

**CLASS XI-CHEMISTRY**  
**CHEMICAL BONDING**

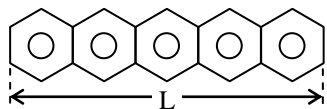
**ASSIGNMENT-1**


**NUMERICAL QUESTIONS:**

**Q.1** In the following compound (X), the bond distance between any two carbon atoms are same and equal to 140 pm. Determine the length (L) of the compound (X) in pm in nearest possible integers.

Given :  $\sqrt{3} = 1.732$

The structural formula of (X) is as follows:



**Q.2**  C = O group moment is 2.3 D and —CH<sub>3</sub> group moment is 0.4 D. Determine the dipole moment of (CH<sub>3</sub>)<sub>2</sub>CO in C-m × 10<sup>30</sup> in nearest possible integer

**Q.3** The geometry of Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> is square planar. It has two geometrical isomers – cis- and trans. The distance between platinum and chlorine atom is 232 pm. What is the distance between the two Cl-atoms in the cis isomer of Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> in pm in nearest possible integers. (Given  $\sqrt{2} = 1.414$ )

**Q.4** Find out distance between two iodine atoms (in Å) in trans-Ethene. (given → Bond length of C = C is 1.33 Å, Bond length of C–I bond is 2.10 Å) -

**Q.5** How many of the following are paramagnetic –  
C<sub>2</sub>, B<sub>2</sub>, O<sub>2</sub><sup>2-</sup>, BN, Cl<sub>2</sub><sup>+</sup> & NO<sup>+</sup>.

**Q.6** Find out number p-orbitals of Boron atom which participate in hybridisation in B<sub>2</sub>H<sub>6</sub>. (number of p-orbitals taking part in hybridisation per atom of Boron)

**Q.7** How many statement of the followings are false

(I) AlCl<sub>3</sub> exists as Al<sub>2</sub>Cl<sub>6</sub> in vapour state

(II) All the Al-Cl bonds in Al<sub>2</sub>Cl<sub>6</sub> are equivalent

(III) Borax when heated with Ammonium chloride forms ammonium tetraborate

(IV) AlF<sub>3</sub> is a high m.pt. solid while AlCl<sub>3</sub> is a low m.pt volatile solid

**Q.8** In (HF)<sub>4</sub> the number of H bonds is .....

**Q.9** The number of resonating structures exist for the azide ion, N<sub>3</sub><sup>-</sup> are .....

**Q.10** Determine the energy released due to formation of MgS lattice in kcal/mol in nearest possible integers from the following data.

$$\Delta_{\text{form}} H (\text{MgS}) = -82.2 \text{ kcal/mol.}$$

$$\Delta_{\text{sub}} H (\text{Mg}) = 36.5 \text{ kcal/mol.}$$

$$\text{for Mg, } IE_{\text{I}} + IE_{\text{II}} = 520.6 \text{ kcal/mol.}$$

$$\text{for S}_8, \Delta_{\text{atom}} H = 1065.6 \text{ kcal/mol.}$$

$$\text{For S, } \Delta_{\text{eg}} H_{\text{I}} + \Delta_{\text{eg}} H_{\text{II}} = -72.4 \text{ kcal/mol.}$$

**Q.11** Proton affinity is the enthalpy change due to acceptance of 1 mole of  $\text{H}^+$  (g) by a species. Determine the proton affinity of  $\text{NH}_3$  (g) from the following data in kcal/mol in nearest possible integers.

$$\text{LE of NH}_4 \text{F (s)} = -181 \text{ kcal/mol}$$

$$\Delta_{\text{form}} \text{ of NH}_4 \text{F (s)} = -112 \text{ kcal/mol}$$

$$\Delta_{\text{form}} \text{ of NH}_3 \text{ (g)} = -280 \text{ kcal/mol}$$

$$\Delta_{\text{atom}} \text{ of H}_2 \text{ (g)} = 104.2 \text{ kcal/mol}$$


$$\text{IE of H (g)} = 311.9 \text{ kcal/mol}$$

$$\Delta_{\text{atom}} H (\text{F}_2, \text{g}) = 37.8 \text{ kcal/mol}$$

$$\Delta_{\text{eg}} H (\text{F, g}) = -79.6 \text{ kcal/mol}$$

**Q.12** The observed dipole moment of  $\text{H}_2\text{O} = 1.85 \text{ D}$ . The  $\text{H}-\text{O}$  bond distance is  $0.94 \text{ \AA}$  and  $\text{HOH}$  bond angle is  $105^\circ$ .  $\cos 52.5^\circ = 0.609$ ;  $\cos 105^\circ = -0.26$ . Determine the percentage fractional charges on each oxygen atom in terms of charge of electron in nearest possible integers.

$$\text{Charge of electron} = 4.8 \times 10^{-10} \text{ e. s. u.}$$

**Q.13**   $\text{C}=\text{O}$  group moment is  $2.3 \text{ D}$  and  $-\text{CH}_3$  group moment is  $0.4 \text{ D}$ . Determine the dipole moment of  $(\text{CH}_3)_2\text{CO}$  in  $\text{Cm} \times 10^{30}$  in nearest possible integer

---