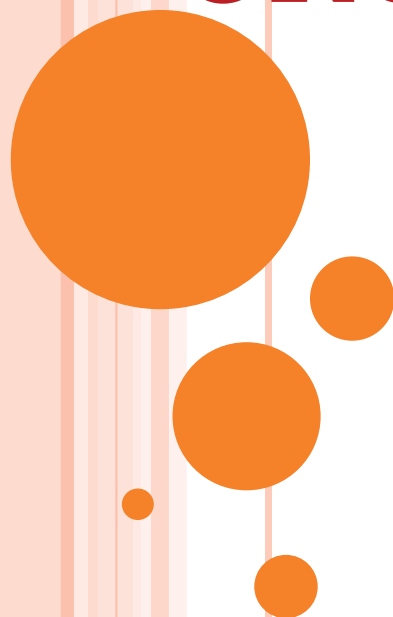


# SYNTHETIC ORGANIC CHEMISTRY

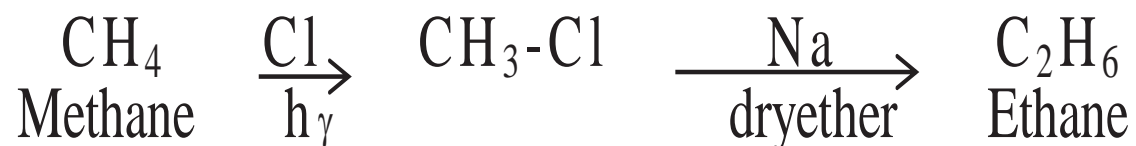




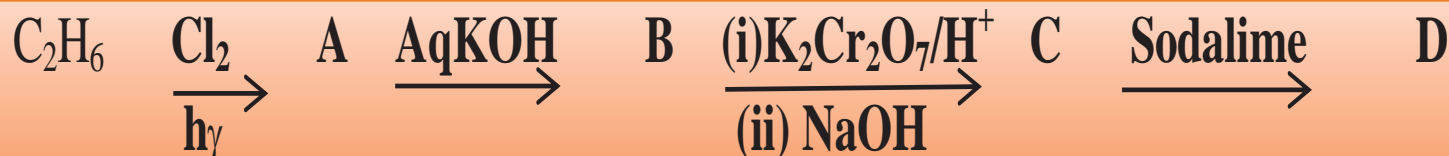
2. Methane can be converted to ethane by the reaction

- a) Chlorination followed by the reaction with alcoholic KOH.
- b) Chlorination followed by the reaction with aqueous KOH.
- c) Chlorination followed by the wurtz reaction.
- d) Chlorination followed by the decarboxylation reaction.

**Ans : c) Chlorination followed by the wurtz reaction.**



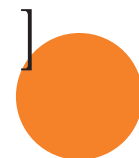
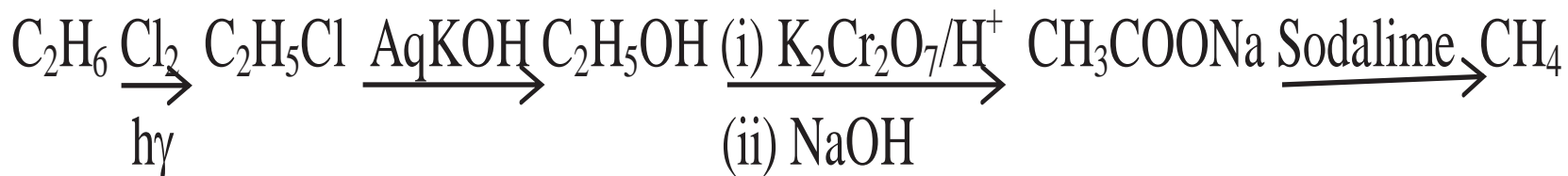
3. The product 'D' in the reaction is



- a) Ethane  
b) Methane  
c) Methanol  
d) Ethanol

**Ans : b) Methane**

[Note :



## 4. Identify the product P in the reaction



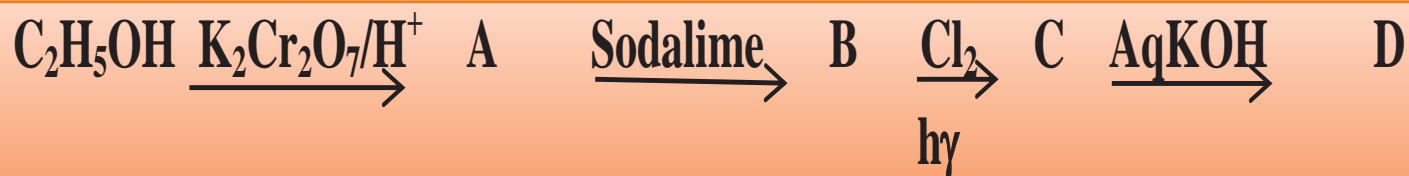
- a) Methanol                      b) Ethanol  
c) Methanal                      d) Ethanal

**Ans : b) Ethanol**

[Note :



## 5. Identify the product D in the reaction



a) Ethanal

b) Methanal

c) Ethanol

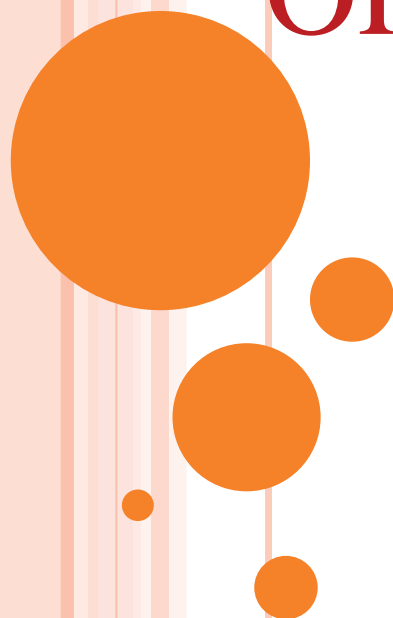
d) Methanol

Ans : d) Methanol

[Note :



CONCEPTS  
IN  
ORGANIC CHEMISTRY



## 6. Inductive effect involves

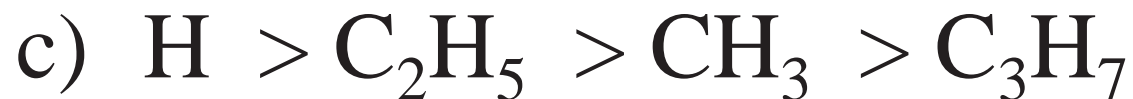
- a) Delocalization of  $\sigma$  Electron.
- b) Delocalization of  $\pi$  Electron
- c) Displacement of  $\sigma$  Electrons.
- d) Displacement of  $\pi$  Electrons.

**Ans : c) Displacement of  $\sigma$  Electrons.**





7. The order of +I effect shown by H, CH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, & C<sub>3</sub>H<sub>7</sub> is



**Ans : a) C<sub>3</sub>H<sub>7</sub> > C<sub>2</sub>H<sub>5</sub> > CH<sub>3</sub> > H**



8. Which of the following represents the correct order of the activity in the given compounds

- a)  $\text{FCH}_2\text{COOH} > \text{CH}_3\text{COOH} > \text{BrCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$
- b)  $\text{BrCH}_2\text{COOH} > \text{ClCH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{CH}_3\text{COOH}$
- c)  $\text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH} > \text{BrCH}_2\text{COOH} > \text{CH}_3\text{COOH}$
- d)  $\text{CH}_3\text{COOH} > \text{BrCH}_2\text{COOH} > \text{ClCH}_2\text{COOH} > \text{FCH}_2\text{COOH}$

**Ans : c)  $\text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$   
 $> \text{BrCH}_2\text{COOH} > \text{CH}_3\text{COOH}$**

[Note : Stronger the electronegative atom stronger is the acidic strength]



9. Which one of the following is the strongest acid.

- a) 2-chloropentanoic acid
- b) 3-chloropentanoic acid
- c) 5-chloropentanoic acid
- d) 4-chloropentanoic acid

**Ans : a) 2-chloropentanoic acid**

[Note : Acidic Strength decreases as the distance of the halogen atom from carboxylic group increases.]



10. Which statement is correct for  
Inductive effect

- a) It is permanent effect
- b) It is the property of single bond
- c) It cause permanent polarization in the molecule
- d) All are correct

Ans : d) All are correct

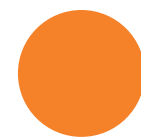


11. Which of the following does not show Electromeric effect

- a) Alkene
- b) Ethers
- c) Aldehydes
- d) Ketones

Ans : b) Ethers

[Note : Because it does not contain double bond]



12. When  $H^+$  approaches the multiple bond of alkene shows

- a) +M effect
- b) -M effect
- c) +E- effect
- d) -E effect

Ans : c) +E effect

[Note : transfer of  $\pi$ - electron takes place towards the atom where the attacking reagent attacks]



### 13. Which statement is wrong for Electromeric effect

- a) It is temporary effect.
- b) It is property of Pi- Bond.
- c) It take place in the presence of attacking reagent.
- d) It is a permanent effect.

Ans : d) It is a permanent effect.



14. Which of the following has +R(resonance) effect.

- a) CN
- b) CHO
- c) NH<sub>2</sub>
- d) NO<sub>2</sub>

**Ans : c) NH<sub>2</sub>**

[Note : +R effect : when the electron displacement is away from the group.]





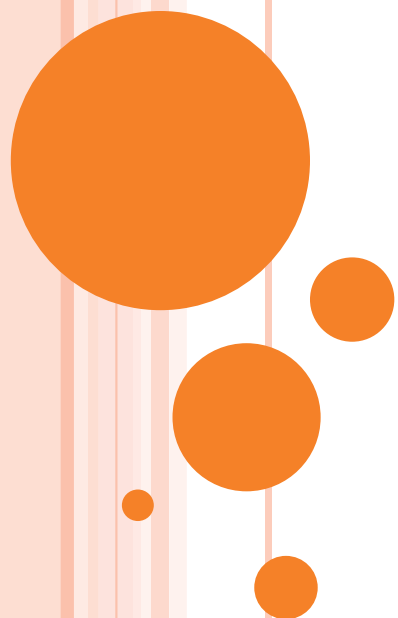
## 15. Resonance effect involves

- a) Migration of hydrogen atom.
- b) Delocalization of  $\sigma$  Electrons.
- c) Delocalization of  $\pi$  Electrons.
- d) All are correct.

**Ans : c) Delocalization of  $\pi$  Electrons.**



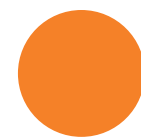
# ISOMERISM-2



16. Which of the following pairs represents stereo-isomerism?

- a) Geometrical Isomerism and Linkage Isomerism.
- b) Geometrical Isomerism and Optical Isomerism.
- c) Structural Isomerism and Geometrical Isomerism.
- d) Chain Isomerism and Rotational Isomerism.

Ans : b) Geometrical Isomerism and Optical Isomerism.



## 17.-But-2-ene exhibits cis-trans isomerism due to

- a) Rotation around  $C_3—C_4$  Sigma Bond
- b) Restricted rotation around  $C=C$  Bond
- c) Rotation around  $C_1—C_2$  bond
- d) Rotation around  $C_2—C_3$  double bond

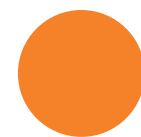
Ans : b) Restricted rotation around  $C=C$  Bond.



**18. The lowest alkene which can exhibit geometrical isomerism is**

- a) Ethene**
- b) Propene**
- c) 1-butene**
- d) 2-butene**

**Ans : d) 2-butene**



**19. Ordinary light is converted into plane polarized light by passing through a**

- a) Nickel prism**
- b) Glass Prism**
- c) Nicol Prism**
- d) Polarimeter**

**Ans : c) Nicol Prism**



**20. Optical activity is measured by**

- a) Polarimeter**
- b) Abbe's refractometer**
- c) Spectrograph**
- d) Radio carbon dating**

**Ans : a) Polarimeter**



**21. An organic molecule necessarily shows optical activity if it**

- a) Contains (Chiral / Asymmetric) Carbon atom**
- b) Is non-planar.**
- c) Is non super impossible on its mirror image.**
- d) Is super impossible on its mirror image.**

**Ans: c) Is non super impossible on its mirror image.**





## **22. An organic molecule definitely shows optical activity if it**

- a) Contains asymmetric carbon atoms**
- b) is non-planar**
- c) does not contain plane of symmetry**
- d) is super impossible on its mirror image**

**Ans : c) does not contain plane of symmetry**

[Note : All compounds which do not contain plane of symmetry have Non-super impossible mirror image. Hence they are optically active. Presence of chiral carbon atoms is not the sufficient conditions for a molecule to show optical activity because more compound contain chiral carbon atoms, but they are optically inactive.]



**23. Optical isomers which are mirror images of each other are called**

- a) Enantiomers**
- b) Diastereomers**
- c) Tautomer**
- d) Meso compounds**

**Ans : a) Enantiomers**



**24. The conversion of enantiomer into racemic mixture is known as**

- a) Resolution**
- b) Racemisation**
- c) Chirality**
- d) Inversion**

**Ans : b) Racemisation**



**25. The process of separation of racemic mixture into + and – Enantiomers is called**

- a) Racemisation**
- b) Resolution**
- c) Boiling Point**
- d) Walden inversion**

**Ans : b) Resolution**



**26. Which of the following is the chiral molecule**

- a)  $\text{CH}_3\text{Cl}$
- b)  $\text{CH}_2\text{Cl}_2$
- c)  $\text{CHBr}_3$
- d)  $\text{CHClBrI}$

**Ans : d)  $\text{CHClBrI}$**

**[Note : Four different groups are attached to carbon atom.]**



# HYDROCARBON-2



**27. The hybridisation of carbon atom  
in cyclopropane is**

- a)  $sp$**
- b)  $sp^2$**
- c)  $sp^3$**
- d)  $d^2sp^3$**

**Ans : c)  $sp^3$**



## 28. The general formula of Cycloalkane is

- a)  $C_nH_{2n}$
- b)  $C_nH_{2n+2}$
- c)  $C_nH_{2n-2}$
- d)  $C_nH_{2n-4}$

Ans : a)  $C_nH_{2n}$





**29. Most stable cycloalkane according to Baeyer's strain theory is**

- a) Cyclobutane**
- b) Cyclopentane**
- c) Cyclohexane**
- d) Cycloheptane**

**Ans: b) Cyclopentane**



**30. Angle strain =  $\frac{1}{2}[109^{\circ}28' - \text{bond angle in cycloalkane}]$  which Cycloalkane has maximum angle strain.**

- a) Cyclopropane
- b) Cyclobutane
- c) Cyclopentane
- d) Cyclohexane

**Ans : a) Cyclopropane**

[Note : Angle strain in Cyclopropane =  $24^{\circ}44'$ ,  
Cyclobutane =  $+9^{\circ}44'$ , Cyclopentane =  $+0^{\circ}44'$   
Cyclohexane =  $-5^{\circ}16'$

According to Baeyer strain theory more the angle strain, less is the stability of cycloalkane.]



**31. The concept of strainless ring of cyclohexane & Cycloheptane was put forward by**

- a) Baeyer**
- b) Sachse**
- c) Kekule**
- d) Berzelius**

**Ans : b) Sachse**



**32. When cyclohexane is poured in water, it floats because**

- a) Cyclohexane is in boat form**
- b) Cyclohexane is in chair form**
- c) Cyclohexane is in crown form**
- d) Cyclohexane is less denser than water.**

**Ans : d) Cyclohexane is less denser than water.**



### **33. The Least Energetic conformation of Cyclohexane is**

- a) Chair Conformation**
- b) Boat Conformation**
- c) E, Z Form**
- d) Cis Form**

**Ans : a) Chair Conformation**



**34. Benzene was discovered by**

- a) Dalton**
- b) Faraday**
- c) Kekule**
- d) Boyle**

**Ans : b) Faraday**



## 35. The number of Sigma & Pi-Bonds in a molecule of Benzene

- a)  $6\sigma$  and  $9\pi$
- b)  $9\sigma$  and  $3\pi$
- c)  $12\sigma$  and  $3\pi$
- d)  $6\sigma$  and  $6\pi$

**Ans : c)  $12\sigma$  and  $3\pi$**



**36. The number of  $\pi$ -Electron in benzene molecule are**

- a) 4
- b) 3
- c) 5
- d) 6

**Ans : d) 6**

**[ Note :  $2p_z$  orbital of carbon is not involved in hybridization. Each  $2p_z$  orbital contain one unpaired electron.  $\therefore$  a total of 6  $\pi$  electron. ]**





**37. Benzene molecule is**

- a) Trigonal**
- b) Planar**
- c) Tetrahedral**
- d) Octahedral**

**Ans : b) Planar**

**[Note : All the 6 carbon atom of  
benzene are present in one  
single plane]**



## **38. The number of di-substituted product of benzene**

- a) Two**
- b) Three**
- c) Four**
- d) Five**

**Ans : b) Three**

**[Note : Benzene give ortho,  
Para, Meta di-substituted  
products]**



**39. Benzene does not give addition reaction even though it contains 3 double bonds because**

- a) Double bonds change their position rapidly**
- b) Resonance lowers the energy of benzene molecule & leads to greater stabilization.**
- c) Double bonds in benzene are strong**
- d) None of the above.**

**Ans : b) Resonance lowers the energy of benzene molecule & leads to greater stabilization.**



**40. The overlapping orbitals in Benzene is of the type**

a)  $sp—sp$

b)  $p—p$

c)  $sp^3—sp^3$

d)  $sp^2—sp^2$

**Ans : d)  $sp^2—sp^2$**

**[ Note : Because the carbon atom in benzene are  $sp^2$  hybridised overlapping between the carbon atom is  $sp^2—sp^2$  ]**



**41. The electrophile in the nitration reaction of benzene is**

- a) Nitronium ion**
- b) Nitrinium Ion**
- c) Nitrite ion**
- d) Nitrate ion**

**Ans : a) Nitronium ion . i.e.,  $\text{NO}_2^+$**



**42. During the nitration reaction of benzene concentrated  $\text{H}_2\text{SO}_4$  is used as**

- a) Solvent**
- b) Dehydrating agent**
- c) Sulphonating agent**
- d) Nitronium ion producer.**

**Ans : d) Nitronium ion Producer.**



Nitronium Ion



**43. In benzene, all the six C—C bonds have the same bond length because of**

- a) Resonance**
- b) Hybridization**
- c) Isomerism**
- d) Chain Isomerism**

**Ans : a) Resonance**

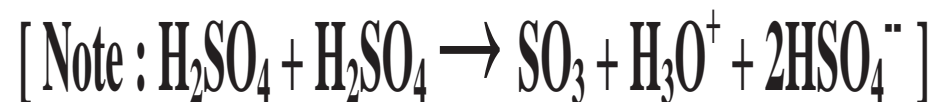
**[Note : Due to resonance, the carbon-carbon bond length is between c—c single bond (0.154nm) and c=c double bond (0.134nm) and it is 0.139nm. This is due to delocalization of  $\pi$  electrons.]**



**44. The electrophile in the sulphonation reaction is**

- a)  $\text{SO}_2$
- b)  $\text{SO}_3$
- c)  $\text{SO}_3\text{H}$
- d)  $\text{SO}_3^+$

**Ans : b)  $\text{SO}_3$**





**45. The function of anhydrous  $\text{AlCl}_3$  in Friedal Craft's reaction is**

- a) To absorb water**
- b) To absorb Hcl**
- c) To produce attacking electrophile.**
- d) To produce nucleophile.**

**Ans : c) To produce attacking electrophile.**

[Note : (i) Friedel Craft's alkylation reaction



(ii) Friedel Craft's Chlorination reaction

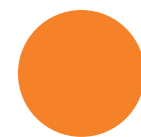


**46. Adding Chlorine to benzene in the present of anhydrous  $\text{AlCl}_3$  is an example of**

- a) Addition reaction**
- b) Substitution reaction**
- c) Elimination reaction**
- d) Polymerisation reaction**

**Ans : b) Substitution reaction**

**[Note : Benzene undergo electrophilic substitution reaction ]**



**47. In Benzene molecule the carbon atoms are inclined at an angle of**

- a)  $120^{\circ}$**
- b)  $180^{\circ}$**
- c)  $109^{\circ} 28'$**
- d)  $60^{\circ}$**

**Ans : a)  $120^{\circ}$**

**[Note : In benzene C-atom are  $sp^2$  hybridised and  $sp^2$  hybridised C-atom have the bond angle  $120^{\circ}$ .]**



**48.Regarding benzene molecule, which of the following statement is wrong.**

- a) It has six identical carbon atom**
- b) It is an unsaturated compound .**
- c) It is an unsaturated compound and answer tests for unsaturation.**
- a) C—C bond length is identical.**

**Ans : c) It is an unsaturated compound and answer tests for unsaturation.**



**49. Which one of the following is formed when benzene ring is attacked by the electrophile.**

- a) Carbon ion**
- b) Carbocation**
- c) Nucleophile**
- d) Free-radical**

**Ans : b) Carbocation**

**[Note : Electrophiles takes up electrons form the benzene ring to form intermediate carbocation which are stabilized by resonance structure.]**



Thank you

ALL THE BEST

