

Daily Tutorial Sheet-10 Level - 2

116.(D) For $p\pi - p\pi$ bonding to occur, following conditions should be satisfied.

→ The acceptor atom must have an empty p orbital

→ The p orbital of both atoms must be of comparable energy

In case of NF₃ and NI₃, N does not have any empty p orbital. Therefore, no $p\pi - p\pi$ bonding occurs.

But B has an empty p - orbital.

In BI₃, we have 2p orbital of B which is much lesser in energy as compared to 5p orbital of I. So, no $p\pi - p\pi$ bonding occurs.

117.(A) $XeOF_2 \rightarrow Hybridsation = 5 \rightarrow sp^3d$

So, one d-orbital is involved which is dz^2 .

If hybridization is $sp^3d^2,$ then $\,d_{\,z^2}^{}\,$ and $d_{\,x^2_{}\,-\,v^2_{}}^{}\,$ both are involved. Eg. In SF_6

118.(B) $C_2 \longrightarrow B$ ond Order = 2 and diamagnetic

 $C_2^+ \longrightarrow Bond Order = 1.5$ and paramagnetic

 $NO \longrightarrow Bond Order = 2.5$ and paramagnetic

NO⁺ → Bond Order = 3 and diamagnetic

 $O_2 \longrightarrow Bond Order = 2$ and paramagnetic

 $\mathrm{O}_2^+{\longrightarrow}$ Bond Order = 2.5 and paramagnetic

 $N_2 \longrightarrow$ Bond Order = 3 and diamagnetic

 $N_2^+ \longrightarrow Bond Order = 2.5$ and paramagnetic

119.(C) Molecular hydrogen \rightarrow H₂ – 2 electrons – diamagnetic

 $Molecular\ nitrogen\ \rightarrow \qquad N_2-14\ electrons-diamagnetic$

Molecular oxygen \rightarrow O₂ – paramagnetic

120.(B) $N_2 : KK^* LL^* (\pi 2p_x)^2 (\pi 2p_y)^2 (\sigma 2p_z)^2$

So, in $\,N_2^{^+}$, the last electrons goes from the last occupied MO i.e. $(\sigma 2p_{_{\rm Z}})$

121.(B) $H_2 : (\sigma ls)^2$ Bond Order = 1; $H_2^+ : (\sigma ls)^1$ B.O. = 0.5

Stability of a molecule ∝ Bond Order or No. of electrons in bonding MOs

Also, Bond Energy ∝ Bond order

Molecule does not exist when bond order is zero.

Since B.O. Of H_2^+ is 0.5, therefore, it exists and has a +ve bond dissociation energy.

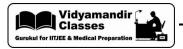
Also, in case of H_2 , two electrons are shared as compared to only one electron in H_2^+ .

: Electron density in case of H2 will be higher.

122.(ABC) $C_2^+ \longrightarrow B.O. = 1.5$, Paramagnetic; $O_2^- \longrightarrow B.O. = 1.5$, Paramagnetic

 $NO \longrightarrow B.O. = 2.5$, Paramagnetic; $CO \longrightarrow B.O. = 3$, Diamagnetic

123.(D) Bond strength ∞ Bond order



124.(C) Bond Order =
$$\frac{N_b - N_a}{2}$$
Bond order of $NO_+^- = 2$

$$NO^+ = 3$$

$$NO = 2.5$$

$$N_2 = 3$$

$$NO^{2-} = 1.5$$

125.(C) H_3PO_4 has intermolecular H-bonding