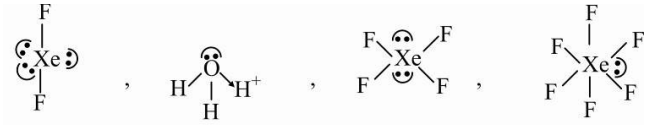
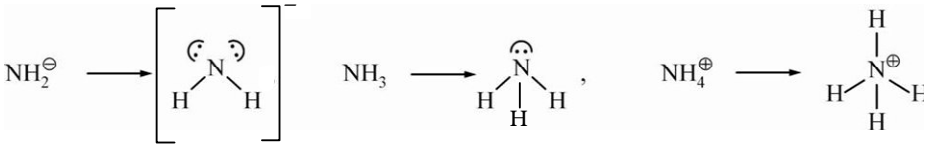
| Daily Tutorial Sheet-5 | Level – 1 |
|---|---|

**61.(A)** 


**62.(D)** 

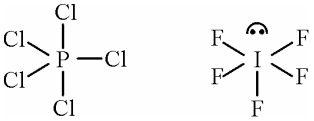
All are $sp^3$ hybridised but bond angle in $NH_2^-$ is minimum as $2\ell p$ are present and hence $\ell p - bp$ repulsion is more

**63.(B)** Generally boiling point of hydrides increases down the group but B.P of $NH_3$ > B.P. of $PH_3$, because of hydrogen bonding in $NH_3$. The B.P. of $SbH_3$ is still higher than $NH_3$ because of its large size.
So, increasing order of boiling point is $\rightarrow PH_3 < AsH_3 < NH_3 < SbH_3$

**64.(D)** Higher the electronegativity difference, higher will be the polarity F is most electronegative followed by O and then S.

**65.(B)** $C-C$ is the longest of all and $C-O$ is longer than C = C.
C – H bond is shortest because of small size of H.
Double bond is smaller than single bond because of more s character.
$C-H < C=C < C-O < C-C$

**66.(D)** $SF_2$ has bent shape

**67.(A)** 

**68.(C)** In diborane ($B_2H_6$), one electron pair is shared between three atoms (B – H – B). Therefore, it is called 3-centre -2 electrons bond (3c 2e) or banana bond.

**69.(B)** Apply MOT, bond order = 1/2 (Bonding electrons – anti bonding electrons).

**70.(B)** Bond Order $= \dfrac{N_b - N_a}{2}$

**71.(A)** $N_2(14) : \sigma 1s^2\, \sigma^* 1s^2\, \sigma 2s^2\, \sigma^* 2s^2\, \pi 2p_x^2\, \pi 2p_y^2\, \sigma 2p_z^2$

**72.(B)** OF = Total 17 electrons

$\therefore$ OF : $KK^*\, (\sigma 2s)^2 (\sigma^* 2s)^2\, (\sigma 2p_z)^2\;\; (\pi 2p_x)^2 (\pi 2p_y)^2\, (\pi^* 2p_x)^2\, (\pi^* 2p_y)^1$

**73.(D)** Check that only $NO^+$ and $N_2$ are isoelectronic and rest of the pairs are not. Obviously, both will have same bond order (check yourself from MO theory). $B_2$ and $O_2^{2-}$, $C_2$ and $O_2$ are not isoelectronic but have same bond order.

**74.(B)** Paramagnetism is observed due to the presence of unpaired electron(s).

$\therefore$ in case of $O_2$, we have

$O_2 : KK^* LL^* (\sigma 2p_z)^2 (\pi 2p_x)^2 (\pi 2p_y)^2 (\pi^* 2p_x)^1 (\pi^* 2p_y)^1$

Two unpaired electrons.

In other cases, we have no unpaired electron(s)

**75.(D)** $N_2 : KK^* (\pi 2p_x)^2 (\pi 2p_y)^2 (\sigma 2p_z)^2$ ; Bond Order = 3

$N_2^- : KK^* (\pi 2p_x)^2 (\pi 2p_y)^2 (\sigma 2p_z)^2 (\pi^* 2p_x)^1$ ; Bond Order = 2.5

Bond Order of $N_2^-$ < Bond Order of $N_2$ $\therefore$ $N_2^-$ bond is weaker than N – N bond in $N_2$.

Also, $N_2^-$ is paramagnetic (one unpaired $e^-$ in $\pi^* 2p_x$ )

$O_2 : KK^* (\sigma 2p_z)^2 (\pi 2p_x)^2 (\pi 2p_y)^2 (\pi^* 2p_x)^1 (\pi^* 2p_y)^1$

B.O. = 2, Paramagnetic

$O_2^- : KK^* \sigma 2p_z)^2 (\pi 2p_x)^2 (\pi 2p_y)^2 (\pi^* 2p_x)^2 (\pi^* 2py)^1$

B.O. = 1.5, Paramagnetic

Bond Order in $O_2^-$ < Bond Order in $O_2$ .

Also, Bond length $\propto \frac{1}{\text{Bond Order}}$