81. The state of hybridisation of S in SF_4 is
(1) sp^3 and has a lone pair of electron
(2) sp^2 and has tetrahedral structure
(3) sp^3d and has a trigonal bipyramidal geometry
(4) sp^3d^2 and has an octahedral structure

82. The correct increasing bond angles order is:
(1) $BF_3 < NF_3 < PF_3 < ClF_3$ (2) $ClF_3 < PF_3 < NF_3 < BF_3$
(3) $ClF_3 < NF_3 < PF_3 < BF_3$ (4) $BF_3 < NF_3 < PF_3 > ClF_3$

83. The charge/size ratio of a cation determines its polarising power. Which one of the following sequences represents the increasing order of the polarising power of the cationic species, $K^+, Ca^{2+}, Mg^{2+}, Be^{2+}$?
(1) $Mg^{2+} < Be^{2+} < K^+ Ca^{2+}$ (2) $Be^{2+} < K^+ < Ca^2 < Mg^{2+}$
(3) $K + < Ca^{2+} < Mg^{2+} < Be^{2+}$ (4) $Ca^{2+} < Mg^{2+} < Be^{2+} < K^+$

84. The hydration energy of Mg^{2+} is larger than that of:
(1) Al^{3+} (2) Na^+ (3) Be^{2+} (4) Both (1) & (3)

85. In a polar molecule, the ionic charge is 4.8×10^{-10}esu. If the interionic distance is 1 Å unit, then the dipole moment is
(1) 0.48 debye (2) 4.18 debye (3) 4.8 debye (4) 41.8 debye

SECTION-B

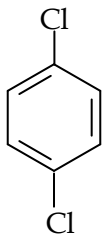
86. Which of the following is not correct with respect to bond length of the species ?
(1) $C_2 > C_2^{2-}$ (2) $B_2^+ > B_2$ (3) $Li_2^+ > Li_2$ (4) $O_2 > O_2^-$

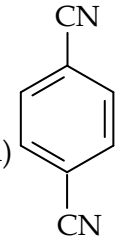
87. In the molecular orbital diagram for O_2^+ ion, the highest occupied orbital is
(1) σ MO orbital (2) π MO orbital (3) π^* MO orbital (4) σ^* MO orbital

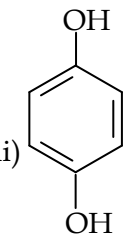
88. Which one of the following pairs of molecules will have permanent dipole moments for both members ?
(1) NO_2 and CO_2 (2) NO_2 and O_3 (3) SiF_4 and CO_2 (4) SiF_4 and NO_2

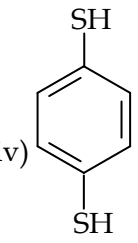
89. In which of the following pairs of molecules/ions, both the species are not likely to exist ?
(1) H_2^+, He_2^{2-} (2) H_2^-, He_2^{2-} (3) H_2^{2+}, He_2 (4) H_2^-, He_2^{2+}

90. For which of the following molecule significant $\mu \neq O$?

(i) 

(ii) 

(iii) 

(iv) 

(1) Only (i) (2) (i) and (ii) (3) Only (iii) (4)(iii) and (iv)