Dipole moment, resonance and reaction intermediates

21. Orbital interaction between the sigma bonds of a substitutent group and a neighbouring *pi* orbital is known as

(a) Hyperconjugation

(b) Inductive effect

(c) Steric effect

(d) Dipole-dipole interactions

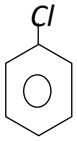
(e) Electric quadruple interactions

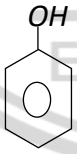
22. Which of the following is the most stable compound

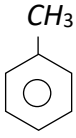
(a) $Ph_3\overset{+}{C}$ (b) $Ph_2\overset{+}{C}H$

(c) $Ph_3\overset{+}{C}H_2$ (d) $Ph\overset{+}{C}H_2$

23. Which of the following will be most easily attacked by an electrophile

(a) 

(b) 

(c) 

(d) 

24. Reactivity towards nucleophilic addition reaction of (I) *HCHO*, (II) CH_3CHO , (III) CH_3COCH_3 is

(a) II > III > I (b) III > II > I

(c) I > II > III (d) I > II < III

25. Which of the following resonating structures of 1-methoxy-1, 3-butadiene is least stable

(a) $\bar{C} \rightleftarrows H_2 - CH = CH - CH = \overset{\oplus}{O} - CH_3$

(b) $CH_2 = CH_2 - \bar{C}H - CH = \overset{\oplus}{O} - CH_3$

(c) $\bar{C} \rightleftarrows H_2 - \overset{\oplus}{C} \rightleftarrows H - CH = CH - O - CH_3$

(d) $CH_2 = CH - \bar{C} \rightleftarrows H - \overset{\oplus}{C} \rightleftarrows H - O - CH_3$

26. Which amongst the following is the most stable carbocation

(a) $CH_3 - \underset{\displaystyle CH_3}{\overset{+}{C}}$ (b) $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\overset{+}{C}}}}$

(c) $\overset{+}{C}H_3$ (d) $CH_3\overset{+}{C}H_3$

27. Which is the decreasing order of stability

(i) $CH_3 - \overset{+}{C}H - CH_3$

(ii) $CH_3 - \overset{+}{C}H - O - CH_3$

(iii) $CH_3 - \overset{+}{C}H - CO - CH_3$

(a) $(i) < (ii) < (iii)$ (b) $(i) > (ii) > (iii)$

(c) $(iii) > (ii) > (i)$ (d) $(ii) > (iii) > (i)$

28. The order of decreasing stability of the carbanions

(1) $(CH_3)_3\bar{\bar{C}}$ (2) $(CH_3)_2\bar{\bar{C}}H$

(3) $CH_3\bar{\bar{C}}H_2$ (4) $C_6H_5\bar{\bar{C}}H_2$ is

(a) 1 > 2 > 3 > 4 (b) 4 > 3 > 2 > 1

(c) 4 > 1 > 2 > 3 (d) 1 > 2 > 4 > 3

29. Choose the chain terminating step

(1) $H_2 \rightarrow H^\bullet + H^\bullet$

(2) $Br_2 \rightarrow Br^\bullet + Br^\bullet$

(3) $Br^\bullet + HBr \rightarrow H^\bullet + Br_2$

(4) $H^\bullet + Br_2 \rightarrow HBr + Br^\bullet$

(5) $Br^\bullet + Br^\bullet \rightarrow Br_2$

(a) 1 (b) 3

(c) 4 (d) 5

30. The compound, which gives the most stable carbonium on dehydrogenation

(a) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$

(b) $CH_3-\underset{\underset{CH_3}{|}}{\overset{CH_3}{\overset{|}{C}}}-OH$

(c) $CH_3-CH_2-CH_2-CH_2OH$

(d) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_3$

31. Which of the following requires radical intermediate

(a) $CH_3-CH=CH_2+HBr \rightarrow CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$

(b) $CH_3-CHO+HCN \rightarrow CH_3-CH\begin{cases}CN\\OH\end{cases}$

(c) $CH_3-CH=CH_2+HBr \rightarrow CH_3-CH_2-CH_2-Br$

(d) $CH_3CHO+NH_2OH \xrightarrow{H^+} CH_3-CH=N-OH$

32. Which of the following species is paramagnetic in nature

(a) Free radical

(b) Carbonium ion

(c) Carbanion

(d) All the above

33. In which of the following species the central *C*-atom is negatively charged

(a) Carbanion

(b) Carbonium ion

(c) Carbocation

(d) Free radical

34. Which of the following free radicals is most stable

(a) Primary (b) Methyl

(c) Secondary (d) Tertiary

35. Which of the following contains three pairs of electrons

(a) Carbocation

(b) Carbanion

(c) Free radical

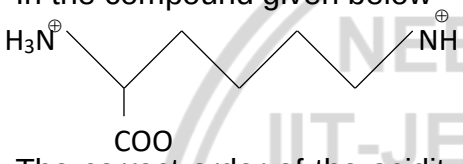
(d) None of these

36. Which of the following carbanion is most stable

(a) Methyl (b) Primary
(c) Secondary (d) Tertiary

37. Among the given cations, the most stable carbonium ion is
(a) *sec*-butyl
(b) *ter*-butyl
(c) *n*-butyl
(d) None of these

38. In the compound given below



The correct order of the acidity of the positions (*X*), (*Y*) and (*Z*) is
(a) (*Z*) > (*X*) > (*Y*)
(b) (*X*) > (*Y*) > (*Z*)
(c) (*X*) > (*Z*) > (*Y*)
(d) (*Y*) > (*X*) > (*Z*)

39. *C*-*C* bond length in benzene is
(a) 1.39 Å
(b) 1.54 Å
(c) 1.34 Å
(d) Different in different bonds

40. Heterolysis of carbon-chlorine bond produces
(a) Two free radicals
(b) Two carbonium ions
(c) Two carbanions
(d) One cation and one anion