JEE(Main) Exam 2017 Chemistry Code B solutions

61. In presence of strong acid NH_2 group is converted into $-\overset{+}{N}H_3$ and is meta-directing.

62. $\Delta U = q + w$
For adiabatic process
q=0, $\Delta U = w$

63. Rate of S_N1 reaction depends on stability of carbocation intermediate
I→ $2°$ carbocation
II→ $1°$ carbocation
III→ Benzylic cabocation.
Stability of carbocations is allylic or benzylic >3°>2° $> 1°$

64.

$$r_2 = 0.529 \times \frac{n^2}{z} A°$$
$$= 0.529 \times \frac{(Z)^2}{1} A°$$
$$= 2.116A°$$

65. For salt of week acid and weak base

$$p^H = \frac{1}{2}(pK_w + pK_a - pK_b)$$
$$= \frac{1}{2}(14 + 3.2 - 3.4)$$
$$= 6.9$$

66. Nylon -6 formed from caprolactam in first step caprolactam ring undergo base catalyzed hydrolysis.

67. Wt. of Hydrogen in body of 75 kg person=$75 \times \frac{10}{100} = 7.5kg$
On ^1H replacing $by\ ^2H$, the new weight of H is $7.5 \times 2 = 15kg$
Weight increase =15-7.5=7.5kg.

68. Compounds (1), (2), and (3) undergo dehydrohalogenation to give alkenes which decolourise Br_2 water. Compound (4) does not undergo elimination as it has no$\beta - H$.

69. ZnO is amphoteric, with Na_2O (base) it acts as acid and with CO_2 (acid) as base.

70.

71. $CH_3 - CH= C - CH_2 - CH_3 \xrightarrow[\text{Peroxide}]{HBr}$

$CH_3 - \underset{Br}{CH} - \underset{CH_3}{CH} - CH_2 - CH_3$

2 chiral centres

No. if stereoisomers=2^2=4

72. In fcc structure distance between two neighboring atoms = 2r =

$2x\frac{a}{2\sqrt{2}} = \frac{a}{\sqrt{2}}$

73. From Arrhenius equation

$K=A\ e^{-Ea/RT}$

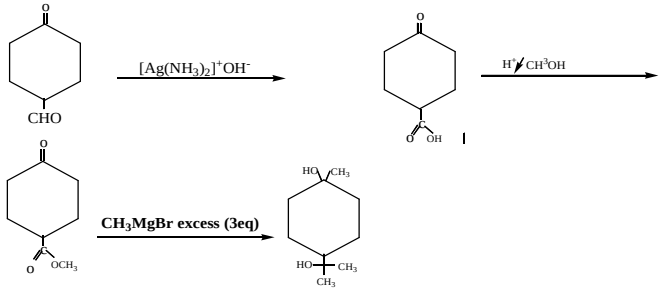
$K_1=A\ e^{-Ea_1/RT}$

$K_2=A_2\ e^{-Ea_2/RT}$

$\frac{K_2}{K_1} = e^{(Ea_1-Ea_2)/RT}$

In $\frac{K_2}{K_1}=\frac{Ea_1-Ea_2}{RT} = \frac{10\times1000}{8.314\times300} = 4$

74.



75.

76. Sugar (1) has ester functional group. In alkaline medium it undergo hydrolysis to give hemiacetal and thus acts as reducing sugar.

77. For reaction

$$CO_2(g)+2H_2O(I)\rightarrow CH_4(g)+2O_2(g)$$

$$\triangle_r H^0=\Sigma\left(\triangle_f H^0\right)_{products}-\Sigma\left(\triangle_f H^0\right)_{reactants}$$

$$=\left[\left(\triangle_f H^0(CH_4)+2\times 0\right)-\left(\triangle_f H^0(CO_2)+2\triangle_f H^0\left(H_2O(I)\right)\right)\right]$$

$$+890.3=\left[\triangle_f H^0(CH_4)\right]-\left[-393.5+2\times(-285.8)\right]$$

$$\triangle_f H^0\left(CH_4(g)\right)=-74.8KJ/mol$$

78. Xenon of XeF_4 is oxidized and oxygen of O_2F_2 is reduced.

79. Cl_2 undergoes disporportunation

$Cl_2+2NaOH\rightarrow NaOCl+NaCl+H_2O$.

80. The compound undergo elimination reaction.

81.
$$Na_2C_2O_4+H_2SO_4\rightarrow Na_2SO_4+CO+CO_2+H_2O$$
$$Na_2C_2O_4+CaCl_2\rightarrow CaC_2O_4\downarrow +2NaCl$$ while ppt

$\downarrow KMnO_4$
Decolorized

82. CO has no unpaired electron while others have (as per M.O.T.)

$$\underset{1-\alpha}{2CH_3COOH}\rightleftharpoons\underset{\alpha/2}{\left(CH_3COOH\right)_2}$$

$$i=1-\alpha+\alpha/2=1-\alpha/2$$

83. $\triangle T_f=i.K_f\times m=0.45$

$$0.45=i\times 5.12\times\frac{0.2\times 1000}{60\times 20}=0.527$$

$$1-\frac{\alpha}{2}\Rightarrow\alpha=0.946 or 94.6\%$$

84. Compound 4 is not an aromatic and complete ring does not participate in resonance.

85. No of moles of complex in solution

$= \frac{100}{1000} \times 0.1 = 0.01 moles$

No of Cl^- precipitated as Agcl = 1.2×10^{22}

$0.01 moles \rightarrow 1.2\times10^{22} ions$

$1 mole \rightarrow 12\times10^{23} ions = 2 moles$

Thus complex contain to ionizable chloride ions and the complex is

$\left[Co\left(H_2O\right)5CI\right]CL_{2,}H_2O$

86. DIBAL-H (Disobutyl aluminium hydride) reduces carboxylic acids and esters to aldehydes.

$F^- = 1 ppm$

87. $SO_4^{-2} < 500 ppm$

$NO_3^- = 50 ppm$

88. $M_2CO_3 + 2HCI \rightarrow 2MCI + H_2O + CO_2$

From reaction,

Moles of M_2CO_3=Moles of CO_2

$$\frac{1}{m.wt.} = 0.01186$$

$$M.wt. = \frac{1}{0.01186} = 84.3$$

$$p^H = \frac{1}{2}\left(pK_w + pK_a - pK_b\right)$$

$$= \frac{1}{2}\left(14 + 3.2 - 3.4\right)$$

$$= 6.9$$

89. Lower the reduction potential,
stronger reducing agent.

90. All are having 10 electronics.