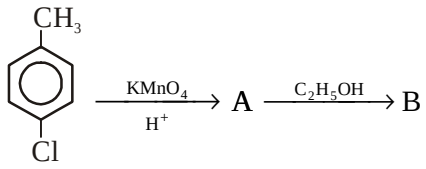
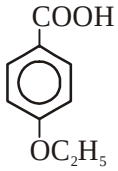
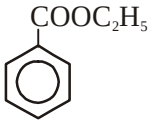
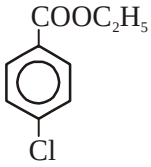
DPMT - 2008 (Memory Based)
CHEMISTRY

1. Identify B in the following reaction



(1)  (2)  (3)  (4) none of these

Sol: Ans [3] This is due to oxidation followed by esterification.

2. Which of the following is chiral

(1) $Cl - CH_2 - CH_2 - CH_2 - CH_2 - CH_3$ (2) $CH_3 - CH_2 - \underset{\displaystyle Cl}{\underset{|}{CH}} - CH_2 - CH_3$

(3) $Cl - CH = CH - CH_2 - CH_2 - CH_3$ (4) $H - \underset{\displaystyle Cl}{\underset{|}{C}} = C = CH - CH_2 - CH_3$

Sol: Ans [4] Allenes are chiral due to restricted rotation.

3. In the given compound which of the following hydrogen is most acidic

$$\underset{(a)}{CH_3} - \underset{(b)}{CH_2} - \overset{\displaystyle O}{\overset{\|}{\underset{(c)}{C}}} - CH_3$$

(1) only (a) (2) only (b) (3) only (c) (4) both (b) and (c)

Sol: Ans [3] As the negative charge gets dispersed through resonance.

4. The following solids are formed by X, Q and Z. XY_2, X_2Z, QZ. Then the formula of the compound formed by Q and Y is

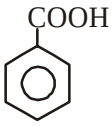
(1) QY (2) Q_2Y_3 (3) QY_4 (4) QY_3

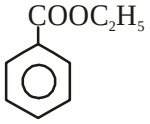
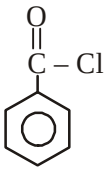
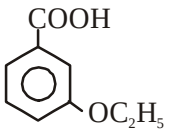
Sol: Ans [3]

5. In the following complex compound $[Co(NH_3)_4Cl_2]$, Co and Cl are collinear. Which of the following structure is possible

(1) linkage (2) trans (3) cis (4) none of these

Sol: Ans [2] This is the only structure possible if Co and Cl are collinear

6.  + $SOCl_2 \xrightarrow{C_2H_5OH}$ A . Product A is

(1)  (2)  (3)  (4) none of these

Sol: Ans [1]

7. Which of the following is false for Tetrahedral complexes.

(1) low spin (2) high spin (3) d-d transition (4) coloured

Sol: Ans [1]

8. In the following reaction

$NH_4^+ + BiN \rightarrow NH_3 + Bi^{3+}$

NH_4^+ is acting as an

(1) oxidising agent (2) acid (3) base (4) catalyst

Sol: Ans [2] Since $NH_4^+$is releasing a proton.

9. Most strongest lewis acid among the following is

(1) NF_3 (2) PCl_3 (3) $SnCl_2$ (4) $PbCl_4$

Sol: Ans [4] As it is most electron deficient due to inert pair effect.

10. NaH, when dissolved in water, produces:

(1) acidic medium (2) basic medium

(3) natural medium (4) cannot be predicted

Sol: Ans [2] H^- will act as a proton acceptor.

11. In a closed packed structure

(1) Tetrahedral voids are bigger than octahedral

(2) Tetrahedral voids are smaller than octahedral

(3) Tetrahedral voids are equal in size as octahedral

(4) none of these

Sol: Ans [2] As for a tetrahedral void $\frac{r^+}{r^-}$ = 0.2247 – 0.414

and for a octahedral void $\frac{r^+}{r^-}$ = 0.414 –0.732.

12. An element with configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ will form a compound of highest ionic character with the element having configuration

(1) $1s^2 2s^2 2p^6$ (2) [Ar] $4s^1\ 3d^{10}$ (3) [Ar] $4s^1$ (4) $1s^2\ 2s^1$

Sol: Ans [3] As it is an alkali metal.

13. $CH_3–CH_2–CH_2–CH_2–CH_2–COOH \longrightarrow CH_3–CH_2–CH_2–CH_2–\underset{\displaystyle NH_2}{\underset{|}{CH}}–COOH$ the reagents used in the conversion are

(1) (i) PBr_3/(ii) NH_3 (2) (i) red P, Br_2/(ii) NH_3 (excess)

(3) (i) PBr_3, NaCN/(ii) $LiAlH_4$ (4) none of these

Sol: Ans [2] The reaction is HVZ.

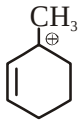
14. Empirical formula of compound having molar mass 58 is C_2H_5 number of structural isomers possible are

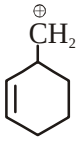
(1) 1 (2) 2 (3) 3 (4) 4

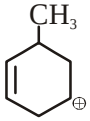
Sol: Ans [2] The molecular formula is C_4H_{10} and the isomers are

$CH_3 – CH_2 – CH_2 – CH_3$ and $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH_3$

15. Most stable among the following is

(1) 

(2) 

(3) 

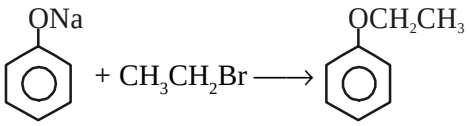
(4) all are equally stable

Sol: Ans [1] This is a 3° allylic carbocation.

16. Which of the following has highest ionization energy

(1) K^+ (2) Cl^- (3) Ar (4) Cs^+

Sol: Ans [1] As K^+ has the smallest size

17. 

the type of reaction is

(1) electrophilic substitution (2) nucleophilic substitution

(3) free radical substitution (4) none of these

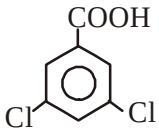
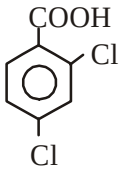
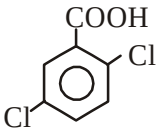
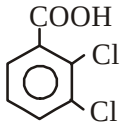
Sol: Ans [2]

18. Which of the following is true at equilibrium

(1) $\Delta G = 0$ (2) $\Delta H = T\Delta S$ (3) $\Delta G = \Delta H + T\Delta S$ (4) both (a) and (b)

Sol: Ans [4]

19. Dichlorobenzoic acid $\xrightarrow{\text{Mononitration}}$ product (only one). The structure of reactant can be

(1)  (2)  (3)  (4) 

Sol: Ans [2] As this position is ortho and para w.r.t. chlorine atoms and hence maximum activated for electrophilie.

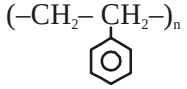
20. In the equilibrium

$2NH_3 \rightleftharpoons N_2 + 3H_2$. 6 moles of NH_3 is taken in 10 litre flask. If concentration of N_2 at equilibrium is *x*, then concentration of NH_3 at equilibrium is

(1) $0.6 - x$ (2) $0.6 - 2x$ (3) $0.6 - \frac{x}{2}$ (4) none is correct

Sol: Ans [2]

21. Teflon is repeating unit of

(1) $-CF_2 - CF_2-$ (2) $CF_2 = CF_2$ (3) $-(CH_2 - CH_2)_n-$ (4) 

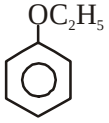
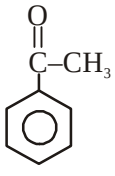
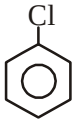
Sol: Ans [1]

22. The number of π-bonds in the following compound $O_2N-C \equiv C-NO_2$, is:

(1) 2 (2) 3 (3) 4 (4) 1

Sol: Ans [3]

23. Most reactive towards electrophilic substitution is

(1)  (2)  (3)  (4) none of these

Sol: Ans [1] As $-OC_2H_5$ is the most activating groop.

24. Which of the following is true representation of lattice energy

(1) $Na^+(s) + 1/2\ Cl_2(g) \rightarrow NaCl(s)$ (2) $Na^+(s) + Cl^-(g) \rightarrow NaCl(s)$

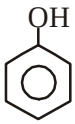
(3) $Na^+(g) + Cl^-(g) \rightarrow NaCl(g)$ (4) $Na(s) + Cl(s) \rightarrow NaCl(s)$

Sol: Ans [3]

25. Arrange the following acids in decreasing order of acidic strength

$CH_3 - CH_2 - CH_2 - COOH$ $CH_3 - CH_2 - CH_2 - CH_2 - OH$

I II



$CH_3 - CH_2 - C \equiv CH$

III IV

(1) I > II > III > IV (2) III > IV > II > I (3) I > III > IV > II (4) I > III > II > IV

Sol: Ans [4]

26. The best condition for Heterogenous catalysis

(1) adsorption (2) absorption (3) diffusion (4) occlusion

Sol: Ans [1]

27. Functionality of protein depends on

(1) its shape and structure (2) pH of medium

(3) temperature (4) all of these

Sol: Ans [4]

28. In acidic medium CrO_4^{2-} changes to

(1) $Cr_2O_7^{2-}$ (2) Cr^{3+} (3) Cr (IV) (4) Cr_2O_3

Sol: Ans [1]

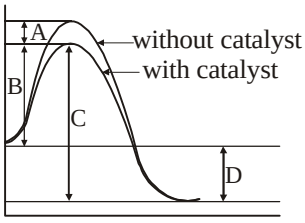
29. $Fe^{2+} \rightarrow Fe^{3+} + e^-$

$MnO_4^- + 5e^- \rightarrow Mn^{2+}$ the ratio of stoichiometric coefficient of Fe^{2+} and MnO_4^- is

(1) 1 : 5 (2) 5 : 1 (3) 2 : 3 (4) 6 : 1

Sol: Ans [2]

30. Which of the following is change in enthalpy



(1) A (2) B (3) C (4) D

Sol: Ans [4]