




GOC Assignment

- Number of π electrons in cyclobutadienyl anion $(C_4H_4)^{2-}$ is
(a) 2 (b) 4 (c) 6 (d) 8
 - Minimum resistance in bond rotation will be observed in the compound
(a) Hexachloroethane (b) Ethylene (c) Acetylene (d) Ethane
 - The number of σ bonds in *o*-xylene is
(a) 6 (b) 9 (c) 12 (d) 18
 - The numbers of sigma (σ) bonds in 1-butene is
(a) 8 (b) 10 (c) 11 (d) 12
 - Number of σ - and π - bonds present in 1-butene-3-yne respectively are
(a) $7\sigma, 3\pi$ (b) $5\sigma, 2\pi$ (c) $8\sigma, 3\pi$ (d) $6\sigma, 2\pi$
 - $\sigma : \pi$ bonds for benzene is
(a) 1 : 2 (b) 4 : 1 (c) 2 : 1 (d) 3 : 1
 - Toluene has
(a) 6σ and 3π bond (b) 9σ and 3π bond (c) 9σ and 6π bond (d) 15σ and 3π bond
 - The enolic form of acetone contains
(a) 8σ bonds, 2π -bonds and 1 lone pair (b) 9σ bonds, 1π -bond and 2 lone pair
(c) 9σ bonds, 2π -bonds and 1 lone pair (d) 10σ -bond, 1π -bond and 1 lone pair
 - The C-C bond length of the following molecules is in the order
(a) $C_2H_6 > C_2H_4 > C_6H_6 > C_2H_2$ (b) $C_2H_2 < C_2H_4 < C_6H_6 < C_2H_6$
(c) $C_2H_6 > C_2H_2 > C_6H_6 > C_2H_4$ (d) $C_2H_4 > C_2H_6 > C_2H_2 > C_6H_6$
 - The number of sp^3 hybridised carbon atoms in cyclohexene are
(a) 2 (b) 3 (c) 4 (d) 6
 - The hybridisation involved in the six carbon atoms of benzene is
(a) $3sp^3, 3sp^2$ (b) $3sp^3, 3sp$ (c) All $6sp$ (d) All $6sp^2$
 - Which of the following C-H bond has the lowest bond dissociation energy
(a) Primary (1°) C-H bond (b) Secondary (2°) C-H bond (c) Tertiary (3°) C-H bond (d) All of these
 - Carbon atoms in the compound $(CN)_4C_2$ are
(a) sp hybridised (b) sp^2 hybridised (c) sp and sp^2 hybridized (d) sp, sp^2 and sp^3 hybridised
 - Examine the following common chemical structures to which simple functional groups are often attached
(i)  (ii)  (iii)  (iv) $CH_3CH_2CH_2CH_2-$ (v) $H_2C = \begin{matrix} H \\ \diagdown \\ C \\ \diagup \\ H \end{matrix}$
- Which of these systems have essentially planar geometry
(a) (i) and (v) (b) (ii) and (iii) (c) (ii), (iii) and (iv) (d) (iv)
- Number of unhybridised orbitals in vinyl acetylene are
(a) 2 (b) 3 (c) 4 (d) 6
 - What kind of attractive forces can exist when ionic species are present
(a) Cation-anion electrostatic forces (b) Ion-dipole forces
(c) Both (a) and (b) (d) Dipole-dipole forces
 - Arrange the following in order of increasing dipole moment (I) Toluene (II) *m*-dichloro-benzene (III) *o*-dichlorobenzene (IV) *p*-dichlorobenzene
(a) I < IV < III < II (b) IV < I < II < III (c) IV < I < III < II (d) IV < II < I < III
 - Which one of the following compound have zero dipole moment
(a) *p*-dinitro benzene (b) *p*-dimethoxy benzene (c) 1-butene (d) 2-methyl-1-propene
 - Which one of the following compounds exhibits strongest hydrogen bonding
(a) $R-CO_2H$ (b) $R-CH_2OH$ (c) RCH_2NHCH_3 (d) $RCONHCH_3$
 - 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) $-NR_2 > -OR < -F$
 - 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

GRAVITY CLASSES

22. Arrangement of $(CH_3)_3-C$, $(CH_3)_2-CH-$, CH_3-CH_2- 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) $(CH_3)_3-C < CH_3-CH_2- < (CH_3)_2-CH-$
23. The $-I$ effect of $-NO_2$, $-CN$, $-COOH$, $-Cl$ decreases in the order
- (a) $-NO_2 > -CN > COOH > -Cl$ (b) $-Cl > -COOH > CN > -NO_2$
 (c) $-CN > -NO_2 > -Cl > -COOH$ (d) $-COOH > -CN > -NO_2 > -Cl$
24. Arrange the following resonating structures of vinyl chloride in order of decreasing stability
- $$H_2C=CH-Cl \leftrightarrow H_2\overset{-}{C}-\overset{+}{C}H=Cl \leftrightarrow H_2\overset{+}{C}-CH=\overset{-}{Cl}$$
- I II III
- (a) I > II > III (b) III > II > I (c) II > I > III (d) I > II = III
25. Arrange the following resonating structures of formic acid in order of decreasing stability
- $$H-\overset{O}{\parallel}C-OH \leftrightarrow H-\overset{O^-}{\mid}C=OH^+ \leftrightarrow H-\overset{O^-}{\mid}C-OH \leftrightarrow H-\overset{O^+}{\mid}C^--OH$$
- I II III IV
- (a) II > I > III > IV (b) I > III > II > IV (c) III > II > IV > I (d) IV > III > I > II
26. The conjugation of electron-withdrawing groups (e.g., $-CHO$, $-C(=O)R$, $-C(=O)OR$, $-C \equiv N$ and $-NO_2$) activates nucleophilic addition. The order of reactivity of these groups is
- (a) $-NO_2 > -C \equiv N > \overset{O}{\parallel}C-OR > \overset{O}{\parallel}C-R > \overset{O}{\parallel}C-H$ (b) $\overset{O}{\parallel}C-H > \overset{O}{\parallel}C-R > \overset{O}{\parallel}C-OR > -C \equiv N > -NO_2$
 (c) $-C \equiv N > -NO_2 > \overset{O}{\parallel}C-H > \overset{O}{\parallel}C-R > \overset{O}{\parallel}C-OR$ (d) $\overset{O}{\parallel}C-H > -NO_2 > -C \equiv N > \overset{O}{\parallel}C-OR > \overset{O}{\parallel}C-R$
27. In the Baeyer-Villiger oxidation of alkyl aryl ketones, it is the more electron-releasing group that migrates. The aptitude of migration of the aryl groups is of the order
- (a) *p*-chlorophenyl > *p*-anisyl > *p*-tolyl > phenyl (b) Phenyl > *p*-tolyl > *p*-anisyl > *p*-chlorophenyl
 (c) *p*-anisyl > *p*-tolyl > phenyl > *p*-chlorophenyl (d) *p*-chlorophenyl > phenyl > *p*-tolyl > *p*-anisyl
28. Which of the following structures have resonance stability
- $$CH_3-C \begin{matrix} \diagup O \\ \diagdown OH \end{matrix} \rightleftharpoons CH_3-C \begin{matrix} \diagup O^+ \\ \diagdown OH \end{matrix} \rightleftharpoons CH_3-C \begin{matrix} \diagup O \\ \diagdown O^{\oplus} \end{matrix} \leftrightarrow CH_3-C \begin{matrix} \diagup O^{\oplus} \\ \diagdown O \end{matrix} + H^+$$
- (a) (b) (c) (d)
29. Which of the following statements are correct
- (a) The nucleophilic addition of HCN to $CH_3CH=CHCHO$ results in a major addition to $C=C$
 (b) The nucleophilic addition of HCN to $CH_3CH=CHCHO$ results in a major addition to $C=O$
 (c) The nucleophilic addition of $PhMgBr$ to $PhCH=CH-CHO$ results in addition to $C=O$
 (d) The nucleophilic addition of $PhMgBr$ to $PhCH=CH-COCMe_3$ results in addition to $C=C$
30. Arrange NO_2 , F , $COOH$, Cl , OH , OR and C_6H_5 in order of electron-withdrawing effect
- (a) $F > NO_2 > COOH > OH > Cl > OR > C_6H_5$ (b) $COOH > NO_2 > F > Cl > OH > C_6H_5 > OR$
 (c) $C_6H_5 > OR > Cl > OH > COOH > NO_2 > F$ (d) $NO_2 > F > COOH > Cl > OH > OR > C_6H_5$
31. Strongest acid out of the following is
- (a) Oxalic acid (b) Malonic acid (c) Succinic acid (d) Adipic acid
32. Leaving tendency of the following in increasing order is :
- $$Cl^-, CH_3COO^-, OH^-, CH_3-C_6H_4-SO_3^-, RO^-, NH_2^-$$
- (I) (II) (III) (IV) (V) (VI)
- (a) VI < V < III < II < IV < I (b) I < II < III < VI < V < IV
 (c) I < III < V < II < IV < VI (d) Can't be decided
33. In CH_3CH_2OH , the bond that undergoes heterolytic cleavage most readily is
- (a) $C-C$ (b) $C-O$ (c) $C-H$ (d) $O-H$

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34. Which one of the following species is most stable
 (a) $p-O_2N-C_6H_4-\overset{+}{C}H_2$ (b) $p-CH_3O-C_6H_4-\overset{+}{C}H_2$ (c) $p-Cl-C_6H_4-\overset{+}{C}H_2$ (d) $C_6H_5-\overset{+}{C}H_2$
35. A solution of (+)-2-chloro-2-phenylethane in toluene racemises slowly in the presence of small amount of $SbCl_5$ due to the formation of
 (a) Carbanion (b) Carbene (c) Free radical (d) Carbocation
36. Heterolytic bond dissociation energy of alkyl halides follows the sequence
 (a) $R-F > R-Cl > R-Br > R-I$ (b) $R-I > R-Br > R-Cl > R-F$
 (c) $R-I > R-F > R-Br > R-Cl$ (d) $R-Cl > R-Br > R-I > R-F$
37. Carbanions initiate
 (a) Substitution reactions (b) Addition reactions (c) Both (d) None of these
38. Which of the following gives most stable carbocation by dehydration
 (a) $(CH_3)_2CH-OH$ (b) $(CH_3)_3C-OH$ (c) CH_3-CH_2-OH (d) $CH_3-CH_2-O-CH_2-CH_3$
39. The bond that undergoes heterolytic cleavage most readily is
 (a) C-C (b) C-O (c) C-H (d) O-H
40. The order of leaving group ability for halides is
 (a) $Cl^- > Br^- > I^- > F^-$ (b) $F^- > Br^- > I^- > Cl^-$ (c) $Br^- > Cl^- > F^- > I^-$ (d) $I^- > Br^- > Cl^- > F^-$
41. The reaction $R-\overset{O}{\parallel}{C}-NH_2 \xrightarrow{NaOBr(Br_2+NaOH)} RNH_2$ has the intermediates
 (a) $R-\overset{O}{\parallel}{C}-NHBr$ (b) $R-\overset{O}{\parallel}{C}-\overset{\cdot}{N}$ (c) $R-N=C=O$ (d) $R-NH-\overset{O}{\parallel}{C}-OH$
42. The order of ease of heterolysis of following *t*-butyl compound is
 $(CH_3)_3C-OH$ (I) $(CH_3)_3C-OAc$ (II) $(CH_3)_3C-Cl$ (III)
 (a) I < II < III (b) III < II < I (c) I < III < II (d) II < I < III
43. Which of the following statement is not correct
 (a) Primary carbonium ions are more stable than secondary ones
 (b) Secondary free radicals are more stable than primary free radicals
 (c) Tertiary free radicals are more stable than secondary ones
 (d) Tertiary carbonium ions are more stable than primary ones
44. The addition of KI increases the rate of the reaction $CH_3CH_2Cl + H_2O \rightarrow CH_3CH_2OH + HCl$. This is because I^- is
 (a) A good nucleophile and a good leaving group (b) A poor nucleophile and a poor leaving group
 (c) A poor nucleophile and a good leaving group (d) None of these
45. Acidic nature of CH_3OH (I), CH_3SH (II) and CH_3NH_2 (III) is in order
 (a) III < II < I (b) III < I < II (c) I < II < III (d) II < I < III
46. Select the correct order of basic nature :
 (a) $CH_3CH_2^- > CH_2 = CH^- > CH \equiv C^- > OH^-$ (b) $CH_3CH_2^- > CH \equiv C^- > CH_2 = CH^- > OH^-$
 (c) $CH_3CH_2^- > OH^- > CH \equiv C^- > CH_2 = CH^-$ (d) $OH^- > CH \equiv C^- > CH_2 = CH^- > CH_3-CH_2^-$
47. Which reaction sequence would be best to prepare 3-chloro-aniline from benzene
 (a) Chlorination, nitration, reduction (b) Nitration, chlorination, reduction
 (c) Nitration, reduction, chlorination (d) Nitration, reduction, acylation, chlorination, hydrolysis
48. Among the following compounds which is most reactive towards nitration
 (a) Benzene (b) Nitrobenzene (c) Toluene (d) Chlorobenzene
49. The intermediate during the addition of HCl to propene in the presence of peroxide is :
 (a) $CH_3\dot{C}HCH_2Cl$ (b) $CH_2\overset{+}{C}HCH_3$ (c) $CH_3CH_2\dot{C}H_2$ (d) $CH_3CH_2\overset{+}{C}H_2$
50. In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti-markownikoff addition to alkenes because
 (a) Both are highly ionic (b) One is oxidising and the other is reducing
 (c) One of the steps is endothermic in both the cases (d) All the steps one exothermic in both the cases