International Islamic University Chittagong

Department of Electrical and Electronic Engineering

Final Examination Spring-2018 | Program: B.Sc. Engg. (EEE)
Course Code: CHEM-2301 | Course Title: Chemistry
Time: 2 hours 30 minutes | Full Marks: 50

Part A

[Answer any ***two*** questions from the followings; figures in the right margin indicate full marks.]

1(a). What is ionic mobility? **1**

1(b). State and explain Faraday's laws of electrolysis. **4**

1(c). How transport number is determined by moving boundary method? **5**

2(a). What is '% by w' and ppm? **2**

2(b). Describe how solubility of a gas in a liquid is dependent on pressure? **3**

2(c). (i) 49g of H_2SO_4 are dissolved in 250 ml of solution. Calculate the molarity of the solution? **5**

(ii) 45g of glucose ($C_6H_{12}O_6$) are dissolved in 500g of water. Calculate the molality of the solution?

3(a). Define dissociation. Describe the Hittorf's rule for relative speed of ions. **3**

3(b). How to determine molecular mass from vapor pressure lowering? **4**

3(c). Calculate the amount of NaCl in 50 mL of 0.75 M NaCl solution? **3**

Part B

[Answer any ***three*** questions from the followings; figures in the right margin indicate full marks.]

4(a). Describe homogenous and heterogeneous equilibria. **2**

4(b). What is equilibrium constant? Establish a relationship between K_p and K_c. **4**

4(c). At 60°C and a total pressure of 1 atmosphere dinitrogen tetroxide, N_2O_4, is 50% dissociated into nitrogen dioxide, NO_2. **4**

$N_2O_{4(g)} \longleftrightarrow 2NO_{2(g)}$

Calculate the value of K_p at this temperature.

5(a). What is pseudo order reaction? **2**

5(b). Derive an expression for the half-life period of the following reaction: **4**

$A \rightarrow B$, where; rate $\propto [A]$

5(c). If the half-life of a first order reaction in A is 15 min., how long it will take for [A] to reach 10 percent of the initial concentration? **4**

6(a). Define adsorption isotherm. **1**

6(b). Show the comparison between physiosorption and chemisorptions. **4**

6(c). Derive Langmuir's adsorption isotherm stating the assumptions on which it is based. **5**

Write short notes: (Answer ***any two*** of the following three)

7(a). La'chateliar principle. **5**

7(b). Colloids and its classifications. **5**

7(c). Activation energy and reaction rate. **5**