Dipole moment (Inorganic compand)

i) $HF > HCl > HBr > HI$.

ii) $H_2O_2 > H_2O > H_2S > H_2Se > H_2Te$.

iii) $HF > H_2O > NH_3 > CH_4 \equiv CCl_4 \equiv SiF_4 \equiv SF_6 \equiv IF_7 \equiv PCl_5$

iv) $NH_3 > NF_3$; v) $PCl_2F_3 > PF_2Cl_3 > PCl_5 \equiv PF_5$.

vi) $Cl-F > I-Cl > Cl_2 \equiv Br_2$

vii) $XeF_6 \equiv XeF_4 \equiv XeF_2 \equiv XeO_4$ all have $\mu = 0$

viii) $XeO_3 > SO_2 > SO_3(0) \equiv BF_3 \equiv BCl_3 \equiv S_2F_{10} \equiv S_2Cl_6 = CO_2$
(3.9 D) (1.62 D)

SO_2Cl_2 (2.1 Debye) $SOCl_2$ (1.44 D)

ix) $SO_2Cl_2 > SOCl_2$

x) a) $NH_3 > PH_3 > AsH_3 > SbH_3$ b) $CH_3Cl > CH_2Cl_2 > CHCl_3 > CCl_4$.

c) $CH_3Cl > CH_3F > CH_3Br > CH_3I$.

xi)  $\mu = 0$ Provided $G_1 = Cl, Br, F, I, NO_2, CH_3, R$; $-CO_2^-$, CN.

xii)  $\mu \neq 0$ provided $G_1 = -OH, -SH, -NH_2, -NMe_2$; $-CO_2H$
$-CO_2R$; $-\overset{O}{\overset{\|}{C}}-Cl$, $-\overset{O}{\overset{\|}{C}}-NH_2$, $-NHR$, $-O-CH_3$.

xiii) The individual oxyanion has zero dipole moment.
CO_3^{2-}, ClO_4^-; NO_3^-; SO_4^{2-}; PO_4^{3-}

xiv) CO has very low dipole moment but it is polar molecule.

xv) $O_3 > O_2$. O_3 has dipole moment 0.53 Debye. $O_3 < H_2O < H_2O_2$

xvi) N_2O & CO_2 are isoelectric, but N_2O is polar, 2nd is nonpolar.

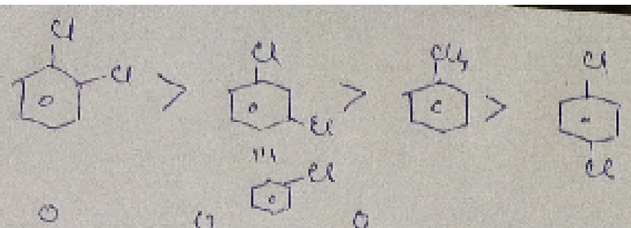
xvii) Cl_2O is polar molecule but $BeCl_2$ (monomer) is nonpolar.

xviii) NaCl is ionic compand, so it has exceptionally high dipole moment $\simeq$ 9 Debye.

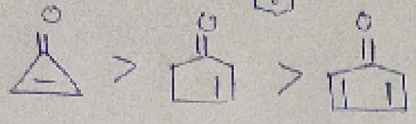
xix) H_2SO_4 ($\mu = 2.96$ D). H_3PO_4 ($\mu = 0.45$ D) $H_2N_2O_2$ (0 Debye) Trans isomer.
(nonpolar molecule)

xx) Silica molecule is nonpolar, tetrahedral molecule with Si-O-Si lenght is present.

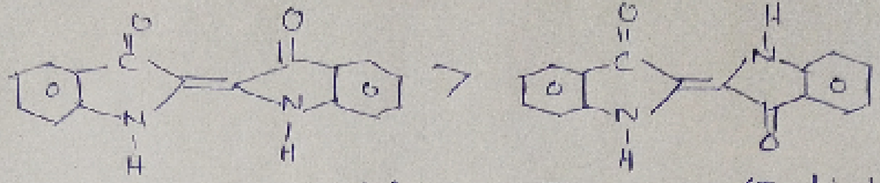
xiii)



xiv)



xv)



Cis isomer of Indigotin(dye) Trans isomer (Indigotin)

xvi) Ethylchloride > methylchloride > CH_2Cl-CH_2Cl > $CH_2=C(Cl)Cl$.

xvii) Acetone > Ethyl alcohol > Diethyl ether

Aceto nitrile.

$HCH=O$.

xviii) CH_3CN => 3.92 Debye

$CH_3-CH_2-CH_3$ => 4.19 Debye

CH_3CH_2OH => 1.66 Debye.

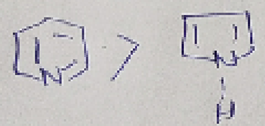
$HCH=O$ => 2.3 Debye.

$C_2H_5-O-C_2H_5$ => 1.15 Debye

xviii) CH_3-NH_2 > $(CH_3)_2NH$ > $(CH_3)_3N$.

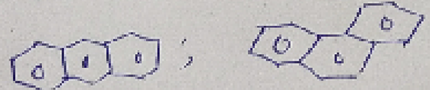
1.31 Debye 1.03 Debye 0.612 Debye.

xix)



Dipole moment direction in both the compands are in opposite direct.

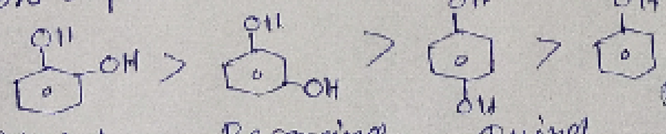
xx)



; CH_4 ; C=C (Symmetrical alkene, alkene allene)

$F_2C=C=CF_2$; Symmetrical allene all have zero dipole moment.

xxi)



Catechol Resorcinol Quinol Phenol.

Dipole moment (Inorganic compand)

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vii) $XeF_6 \not\equiv XeF_4 \equiv XeF_2 \equiv XeO_4$ all have $\mu = 0$

viii) $XeO_3 > SO_2 > SO_3(g) \equiv BF_3 \equiv BCl_3 \equiv S_2Cl_2 \equiv C_2Cl_6 \equiv CO_2$
(3.9 D) (1.62 D) SO_2Cl_2 (2.1 Debye) $SOCl_2$ (1.44 D)

ix) $SCl_2 > SOCl_2$

x) $NH_3 > PH_3 > AsH_3 > SbH_3$

a) b) $CH_3Cl > CH_2Cl_2 > CHCl_3 > CCl_4$.

c) $CH_3Cl > CH_3F > CH_3Br > CH_3I$.

xi)  $\mu = 0$ Provided $G_1 = Cl, Br, F, I, NO_2, CH_3, R$; $-CO_2^-$, CN.

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$-CO_2R$; $-\overset{O}{\overset{\|}{C}}-Cl$, $-\overset{O}{\overset{\|}{C}}-NH_2$, $-NHR$, $-O-CH_3$.

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↑ Transformer.
(nonpolar molecule)

xx) Silica molecule is nonpolar, tetrahedral molecule with Si–O–Si linkage is present.