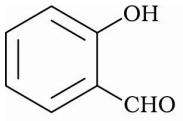
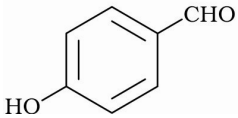
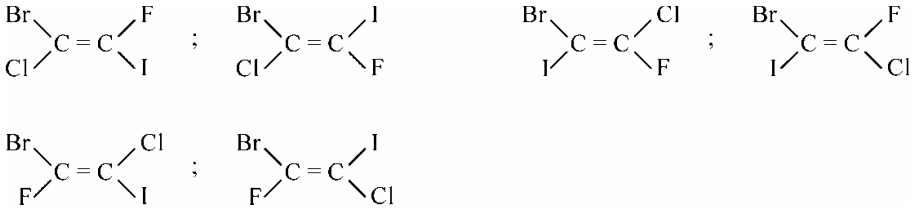
46. 

intramolecular H-bonding, weaker intermolecular force hence exist in liquid form.

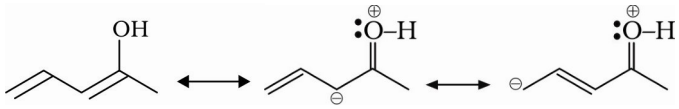


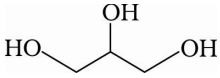
intermolecular H-bonding, stronger intermolecular force hence exist in high melting solid form.

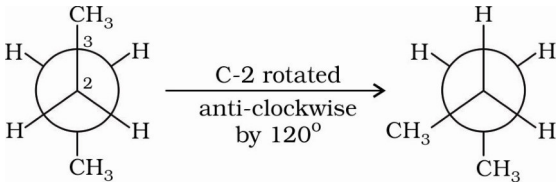
47.(D) By arranging the given halides differently on carbon atoms we can get a maximum of the following six isomeric compounds.



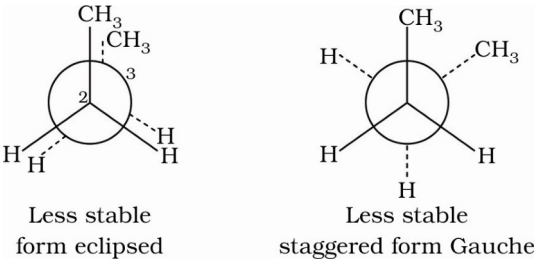
48.(D) In a four carbon chain, presence of methyl at third carbon will make compound optically inactive and 1-alkyne cannot show geometrical isomerism. A compound having terminal double bond cannot show geometrical isomerism and presence of methyl on second carbon can create a chiral carbon on a 4 carbon chain with CO_2H group. 2-methyl butanoic acid is capable of showing optical isomerism.

49. 

50.  it contains 1 secondary and 2 primary hydroxy groups.

51.(C) 

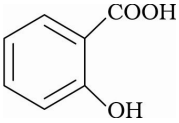
52. **(a)** Fully eclipsed form of n-butane is least stable and gauche form is less stable staggered form.



Less stable form eclipsed

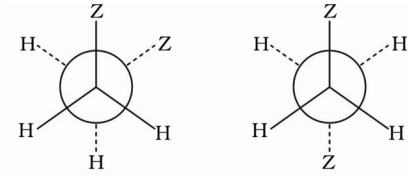
Less stable staggered form Gauche

(b) Relatively less stability of the gauche form is mainly due to less Vander Waal's strain & lower torsional strain as compared to anti/staggered form.

53.(D) 

Intramolecular H-bond hence lower boiling point

54. Staggered conformer is stable conformer

(a) 

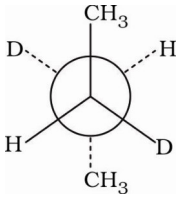
(Gauche form $\mu \neq 0$) (Anti form $\mu = 0$)

$\mu_{solution} = (\mu_{gauche} \times x_{gauche}) + (\mu_{anti} \times x_{anti}) \Rightarrow 1.0 = [\mu_{gauche} \times (0.18)] + [(0 \times 0.82)]$

$\mu_{gauche} = \dfrac{1.0}{0.18} = 5.55D$

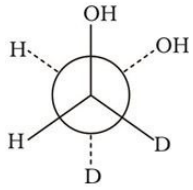
(b) Most stable meso conformer of $Y - \underset{\underset{D}{|}}{CH} - \underset{\underset{D}{|}}{CH} - Y$

When $Y = CH_3$, anti staggered is most stable form and it is optically inactive due to presence of centre of symmetry.



about $C_2 - C_3$ bond.

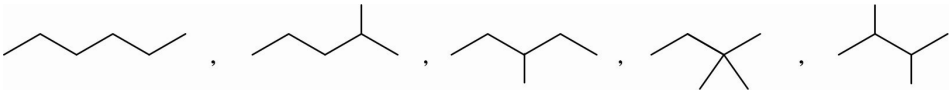
When Y = OH, gauche staggered is more stable form due to intra molecular H-bond between OH groups.



about $C_1 - C_2$ bond

55.(C) Structure (C) is least stable due to negative charge and lone pair repulsion.

56.(A) $C_6H_5 - \underset{\underset{O}{||}}{C} - Cl$ preferred IUPAC name is Benzoyl chloride

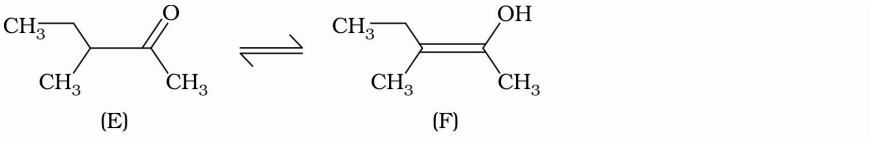
57.(B) 

58.(C) Compound having non-super imposable mirror image is chiral compound. All chiral compounds may or may not have chiral centres.

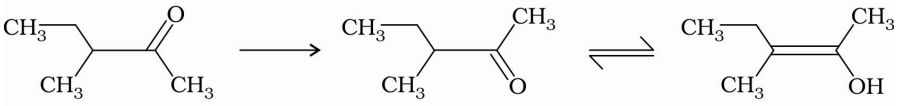
59.(A) Structure having charge separation and like charge on adjacent position is least stable.

60.(BCD) (E) and (F) are Keto-enol isomers i.e. tautomers

(E) and (G) are also Keto-enol isomers i.e. tautomers



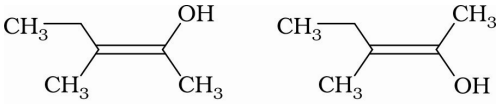
(E) (F)



(E) (E′) (G)

(E) and (E′) are conformers.

(F) and (G) are cis and trans isomers (geometrical isomers) i.e. diastereomers.



cis-isomer Trans-isomer