Sri Chaitanya IIT Academy, India

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

A right Choice for the Real Aspirant

ICON CENTRAL OFFICE, MADHAPUR-HYD

Sec: Sr. IPLCO **Date: 19-12-15**

Time: 9:00 AM to 12:00 Noon **RPTM-15** **Max.Marks: 360**

KEY SHEET

PHYSICS			MATHS			CHEMISTRY	
Q.NO	ANSWER		Q.NO	ANSWER		Q.NO	ANSWER
1	4		31	4		61	2
2	3		32	3		62	3
3	3		33	1		63	1
4	1		34	1		64	3
5	3		35	3		65	1
6	3		36	4		66	2
7	1		37	3		67	3
8	1		38	2		68	2
9	2		39	2		69	1
10	1		40	1		70	4
11	2		41	2		71	4
12	3		42	2		72	2
13	4		43	1		73	3
14	4		44	3		74	3
15	4		45	3		75	3
16	2		46	3		76	2
17	2		47	4		77	1
18	2		48	1		78	3
19	1		49	4		79	1
20	1		50	2		80	2
21	1		51	4		81	2
22	2		52	4		82	4
23	2		53	2		83	4
24	1		54	1		84	4
25	1		55	2		85	3
26	1		56	2		86	2
27	1		57	2		87	3
28	3		58	1		88	2
29	3		59	3		89	1
30	2		60	1		90	1

CHEMISTRY

61. Key: 2

$\Delta S^0_{Total} = \Delta S^0_{Sys} + \Delta S^0_{Surr}$

$= +3.78\ kJK^{-1}mol^{-1}$

$\Delta G^0 = -T\Delta S^0_{Total}$

$= -298 \times 3.78 = -1126.4\ kJK^{-1}mol^{-1}$

62. Key: 3

$\Delta G^o = \Delta H^o - T\Delta S^o$ and ΔG^o must be negative

63. Key: 1

Thermodynamics

$H_3PO_4(aq) \rightleftharpoons H_2PO_4^-(aq) + H^+(aq)$

$\Delta_r H° = \Delta_f H°(H_2PO_4^-) + \Delta_f H°(H^+) - \Delta_f H°(H_3PO_4) = -1302 + 0 - (-1290) = -12\ kJ\ mol^{-1}$

$\Delta_r S° = S°(H_2PO_4^-) + S°(H^+) - S°(H_3PO_4) = 89 + 0 - 176 = -87\ JK^{-1}mol^{-1}$

$\Delta_r G° = \Delta_r H° - T\Delta_r S° = -12000 + 298 \times 87 = 13926\ J$

$2.303RTpK_{a1} = 13926 \Rightarrow pK_{a1} = 2.44$

64. Key: 3

65. Key: 1

66. Key: 2

$\frac{dE}{dT} = \frac{\Delta H - \Delta G}{nFT}$ $\Delta G - nFE$

67. Key: 3

68. Key: 2

69. Key: 1

70. Key: 4

71. Key: 4

72. Key: 2

73. Key: 3

$PV^{\gamma} = \text{constant}$

$P_1V_1^{\gamma} = P_2V_2^{\gamma}$

$$\frac{P_1}{P_2}=\left(\frac{V_2}{V_1}\right)^{\gamma} \qquad \Rightarrow \frac{V_2}{V_1}\cdot\frac{T_1}{T_2}=\left(\frac{V_2}{V_1}\right)^{\gamma}$$

$$\log\frac{P_1}{P_2}=\gamma\log\frac{V_2}{V_1} \qquad \Rightarrow \frac{T_1}{T_2}=\left(\frac{V_2}{V_1}\right)^{\gamma-1}$$

$$\gamma=\frac{\log P_1-\log P_2}{\log V_2-\log V_1} \qquad \gamma-1=\frac{\log T_1-\log T_2}{\log V_2-\log V_1}$$

$$\gamma=\frac{(\log V_2-\log V_1)+(\log T_1-\log T_2)}{\log V_2-\log V_1}$$

74. Key: 3

$$\Delta S={}^{n}C_p\ln\frac{T_2}{T_1}+nR\ln\frac{P_1}{P_2}$$

75. Key: 3

$$C_8H_{18}(g)+\frac{25}{2}O_2(g)\longrightarrow 8CO_2(g)+9H_2O(\ell)$$

$$\Delta_rH^0=8\times(-394)+9\times(-286)-(-250)=-5476\,KJ/mole$$

76. Key: 2

77. Key: 1

78. Key: 3

79. Key: 1

80. Key: 2

81. Key: 2

82. Key: 4

83. Key: 4

84. Key: 4

85. Key: 3

86. Key: 2

87. Key: 3

$$\frac{d(\Delta H)}{dT}=\Delta C_p;\qquad \Delta C_p=-C_{P\,(reactant)}+C_{P\,(products)}$$

$\therefore \quad \int_{\Delta H_1}^{\Delta H_2} d(\Delta H) = \Delta C_P \int_{T_1}^{T_2} dT$.

88. Key: 2

89. Key: 1

90. Key: 1

$\underset{(s)}{CaCO_3} \rightleftharpoons \underset{(s)}{CaO} + \underset{(g)}{CO_2}$

$k_p = p_{CO_2}$

$\therefore \quad k_p = p_{CO_2} = 500 \text{ torr at } 900K$

$k_p' = p_{CO_2} = 2000 \text{ torr at } 1000K$

$\therefore \quad \ln \frac{k_p}{k_{p'}} = -\frac{\Delta H}{R}\left(\frac{1}{T} - \frac{1}{T'}\right)$

$\Rightarrow \ln \frac{500}{2000} = -\frac{\Delta H}{R}\left(\frac{1}{900} - \frac{1}{1000}\right)$

$\Rightarrow \ln \frac{1}{4} = -\frac{\Delta H}{R}\left(\frac{1}{9000}\right)$

$\Rightarrow \quad \Delta H = 9000 \times R \times \ln 4.$