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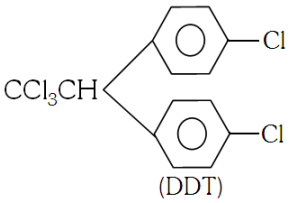
Chemistry mock 7 2022-23

Time : 60 Min	Chem : Full Portion Paper	Marks : 200

Hints and Solutions

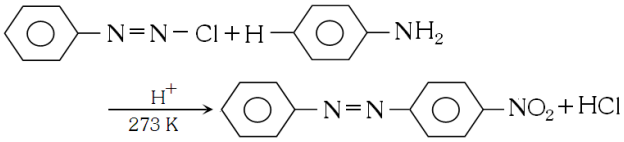
51) Ans: **C)** unsaturation present in acid contents.
Sol: Iodine number is the number of gm of I_2 that combine with 100 gm of oil or fat. It gives the degree of unsaturation of acids in fat or oil.

52) Ans: **B)** 1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl) ethane.
Sol:



(DDT)

53) Ans: **A)** dyes.
Sol:



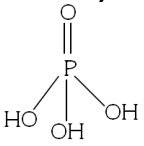
p-Aminozobenzene (yellow ppt.)

54) Ans: **C)** molar concentration of reactants.
Sol: By the law of mass-action, "at a given temperature, the rate of a reaction at a particular instant is proportional to the product of the active masses of the reactants at that instant raised to powers which are numerically equal to the numbers of their respective molecules in the stoichiometric equation describing the reaction".

55) Ans: **C)** (1) and (2) both.
Sol: Electrolysis is used for both electroplating and electrorefining.

56) Ans: **C)** +11250 cal
Sol: Heat of neutralization of HCN
= Total heat - heat of neutralization of strong base
=-2.460-(-13.71) = 11.25 kcal or 11250 cal

57) Ans: **C)** 3
Sol:



3-OH groups are present, therefore it is tribasic.

58) Ans: **D)** All of the above

59) Ans: **A)** $CH_3CH_2-O-CH_2CH_3$
Sol:

$$CH_3CH_2-OH+HO-CH_2-CH_3 \xrightarrow[140^oC]{\text{Conc. } H_2SO_4} CH_3CH_2-O-CH_2-CH_3+H_2O$$

Diethyl ether

60) Ans: **D)** Statement 1 is false but statement 2 is true.
Sol: At the isoelectric point, solubility of protein is maximum.

61) Ans: **A)** more volatile.

62) Ans: **A)** organometallic compound.
Sol: The organometallic compound of Mg is called as Grignard reagent $(R-Mg-X)$.

63) Ans: **B)** (i) 25 c.c. (ii) 75 c.c.
Sol: At room temperature,

$$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(l)}$$

$t=0$	50 ml	50 ml	0
$t=t$	$50-2x$ $=0$	$50-x$ 25 gases	$2x$ (50) liquid

In this case, H_2 is limiting reagent x = 25 ml

$$\text{At } 110^oC \quad 2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)} \quad V_{gas} = 75 \text{ ml}$$
$$t=t \qquad 0 \qquad 25 \text{ ml} \qquad 50 \text{ ml}$$

64) Ans: **B)** Hard
Sol: Low density polythene is tough but flexible (i.e., not too hard) and a poor conductor of electricity and has highly branched structure.

65) Ans: **D)** dipole moment.
Sol: Critical temperature of water is more than O_2 because of its dipole moment (Dipole moment of water = 1.84 D; Dipole moment of O_2 = zero D).

66) Ans: **A)** amino acids.

67) Ans: **D)** 90^o
Sol: H_2O_2 contains the bond angle between two $O-H$ planes of about 90^o.

68) Ans: **C)** 2
Sol: For second order reactions, $t_{1/2} = \frac{1}{Ka}$.

69) Ans: **D)** $CaCO_3 + NH_3$
Sol: Calcium cyanamide on treatment with steam gives $CaCO_3 + NH_3$.

70) Ans: **C)** $\Delta U - 2RT$

Sol: We know, $\Delta H = \Delta U + \Delta nRT$
As $\Delta n = -2$, so $\Delta H = \Delta U - 2RT$

71) Ans: **B)** most part of the atom is empty space.

72) Ans: **D)** Electron > hydrogen > helium > neon
Sol: Since, $\lambda \propto \frac{1}{m}$, therefore
$m_e < m_H < m_{He} < m_{Ne}$.

73) Ans: **B)** complex salts.
Sol: Complex salts consist of two different metallic elements but give test for only one of them. e.g. $K_4Fe(CN)_6$ does not give test for Fe^{3+} ions.

74) Ans: **C)** 1.0
Sol: In the solution, urea does not give ion.

75) Ans: **B)** 7.0
Sol: pK_a = - log K_a, pK_b = - log K_b

$$\therefore \ pH = -\frac{1}{2}[\log K_a + \log K_w - \log K_b]$$

$$pH = -\frac{1}{2}[-5 + \log(1\times 10^{-14}) - (-5)]$$

$$pH = -\frac{1}{2}[-5 - 14 + 5] = -\frac{1}{2}(-14) = 7$$

76) Ans: **A)** they can withstand high temperature.
Sol: These are the materials which can withstand very high temperature without melting or becoming soft.

77) Ans: **D)** ZnO
Sol: ZnO is an amphoteric oxide.
$ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$
$ZnO + 2NaOH \rightarrow Na_2ZnO_2 + H_2O$

78) Ans: **B)** D > B > C > A
Sol: Since +I effect and hyperconjugative effect increases, stability of carbanion decreases

79) Ans: **B)** $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$
Sol: $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$
As, Oxidation state of sulphur in $S_2O_4^{2-} = +3$.
Oxidation state of sulphur in $SO_3^{2-} = +4$.
Oxidation state of sulphur in $S_2O_6^{2-} = +5$.

80) Ans: **A)** electrolysis of molten anhydrous calcium chloride.

81) Ans: **A)** extent of its ionization.

82) Ans: **B)** washing soda.
Sol: Washing soda removes both the temporary as well as permanent hardness by converting soluble calcium and magnesium compounds into insoluble carbonates.
$CaCl_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaCl$
$CaSO_4 + Na_2CO_3 \rightarrow CaCO_3 + Na_2SO_4$
$Ca(HCO_3)_2 + Na_2CO_3 \rightarrow CaCO_3 + 2NaHCO_3$.

83) Ans: **A)** 2.84 gm
Sol: We know, $M = \frac{\omega}{m \times V(l)}$

$$0.52 = \frac{\omega}{36.5 \times 0.15} \qquad \therefore \ \omega = 2.84 \text{ gm}$$

84) Ans: **B)** soaps.
Sol: Soaps are either sodium or potassium salts of higher fatty acids.

85) Ans: **D)** Mg and Al
Sol: Mg and Al can not be obtained by the electrolysis of aqueous solution of their salts, as instead of metal H_2 gas is liberated at the cathode.

86) Ans: **C)** Na^+ ions has coordination number 4.
Sol: In NaCl crystal, Na^+ ions possesses coordination number 6.

87) Ans: **D)** the difference in the size of the colloidal particles.

88) Ans: **A)** tetrahedral.
Sol: All the $C-C$ bond are single bonds. Therefore, there will be sp^3-hybridization and tetrahedral structure.

89) Ans: **B)** U
Sol: U > Ra > Pb > Hg

90) Ans: **A)** it has no d-orbitals.

91) Ans: **C)** 7
Sol: $C_4H_{10}O$ have 7 isomers out of which 4 are alcohols while 3 are ethers.

1. $CH_3-CH_2-CH_2-CH_2-OH$
   n–butyl alcohol
2. $CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3$
   Sec–butyl alcohol
3. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$
   Isobutyl alcohol
4. $CH_3-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$
   Ter–buty–alcohol
5. $CH_3-CH_2-O-CH_2-CH_3$
   Diethyl ether
6. $CH_3-O-CH_2-CH_2-CH_3$
   Methyl propyl ether

7. $CH_3 - O - CH\begin{matrix}/CH_3\\ \backslash CH_3\end{matrix}$

Methyl isopropyl ether

92) Ans: **A)** Cu^+

Sol: In Cu^{+1} i.e. cuprous ion, d orbitals are completely filled therefore it will form colourless complex.

93) Ans: **B)** $M/3$

Sol: We know, $d \propto M$

$$\frac{d_1}{d_2} = \frac{M_1}{M_2} \Rightarrow \frac{3d}{d} = \frac{M}{M_2} \qquad \therefore M_2 = \frac{M}{3}$$

94) Ans: **A)** fuming H_2SO_4.

Sol: Fuming H_2SO_4.

95) Ans: **B)** CH_3COOH

Sol: CH_3COOH does not exhibit silver mirror test.

96) Ans: **D)** NH_3

Sol: Conjugate acid is obtained from the base by gaining H^+ ion.

97) Ans: **A)** SF_6

Sol: SF_6 is symmetrical and therefore non polar as its net dipole moment is zero.

98) Ans: **A)** BF_3

Sol: BF_3 does not have octet, it has only six electrons thus it is electron deficient compound and not follow octet rule.

99) Ans: **B)** p-nitrobenzaldehyde

Sol: Because of the electron withdrawing nature of NO_2 group, the partial +ve charge on the carbon atom of the carbon atom of the C = O group in p-nitrobenzaldehyde increases, and so becomes more susceptible to nucleophilic attack by the CN^- ion.

100) Ans: **B)** tranquilizers.