Sharath Gore

Chemistry mock test 4 2022-23

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

Hints and Solutions

51) Ans: **B)** CH_3CH_2OH

Sol: CH_3CH_2OH

52) Ans: **C)** CH_3COO^-

Sol: Since, it is conjugate base of weak acid

i.e. $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$

53) Ans: **C)** $Na_2S_2O_3 + Na_2S$

Sol: $3S + 4NaOH \xrightarrow{\text{boiling}} Na_2S_2O_3 + Na_2S$

54) Ans: **D)** PbO_2

Sol: PbO_2 i.e. lead dioxide is not a peroxide. All other are peroxides because they have $(-O-O-)$ linkage.

55) Ans: **D)** - 17 kcal

Sol: $C_{(s)} + 2H_{2(g)} \rightarrow CH_{4(g)}$ ....(i)

$C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}; \Delta H = -94 \text{ kcal mol}^{-1}$ ....(ii)

$H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(l)}; \Delta H = -68 \text{ kcal mol}^{-1}$ ....(iii)

$CH_4 + 3/_2\ O_2 \rightarrow CO_2 + 2H_2O;$

$\Delta H = -213 \text{ kcal mol}^{-1}$ ....(iv)

To obtain equation (i) calculate -(ii) + 2 × (iii) - (iv).

56) Ans: **B)** CH_3CHCl_2

Sol:

$CH \equiv CH + HCl \rightarrow CH_2 = CHCl \xrightarrow{HCl} CH_3 - CHCl_2$

57) Ans: **A)** $k[Au(CN)_2]$

Sol: For gold plating, the used electrolyte which is used is $K\left[Au(CN)_2\right]$.

58) Ans: **C)** This Statement 1 is true, but the Statement 2 is false

Sol: Mohr's salt contains only Fe^{2+} ions without any of Fe^{3+} ions. Thus, a standard solution of Fe^{2+} can be obtained directly by weighing a known amount of the Mohr's salt.

59) Ans: **A)** Neutron/proton ratio

Sol: Radioactivity is due to n/p ratio.

60) Ans: **B)** double dumb-bell.

61) Ans: **C)** 4,5-dimethyl-2-hexyne

Sol: $\underset{6}{CH_3} - \underset{5}{\overset{\overset{CH_3}{|}}{CH}} - \underset{4}{\overset{\overset{CH_3}{|}}{CH}} - \underset{3}{C} \equiv \underset{2}{C} - \underset{1}{CH_3}$

4, 5 – di methyl – 2 – hexyne

62) Ans: **B)** guanine.

Sol: It is guanine containing two possible binding site.

63) Ans: **A)** 44800 ml

Sol: Here, n of $O_2 = \frac{16}{32} = \frac{1}{2}$ and n of $H_2 = \frac{3}{2}$

$\therefore$ Total no. of moles = $\frac{3}{2} + \frac{1}{2} = 2$

$\therefore\ V = \frac{nRT}{P} = \frac{2 \times .082 \times 273}{1} = 44.8 \text{ lit} = 44800 \text{ ml}$

64) Ans: **A)** $MgSO_4$

Sol: Because $MgSO_4$ dissociates to give 2 ions.

65) Ans: **A)** hydrogen bonds.

Sol: α-helix structure is formed, when the chain of α-amino acid coil, as a right handed screw due to the formation of hydrogen bonds between amide groups of the same peptide chain means NH group in one unit, is linked to carbonyl oxygen of the third unit by hydrogen bonding. This H-bonding is responsible for holding helix in a position.

66) Ans: **C)** square planar.

Sol: The copper complexes usually involve with four co-ordination number and possess square planar in shape.

67) Ans: **A)** $BaCrO_4$

Sol: When barium ion is added in chromate ion solution, yellow ppt of $BaCrO_4$ is obtained.

$BaCl_2 + K_2CrO_4 \rightarrow \underset{\text{Yellow ppt.}}{BaCrO_4 \downarrow} + 2KCl$

68) Ans: **D)** all of these

69) Ans: **A)** changes.

70) Ans: **C)** $O_2^+ > O_2 > O_2^-$

Sol: The correct sequence of bond order is

	O_2^+	>	O_2	>	O_2^{2-}
B.O.	2.5		2		1.5

71) Ans: **A)** combustion zone

Sol:

Combustion zone	1800 K
Fusion zone	1600 K
Slage zone	1300 K
Treduction zone	800 K

72) Ans: **A)** intermolecular hydrogen bond.
Sol: Intermolecular hydrogen bonding causes dimerisation of carboxylic acid in non-aqueous solvents.

73) Ans: **B)** 4
Sol: In Na_2O, each oxide ions (O^{2-}) is co-ordinated to $8\,Na^+$ ions while each Na^+ ion to 4 oxide ions. Thus, it has 4 : 8 co-ordination.

74) Ans: **D)** There is no difference between order and molecularity of a reaction.
Sol: Order may or may not be equal to molecularity.

75) Ans: **D)** both (1) and (2).

76) Ans: **A)** PO_4^{---} and $C_2O_4^{--}$
Sol: Here, both possess the tendency to accept proton.

77) Ans: **D)** Na_3AlF_6 and CaF_2
Sol: Na_3AlF_6 and CaF_2

78) Ans: **B)** larger size of phosphorus atom.
Sol: Pentavalency in phosphorus is more stable that of nitrogen because of large size of phosphorus atom.

79) Ans: **B)** 1, 2-dibromoethane
Sol: $Pb(C_2H_5)_4 \xrightarrow{\text{heat}} Pb + \underset{\text{Ethyl radical}}{4CH_3CH_2}$

$$\underset{\text{Br}}{\underset{|}{CH_2}} - \underset{\text{Br}}{\underset{|}{CH_2}} + Pb \longrightarrow \underset{\text{Ethene}}{CH_2 = CH_2} + \underset{\text{Lead bromide}}{PbBr_2}$$

When leaded gasoline burns, lead metal gets deposited in the engine which is removed by adding ethylene dibromide. The lead bromide is volatile and is carried off with the exhaust gases from the engine.

80) Ans: **A)** Hydrogen bonding

81) Ans: **C)** e/m ratio of protons is not constant.
Sol: For protons, e/m is constant.

82) Ans: **C)** 224 ml
Sol: As we know,

$$\underset{2\times34\text{ gm}}{2H_2O_2} \longrightarrow \underset{22400\text{ ml}}{2H_2O + O_2}$$

As, $2\times34\text{ gm} = 68\text{ gm}$ of H_2O_2 liberates $22400\text{ ml}\ O_2$ at STP,
$\therefore$ 0.68 gm of H_2O_2 liberates

$$= \frac{0.68\times22400}{68} = 224\text{ ml}$$

83) Ans: **D)** $\Delta G^o = -nFE^o_{cell}$
Sol: $\Delta G^o = -2.303\,RT\log K_{eq}$ i.e. $\Delta G^o = -nFE^o_{cell}$.

84) Ans: **C)** 125 ml
Sol: Here, $M = \frac{n}{V(l)} \Rightarrow 0.8 = \frac{0.1}{V(l)}$ $\therefore V = 125\text{ ml}$

85) Ans: **A)** Excess NO_2 and SO_2 from burning fossil fuels
Sol: Excess of SO_2 and NO_2 reacts with water to form H_2SO_3 (sulphonic acid) and HNO_3 (nitric acid) respectively that cause decrease is pH of water.

86) Ans: **D)** Statement 1 is false but statement 2 is true.
Sol: Both fumaric and maleic acids contain two ionisable H^+ i.e. protons. The maleate monoanion shows intramolecular H-bonding and hence requires more energy to give maleate dianion. It is therefore second dissociation of fumaric acid is more than maleic acid, as former does not show intramolecular H-bonding.

87) Ans: **A)** α-hydroxy ketone.
Sol: α-hydroxy ketone.

88) Ans: **A)** - 602 kJ/mol
Sol: Molecular weight of $NH_4NO_3 = 80$
and Heat evolved $= 1.23\times6.12$
$\therefore$ Molar heat capacity $= 1.23\times6.12\times C$

89) Ans: **C)** autocatalysis
Sol: In autocatalysis, the rate of reaction increases with time as one of the product acts as catalyst.

90) Ans: **A)** phthalic anhydride and resorcinol.
Sol: Fluorescein is prepared by the reaction of phthalic anhydride and resorcinol.

91) Ans: **A)** metallic iron is reduced to Fe^{2-} ions.
Sol: As $4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$

92) Ans: **A)** ethanal.

93) Ans: **D)** MW/6
Sol:

$$\underbrace{\underset{+12/2\text{ atom}}{K_2Cr_2O_7} + 4H_2SO_4 \rightarrow K_2SO_4 + \underset{+6/2\text{ atom}}{Cr_2(SO_4)_3} + 4H_2O + 3[O]}_{\text{Change by 6}}$$

Thus, $\text{Eq. wt.} = \frac{\text{Mol. wt.}}{6}$

94) Ans: **B)** NaCl solution in water.
Sol: $2NaCl + 2H_2O \rightarrow 2NaOH + \underset{\text{(anode)}}{Cl_2} + \underset{\text{(cathode)}}{H_2}$

95) Ans: **D)** $MgCO_3$

Sol: $MgCO_3 \xrightarrow{Heat} MgO + CO_2$

The metal whose oxide is stable, then it's carbonate is unstable.

96) Ans: **D)** potash alum

Sol: Potash alum i.e. $K_2SO_4.Al_2(SO_4)_3.24H_2O$

97) Ans: **A)** benzyl alcohol

Sol:

$$CH_3CHO \xrightarrow{NaOH/I_2} CHI_3$$
$$CH_3CH_2OH \xrightarrow{NaOH/I_2} CHI_3$$
$$CH_3-\underset{\underset{OH}{|}}{C}H-CH_3 \xrightarrow{NaOH/I_2} CHI_3$$

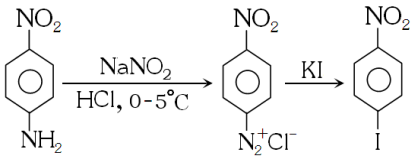
} Yellow ppt.

98) Ans: **B)** raising temperature.

Sol: Rate of forward reaction can be increased by raising temperature in endothermic reaction.

99) Ans: **B)** $NaNO_2$ / HCl followed by KI.

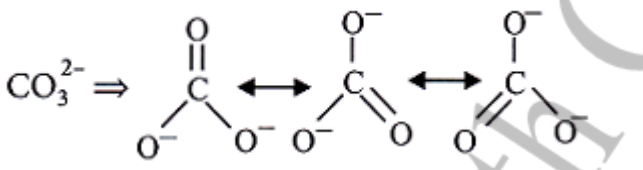
Sol:

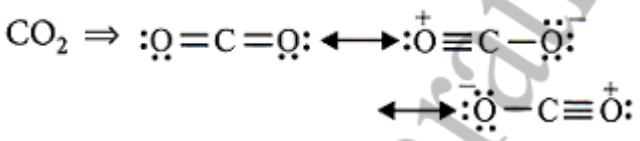


p-nitroaniline p-nitroiodobenzene

100) Ans: **C)** $CO < CO_2 < CO_3^{2-}$

Sol: $CO \Rightarrow :\bar{C} \equiv O^{+}: \longleftrightarrow :C = \ddot{O}:$





More single bond character in resonance hybrid, more is the bond length. Hence, the increasing bond length is

$CO < CO_2 < CO_3^{2-}$