

MOBILES AND SMART WATECHES ARE BANNED

RAMAIAH INSTITUT E OF TECHNOLOGY, BANGALRORE - 560054

DEPARTMENT OF CHEMISTRY

SUB: ENGG. CHEMISTRY

CODE: CYM12/CYE12

COURSE: I SEM B.E.

CIE TEST - 1

TERM: 30-11-2022 to 10-03-2023

MAX. MARKS: 30, TIME: 60 MIN.

Credits: 3:0:0

Instructions: answer any two full questions. Each carries 15 marks

Q. NO	Question	Marks	Course outcomes
1	a) Give reasons: (i) In a concentration cell, no electricity flow when the concentration of metal ion is same in both the half cell. (ii) A salt bridge is used in the construction of a Galvanic cell. (iii) There is no self discharge in reserve batteries.	2+1+2	CO1
	b) What is single electrode potential? A cell is constructed by coupling Zn-electrode dipped in 0.42 M ZnSO_4 and Ni-electrode dipped in 0.045 M NiSO_4 . Write the cell representation, over all cell reaction and calculate EMF of the cell at 298 K. Given: standard reduction potentials of Zn and Ni are -0.76 and -0.25 V respectively.	5	CO1
	c) Explain the mechanism of <i>wet corrosion</i> of an iron rod by electrochemical theory.	5	CO2

(PTO)

2	a) Derive the Nernst equation for the following electrode reaction: $\text{Ag}^+ + e^- \leftrightarrow \text{Ag}$	5	C01
	b) Calculate the potential of Ag-Cu cell at 25 °C, if the concentration of Ag^+ and Cu^{2+} are 0.01 M and 0.008 M respectively. Standard reduction potential of Cu and silver electrodes are +0.34 and +0.8 volts respectively. Calculate the change in free energy ΔG for reduction of 1 mole of Ag^+ ions. 1 Faraday = 96.5 KJ $\text{V}^{-1}\text{mole}^{-1}$.	3+2	C01
	c) Discuss the following factors which influence the rate of corrosion: (i) Nature and surface state of metal (ii) Temperature	3+2	C02
3	a) (i) How cathodic inhibitors reduce rate of corrosion? Name any 2 corrosion inhibitors used to inhibit the evolution of hydrogen gas at cathode. (ii) Justify: The corrosion product formed on aluminium is Al_2O_3 ; it is passive, whereas corrosion product formed on iron is Fe_2O_3 ; it is active.	2+3	C02
	b) Explain the construction and discharge reactions of Ni-MH ₂ battery.	5	C01
	c) Write the details of construction and electrode reactions of calomel electrode with neat figure.	5	C01
