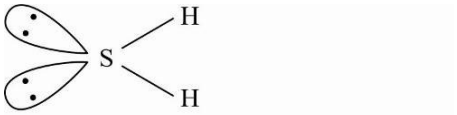
61.(B) When E = B in BCl_3, bond angle is $120°$. When E = P, As or Bi in ECl_3, hybridization at E will be sp^3. Also, if central atoms are from same group, bond angle decreases down the group provided all other things are similar. Hence, the order of bond angles is $BCl_3 > PCl_3 > AsCl_3 > BiCl_3$

62.(D) Bond length $\propto \frac{1}{\text{Bond order}}$ Bond order : $CO_2 = 2, CO = 3, CO_3^{2-} = 1 + \frac{1}{3} = \frac{4}{3}$.

Therefore, order of bond length is $CO_3^{2-} > CO_2 > CO$

63.(D) $\overset{1}{C}H_2 = \overset{2}{C}H - \overset{3}{C}H_2 - \overset{4}{C}H_2 - \overset{5}{C} \equiv \overset{6}{C}H$ Hybridisation at $C_2 = sp^2$ and at $C_2 = sp^3$.

64.(A) H_2S has sp^3 hybridized Sulphur, therefore, angular in shape with non-zero dipole moment.



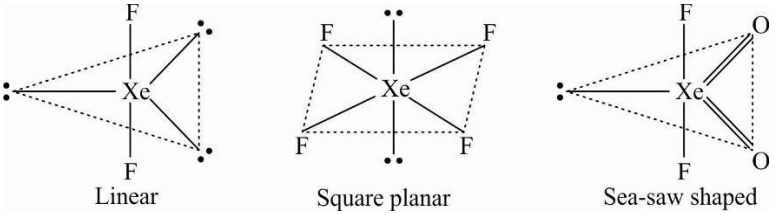
(Non-linear, polar molecule)

65. **(2, paramagnetic)**

(a) $O_2 : \sigma 1s^2 \overset{*}{\sigma} 1s^2 \sigma 2s^2 \overset{*}{\sigma} 2s^2 \sigma 2p_x^2 \left|\begin{matrix}\pi 2p_y^2 \\ \pi 2p_z^2\end{matrix}\right| \left|\begin{matrix}\pi^* 2p_y^1 \\ \pi^* 2p_z^1\end{matrix}\right|$

Bond order $= \frac{10-6}{2} = 2$, paramagnetic.

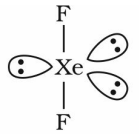
66. ***XeF*$_2$ → linear, *XeF*$_4$ → square planar**
XeO$_2$*F*$_2$ → See-Saw



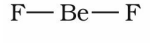
Linear Square planar Sea-saw shaped

67.(A) All three have 14 electrons (iso electronic) with bond order of three.

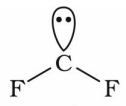
68.(D)



Linear shape

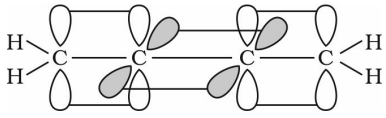


Linear shape

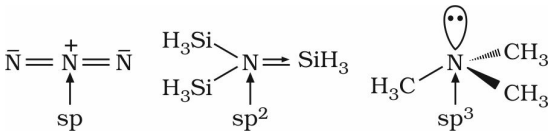


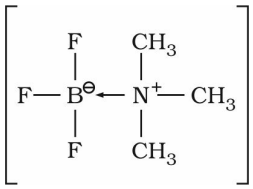
Bent shape

69.(AC)



Pi bond is formed by the p-orbitals whose lobes have minima in the plane of molecule, hence molecular plane and a plane perpendicular to the molecular plane is the nodal plane of pi-bond.

70.(B) 

71.(A)  Both 'B' and 'N' sp^3 tetrahedral.

72.(B) EA of Be is almost zero so Be^- is unstable.

73.(C) O_2^- has odd number (17) of electrons, therefore it must contain at least one unpaired electron.

74.(A) CH_3Cl has the highest dipole moment.

75.(A) NO_3^- and CO_3^{2-} both have 32 electrons, central atom sp^2 hybridized, triangular planar.