INTERNATIONAL CENTR FOR APPLIED SCIENCES
MAHE, MANIPAL
B.Sc. (Applied Sciences) in Engg.
End – Semester Theory Examinations – MAY 2021
II SEMESTER - CHEMISTRY (ICH-121)
(Branch: Common to all)

Time: 3 Hours **Date: 18 May 2021** **Max. Marks: 50**

- ✓ **Answer all the questions from the following.**
- ✓ **Draw the diagrams wherever required.**

1A. Discuss the mechanism of S_N1 and S_N2 reaction of alkyl halides. Explain the Homolytic fission and Heterolytic fission of organic compounds with suitable examples. **(5)**

1B. What are the sign conventions for electrode potentials? A galvanic cell consists of copper plate immersed in 10 M solution of $CuSO_4$ and iron plate immersed in 0.5 M $FeSO_4$ at 298K. If $E^0_{cell} = 0.78$ V, write the cell reaction and calculate E.M.F. of the cell. **(3)**

1C. Draw the structure of the following molecules
i) 1-Penten-4-yne ii) 2- Methoxy-1 -butanol
iii) 4-Hexen-3-one iv) 1-Chloro-2-methylbutane **(2)**

2A. Explain the hybridization concept and hybridized structures of BeF_2 and CH_4. **(5)**

2B. Derive the expression for the degree of dissociation and obtain Ostwald's dilution law. Calculate the degree of hydrolysis of 0.01 M CH_3COONa at 25 ℃. If the hydrolysis constant of CH_3COONa at 25 ℃ is 5.76×10^{-10}. **(3)**

2C. Differentiate order and molecularity of a reaction. Give examples. **(2)**

3A. Explain the following:
i) Band theory of metals and its significance
ii) Criteria for Resonance and orbital approach to benzene **(5)**

3B. Derive the rate constant of second order reaction having one reactant. **(3)**

3C. Explain: Extensive property and intensive property. **(2)**

4A. According to VSEPR theory describe the structures of NH_3 and H_2O molecules. Compare its bond angle with CH_4. **(5)**

4B. Derive Gibbs-helmholtz equation. Discuss its application and significance. **(3)**

4C. Obtain the expression from the circuit diagram in the Poggendorff's compensation method. **(2)**

5A. Explain types of electrochemical cells its construction and working. **(5)**

5B. For the reaction: $N_2 + 3H_3 \rightleftharpoons 2\ NH_3$ at 500 ℃ and low pressure, the value of Kp with partial pressure in atmospheres is 1.44×10^{-5}, calculate the value of Kc for this equilibrium with concentration in units of moles per liter. (R in liter atm K^{-1} mol^{-1} is 0.0820). Discuss the magnitude of equilibrium constant. **(3)**

5C. Give reason:

i) Conductivity of metals decrease at high temperatures

ii) Silvery white lustrous surface of metals. **(2)**

****