DAYANANDA SAGAR COLLEGE OF ENGINEERING (An Autonomous Institute Affiliated to VTU, Belagavi)

ShavigeMalleshwara Hills, Kumaraswamy Layout, Bengaluru-560078

Model Question Bank 2018-19 Unit wise

Program: B.E.

Course: Engineering Chemistry

Semester: I/II

Course Code: 18CH1ICCHY/18CH2ICCHY

Q. No	Question Description	Marks	BL	COs
1	In a cell containing Zn/Zn ²⁺ and Sn ²⁺ /Sn couples,		3	CO3
	 a) Solve for the cell potential if the [Zn²+] = 3.0 M and [Sn²+] = 2 x 10⁻⁵ M at 298 K. b) Detect the ΔG and ΔG° for the reduction of 1.0 M of Sn²+ by Zn. [Given E°cell = 0.62 V] 		6	CO3
2	The standard reduction potentials of Zn/Zn^{2+} and Ag^+/Ag electrodes are -0.76 and 0.80 V respectively. Construct a galvanic cell using these electrodes so that its standard emf is positive. Solve for the concentration of Ag^+ that result the 0 emf for the cell at 25°C if $[Zn^{+2}] = 0.02$ M.		3	CO3
3	A cell is formed by dipping Zn rod in 0.05 M Zn2+ solution and Cu rod in 0.15 M Cu2+ solution. The standard electrode potential of Zn and Cu are - 0.76 V and 0.34 V respectively. Execute the cell representation, cell reaction and calculate the emf of the cell		3	CO3
4	Detect the valency of copper ions with the help of the following cell: Cu CuSO ₄ (0.005 M) CuSO ₄ Cu (0.05 M), when the emf is 0.029 V.		6	CO3
5	The emf of the cell, $Ag AgNO_3$ (0.02 M) $\ AgNO_3$ (x M) $ Ag$ is 0.0764 V at 25° C. Find the concentration x.		1	CO3
	Reasoning		<u> </u>	
	1) Always reduction potential is taken for calculating the cell voltage, Clar	ify	2	CO2
	2) Retrieve the reason for the origin of single electrode potential.		1	CO2
	3) Defend potential of SHE is taken as zero.		6	CO2
	4) Explain salt bridge is used in the construction of Daniel cell?		2	CO2
	5) Assess electrochemical cells stop working after some time?		6	CO2
	6) Defend calomel electrode is called a secondary reference electrode?		6	CO2
	7) Nickel spatula cannot be used to stir copper sulphate solution, evaluate		6	CO2
	8) Blue color of copper sulphate fades when electrolyzed using platinu electrode, describe?	ım	1	CO2

10) Analyze: Reactivity of the metal varies inversely with its electrode potential. 11) EMF of the concentration cell decrease gradually: check for reason. 6 CO2 12) No electricity flows out of concentration cell when the metal ion concentration at the two electrodes is same: clarity 13) The potential of concentration cell doubles when the concentration ratio is changed from 0.0001 to 0.01; justify. 14) A dry cell does becomes dead after sometime even if it has not been used, find the reason. 15) Interpret the order in which Clements are arranged in electrochemical series 2 CO1 17) Classify the calomel electrode 18) Assess the decrease in the EMF of calomel electrode with increase in the concentration of KCl. 19) Connect the concentration of ions and electrode potential by referring to Nernst equation 20) Clarify the principle on which Nernst equ is derived 20) Clarify the principle on which Nernst equ is derived 21) Define the anode material for lithium ion battery 1 CO2 22) Identify the cathode material for lithium ion battery 1 CO2 23) Conclude the role of separator in rechargeable battery 24) Outline the direction of flow of electross during discharge of battery 25) Name the battery generally used in the mobile phones 26) Illustrate the cell representation for Ni-MI battery 3 CO 27) Illustrate the cell representation for Fai-ion battery 3 CO 27) Illustrate the cell representation for per when it is in contact with 0.5 M CuSO4 solution at 298 K, given Eo value of copper as 0.34 V. 4 Solve for the estandard electrode potential of Zn2+/Zn if the electrode dipped in 0.5 M ZnSO4 and a nickel electrode potential of Zn2+/Zn if the electrode dipped in 0.5 M ZnSO4 and a nickel electrode potential of Zn2+/Zn if the electrode dipped in 0.5 M ZnSO4 and a nickel electrode potential of Zn2+/Zn if the electrode dipped in 0.5 M ZnSO4 and a nickel electrode seation. 2 Costand Ni as -0.76 V, when [Zn2+] = 0.73 M. 3 Costand Ni as -0.76 V, when [Zn2+] = 0.73 M. 4 Costand Ni as -0.76 V, when [Zn2+]		9) Explain: EMF of a cell is always positive.	2	CO2
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Solve for the standard electrode potential of Zn2+/Zn if the electrode potential at 25oC is -0.764 V, when [Zn2+] = 0.73 M. Solve for the emf of a cell constructed by coupling a zinc electrode dipped in 0.5 M ZnSO4 and a nickel electrode dipped in 0.05M NiSO4. Write the cell representation and cell reaction, given the standard reduction potential of Zn and Ni as -0.76 V and -0.25 V respectively. Solve for the emf of the following cell at 298 K; Ni/ Ni2+ (0.01M) // Cu2+ (0.5M) / Cu. The standard reduction potentials of Ni and Cu are -0.25 V and 0.34V respectively. Write the electrode reaction. Classify the six different types of electrodes with examples for each. Define reference electrodes and mention their applications. Explain the construction and working of Ag/AgCl electrode. Describe the construction of calomel electrode with a neat diagram giving the electrode reaction.	3	Solve for the electrode potential of copper when it is in contact with 0.5 M		CO3
0.5 M ZnSO4 and a nickel electrode dipped in 0.05M NiSO4. Write the cell representation and cell reaction, given the standard reduction potential of Zn and Ni as -0.76 V and -0.25 V respectively. 6 Solve for the emf of the following cell at 298 K; Ni/ Ni2+ (0.01M) // Cu2+ (0.5M) / Cu. The standard reduction potentials of Ni and Cu are -0.25 V and 0.34V respectively. Write the electrode reaction. 7 Classify the six different types of electrodes with examples for each. 8 Define reference electrodes and mention their applications. Explain the construction and working of Ag/AgCl electrode. 9 Describe the construction of calomel electrode with a neat diagram giving the electrode reaction.	4	Solve for the standard electrode potential of Zn2+/Zn if the electrode potential	3	CO3
(0.5M) / Cu. The standard reduction potentials of Ni and Cu are -0.25 V and 0.34V respectively. Write the electrode reaction. Classify the six different types of electrodes with examples for each. Define reference electrodes and mention their applications. Explain the construction and working of Ag/AgCl electrode. Describe the construction of calomel electrode with a neat diagram giving the electrode reaction.	5	0.5 M ZnSO4 and a nickel electrode dipped in 0.05M NiSO4. Write the cell representation and cell reaction, given the standard reduction potential of	3	CO3
8 Define reference electrodes and mention their applications. Explain the construction and working of Ag/AgCl electrode. 9 Describe the construction of calomel electrode with a neat diagram giving the electrode reaction. 1 CO1	6	Solve for the emf of the following cell at 298 K; Ni/ Ni2+ (0.01M) // Cu2+ (0.5M) / Cu. The standard reduction potentials of Ni and Cu are -0.25 V and	3	CO3
construction and working of Ag/AgCl electrode. 9 Describe the construction of calomel electrode with a neat diagram giving the electrode reaction. 1 CO1	7		1	CO2
Describe the construction of calomel electrode with a neat diagram giving the electrode reaction.	8		1	CO1
	9	Describe the construction of calomel electrode with a neat diagram giving the	1	CO1
	10		1or 5	CO2

11	Determine the standard electrode potential of copper using a reference calomel electrode.	2	CO4
12	Describe the construction and working of glass electrode with a neat diagram.	1	CO2
13	Describe the determination of pH of a solution using glass electrode.	1	CO2
14	Define: (a) ion selective electrode (b) concentration cell	1	CO1
15	Explain the concept of electrolyte concentration cell.	2	CO1
16	A concentration cell is constructed by immersing two iron electrodes in 0.01M and 0.1M FeSO4 solutions. Represent the cell and solve for the emf of the cell at 298 K.	3	CO3
17	The emf of the cell Ag / AgNO3(0.0093 M) // AgNO3(X) / Ag is 0.086 V at 25 $^{\circ}$ C. Solve for the value of X.	3	CO3
18	Solve for the emf of the following concentration cell: Zn /Zn2+(0.025 M) // Zn2+(0.15 M) /Zn at 298 K.	3	CO3
19	Emf of the cell Ag / AgNO3(C1) // AgNO3(C2 = 0.2 M) / Ag is 0.8 V . Solve for C1.	3	CO3
20	Classify the three different types of batteries with description.	2	CO2
21	Analyze the following characteristics of a battery: (a) cell potential (b) capacity (c) energy density.	4	CO1
22	Analyze the following characteristics of a battery: (a) current (b) power density (c) energy efficiency (d) cycle life and (e) shelf life.	4	CO2
23	Describe the construction, working and applications of Zn-air battery.	1	CO1
24	Analyze the criteria for selection of lithium as anode.	4	CO2
25	Appraise the construction, working and applications of Li ion battery.	6	CO2
26	Define fuels cells. Formulate the construction and working of hydrogen-oxygen fuel cell.	1	CO2