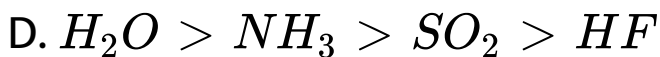
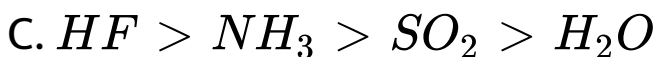
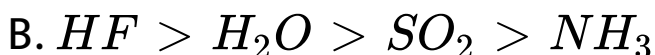
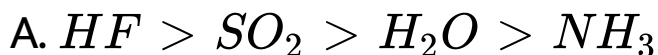
D. NaI

Answer: C



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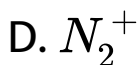
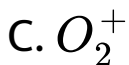
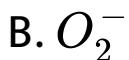
274. The correct order of decreasing polarity is :



Answer: B



275. one species has the longest bond length ?

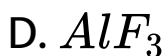
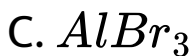
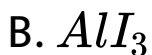
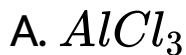


Answer: B



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276. Most covalent halide of aluminium is :

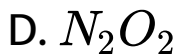
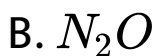


Answer: B



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277. Which oxide of nitrogen is isoelectronic with CO_2 ?



Answer: B



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278. Which hybridisation results non-planar orbitals?

A. sp

B. sp^2

C. sp^3

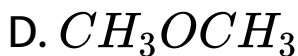
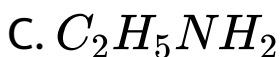
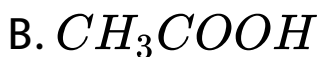
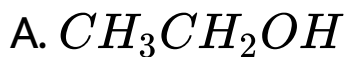
D. dsp^2

Answer: C



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279. Intermolecular hydrogen bonds are not present in :

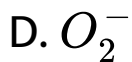
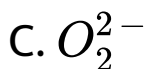
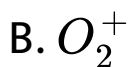


Answer: D



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280. Which of the following has maximum bond energy ?



Answer: B



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281. Highest covalent character is found in which of the following ?



Answer: C



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282. Dipole moment is highest for :



Answer: C



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283. Which of the following has largest dipole moment ?

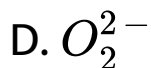
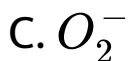
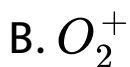


Answer: D



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284. Which of the following is diamagnetic ?



Answer: D



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285. The compound with the maximum dipole moment among the following is :

- A. p-dichlorobenzene
- B. m-dichlorobenzene
- C. o-dichlorobenzene
- D. Carbon tetrachloride

Answer: C



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286. How many (π)-bonds are there in the nitrogen molecule ?

A. One

B. Three

C. Two

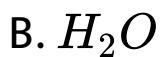
D. None

Answer: C



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287. Octet rule is not valid for the molecule :



Answer: B



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288. Which contains both covalent and ionic bonds ?



Answer: B



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289. Which has a giant covalent structure ?

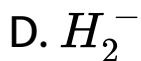
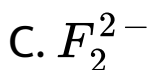
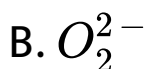
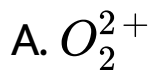


Answer: B



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290. Which of the following has fractional bond order ?

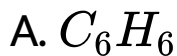


Answer: D



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291. Each of the following has non zero dipole moment ,except:



Answer: A



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292. Which one is least ionic?

A. AgCl

B. KCl

C. BaCl_2

D. KNO_3

Answer: A



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293. The total number of electrons that take part in forming bonds in N_2 molecule is :

A. 2

B. 6

C. 4

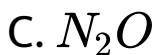
D. 8

Answer: B



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294. Which has sp^2 -hybridisation?



Answer: B



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295. Which bond is more polar?

A. Cl-Cl

B. N-F

C. C-F

D. O-F

Answer: C



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296. Both ionic and covalent bonds are present in :

A. CH_4

B. KCl

C. SO_2

D. NaOH

Answer: D



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297. In PCl_5 molecule, P is :

A. sp^3 -hybridised

B. dsp^2 -hybridised

C. ds^3p -hybridised

D. sp^3d -hybridised

Answer: D



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298. The total number of valency electrons in

PH_4^+ ion is :

A. 8

B. 9

C. 6

D. 14

Answer: A



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299. Structure of ICl_2^- is :

A. Trigonal

B. Octahedral

C. Square planar

D. Distorted trigonal pyramidal

Answer: D



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300. The pair of species having identical shape is :

A. CF_4 , SF_4

B. PCl_3 , BF_3

C. XeF_2 , CO_2

D. PF_5 , IF_5

Answer: C



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301. Which hydrolysis in water :

A. AgF

B. AgCl

C. AgBr

D. Agl

Answer: A



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302. Intramolecular hydrogen bonding is found in :

A. Salicyldehyde

B. Water

C. Acetaldehyde

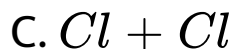
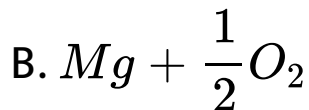
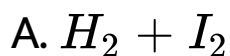
D. Phenol

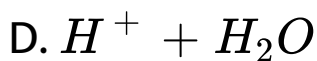
Answer: A



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303. Which combination is best explained by the coordinate covalent bond ?





Answer: D



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304. H_2O boils at higher temperature than H_2S because it is capable of forming :

- A. Ionic bonds
- B. Covalent bonds
- C. Hydrogen bonds

D. Metallic bonds

Answer: C



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305. Describe the shape of XeF_6 molecules.

A. Octahedral

B. Pentagonal pyramidal

C. planar

D. Tetrahedral

Answer: B



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306. Which of the following molecules is covalent and shows expanded octet in its formation ?

A. HF

B. NF_3

C. BF_3

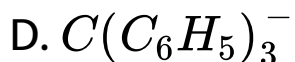
D. ClF_3

Answer: D



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307. Which does not have pyramidal geometry:



Answer: B



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308. The correct order of ionic radii is :

A. $I^{+} > I^{-} > I$

B. $I > I^{+} > I^{-}$

C. $I^{+} > I > I^{-}$

D. $I^{-} > I > I^{+}$

Answer: D



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309. OF_2 is :

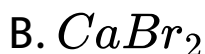
- A. Linear molecule and sp -hybridised
- B. Tetrahedral molecule and sp^3 -hybridised
- C. Bent molecule and sp^3 -hybridised
- D. None of these

Answer: C



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310. Which of the following is an ionic compound ?



Answer: C



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311. Which of the following is an ionic compound ?

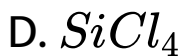
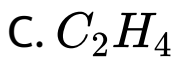
- A. One molecular orbital
- B. Two molecular orbitals
- C. Two bonding molecular orbitals
- D. Two antibonding molecular orbitals

Answer: B



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312. Which molecule is planar ?



Answer: C



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313. The molecule which has pyramidal shape is :



Answer: A



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314. Resonance is due to :

A. Delocalization of sigma electrons

B. Delocalization of pi electrons

C. Migration of H-atoms

D. Migration of protons

Answer: B



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315. In the series ethane, ethylene and acetylene, the C-H bond energy is :

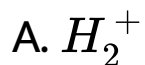
- A. The same in all the three compounds
- B. Greatest in ethane
- C. Greatest in ethylene
- D. Greatest in acetylene

Answer: D



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316. which is paramagnetic and has bond order 0.5 ?



Answer: A



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317. Which is non -polar ,but contains polar bonds ?

A. HCl

B. H_2O

C. SO_3

D. CO_2

Answer: D



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318. Which species is paramagnetic ?



Answer: A



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319. The hydrogen bonding is strongest in :

A. $\text{O}-\text{H}\cdots\text{S}$

B. $\text{S}-\text{H}\cdots\text{O}$

C. $\text{F}-\text{H}\cdots\text{F}$

D. $\text{F}-\text{H}\cdots\text{O}$

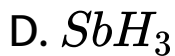
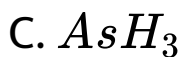
Answer: C



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320. Which has largest bond angle ?

A. NH_3



Answer: A



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321. Which shows non -directional bonding :





Answer: B



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322. Sulphur in SO_2 is :

A. sp-hybridised

B. sp^2 hybridised

C. sp^3 -hybridised

D. $sp^2 d$ - hybridised

Answer: B



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323. The bond order of C_2^+ is :

A. 1

B. 2

C. $3/2$

D. $1/2$

Answer: C



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324. How many unpaired electrons are present in N_2^+

A. 1

B. 2

C. 3

D. 4

Answer: A



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325. What bond order does O_2^{2-} have :

A. 1

B. 2

C. 3

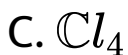
D. 44198

Answer: A



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326. The molecule with largest dipole moment is:



Answer: B



327. Sp^2 -hybridisation is shown by :



Answer: B



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328. Debye an unit of dipole moment is of the order of :

A. 10^{-10} esu cm

B. 10^{-18} esu cm

C. 10^{-6} esu cm

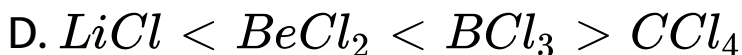
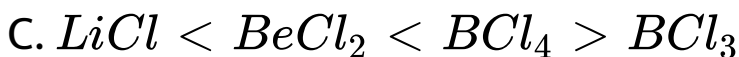
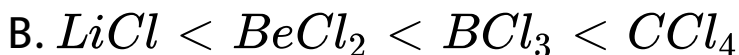
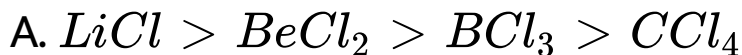
D. 10^{-12} esu cm`

Answer: B



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329. Among LiCl , BeCl_2 , Bcl_3 and CCl_4 the covalent bond character follows the order :

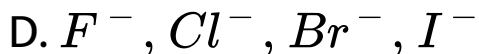
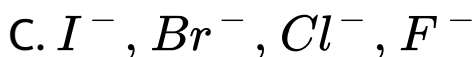
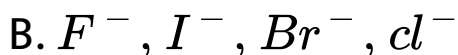
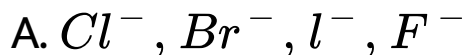


Answer: B



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330. The correct order of decreasing polarisability of ion is :



Answer: C



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331. Which one is the strongest bond?

A. Hydrogen

B. Ionic

C. Covalent

D. Metallic

Answer: A



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332. In which of the following the angle between the two covalent bonds is greatest ?

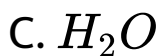


Answer: A



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333. Which has zero dipole moment?

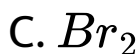


Answer: A



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334. Which has higher bond energy and stronger bond ?

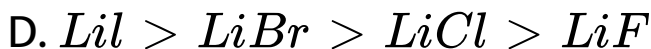
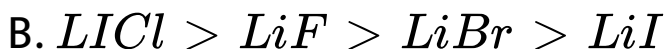
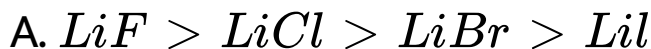


Answer: B



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335. The lattice energy order for lithium halide is :



Answer: A



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