Dipole moment, resonance and reaction intermediates

1. Which has zero dipole moment
   (a) *cis*-2-butene
   (b) *trans*-2-butene
   (c) 1-butene
   (d) 2-methyl-1-propene

2. Dipole moment is shown by
   (a) 1, 4-dichloro benzene
   (b) Cis-1, 2-dichloro ethane
   (c) Trans-1, 2-dichloro, 2-pentene
   (d) Trans-1, 2-dichloro ether

3. Which compound shows dipole moment
   (a) 1,4-di-chloro benzene
   (b) 1, 2-di-chloro benzene
   (c) Trans-1, 2-di-chloro ethene
   (d) Trans-2-butene

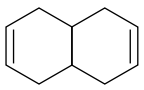
4. Which of the following is a polar compound
   (a) C_2H_6 (b) CCl_4
   (c) *HCl* (d) CH_4

5. The dipole moment is the highest for
   (a) *Trans*-2-butene
   (b) 1, 3-Dimethylbenzene
   (c) Acetophenone
   (d) Ethanol

6. Resonance structure of molecule does not have
   (a) Identical arrangement of atoms
   (b) Nearly the same energy content
   (c) The same number of paired electrons
   (d) Identical bonding

7. All bonds in benzene are equal due to
   (a) Tautomerism
   (b) Inductive effect
   (c) Resonance
   (d) Isomerism

8. Aromatic properties of benzene are proved by
   (a) Aromatic sextet theory
   (b) Resonance theory
   (c) Molecular orbital theory
   (d) All of these

9. Which of the following will show aromatic behaviour
   (a)  (b) 
   (c)  (d) 

10. Which one of the following orders is correct regarding the inductive effect of the substituents

(a) $-NR_2 < -OR > -F$

(b) $-NR_2 > -OR > -F$

(c) $-NR_2 < -OR < -F$

(d) $-NR_2 > -OR < -F$

11. Benzene is unreactive because

(a) It has double bonds

(b) It has carbon-carbon single bond

(c) Carbon are sp^2 hybridised

(d) π electrons are delocalised

12. Carboxylic acids are easily ionised. The main reason of this statement

(a) Absence of α-hydrogen

(b) Resonance stabilisation of carboxylate ion

(c) Reactivity of α-hydrogen

(d) Hydrogen bond

13. $'C-C'$ bond length in benzene lies between single and double bond. The reason is

(a) Resonance

(b) Isomerism

(c) Metamerism

(d) Inductive effect

14. Credit for the ring structure of benzene goes to

(a) Wholer (b) Faraday

(c) Kekule (d) Baeyer

15. Polarisation of electrons in acroline may be written as

(a) $CH_2^{\delta-} = CH - CH^{\delta+} = O$

(b) $CH_2^{\delta-} = CH - CH = O^{\delta+}$

(c) $CH_2^{\delta-} = CH^{\delta+} - CH = O$

(d) $CH_2^{\delta+} = CH - CH = O^{\delta-}$

16. In the mixture of conc. H_2SO_4 and HNO_3 the nitrating species is

(a) N_2O_4 (b) NO_2^+

(c) NO_2 (d) NO_2^-

17. Which of the following are not aromatic

(a) Benzene

(b) Cyclo-octatetrarenyl dianion

(c) Tropyllium cation

(d) Cyclopentadienyl cation

18. Arrangement of

$(CH_3)_3 - C - (CH_2)_3 - CH - CH_3 - CH_2 - CH_3$

when attached to benzyl or an unsaturated group in increasing order of inductive effect is

(a) $(CH_3)_3 - C - < (CH_3)_2 - CH - < CH_3 - CH_2 -$

(b) $CH_3 - CH_2 - < (CH_3)_2 - CH - < (CH_3)_3 - C -$

(c) $(CH_3)_2 - CH - < (CH_3)_3 - C - < CH_3 - CH_2 -$

(d) $(CH_2)_3 - C - < CH_3 - CH_2 - < (CH_3)_2 - CH -$

19. Which of the following is observed in ethylene molecule

(a) Electromeric effect

(b) Inductive effect

(c) Homolytic fission

(d) None of these

20. Cyclopentadienyl anion is

(a) Aromatic

(b) Non-aromatic

(c) Non-planar

(d) Aliphatic