Daily Tutorial Sheet-3	JEE Advanced (Archive)

31. **(Triangular planar)**

Triangular planar. Carbon in CH_3^+ is sp^2 hybridisied.

32.(F) A non-polar molecule may also contain polar bonds. Eg. CCl_4, BF_3, CO_2

33. **Increase polar character**

Resonance in vinyl chloride increases polar character of the molecule.

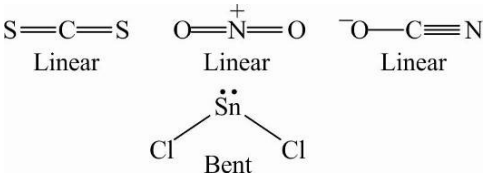
34. **S < Cl < N < O < F**

Strength of hydrogen bonding in X–H–X depends on electronegativity as well as size of X. X with higher electronegativity and smaller size forms stronger H-bond. Hence, increasing order of strength of H-bond is S < Cl < N < O < F

35. I_2

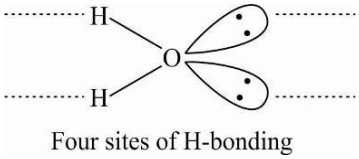
I_2 is Lewis acid because I^- coordinate its one lone pair to I_2.

36.(BCD)

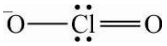


37. $Li^+ < Al^{3+} < Mg^{2+} < K^+$

38.(B) A water molecule can form at the most four H-bonds.



39.(A)



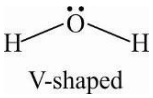
Electron pairs at Cl = 2 (σ – bonds) + 2 (lone-pairs) = 4. Hybridisation at Cl = sp^3

40.(AC) CN^- and NO^+ are isoelectronic, have the same bond order of 3.

41.(F) Dipole moment (μ) = q.d

Since electronegativity of F and Cl are very close, it is the internuclear distance (d) that decides dipole moment here. Hence, C – Cl bond has greater dipole moment the C-F bond.

42.(F) H_2O is V-shaped molecule.



43. **4.16×10^{-29}, 80.2%**

Dipole moment is calculated theoretically as $\mu = q.d$

Here, $q = 1.6 \times 10^{-19}$ C and $d = 2.6 \times 10^{-10}$ m

$$\mu_{Theo} = 1.6 \times 10^{-19} \times 2.6 \times 10^{-10} = 4.16 \times 10^{-29} \text{cm}$$

$$\% \text{ ionic character } = \frac{\mu_{obs}}{\mu_{Theo}} \times 100 = \frac{3.336 \times 10^{-29}}{4.16 \times 10^{-29}} \times 100 = 80.2\%$$

44. $3C - 2e^-$ (Three centre bond-two electrons). Three centred-2-electrons.

45.(F) The resultant of individual bond dipoles may or may not be non-zero.