



Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Spring – 2025

Course Code: 0531-111
 Section: A, B, C, D, E
 Full Marks: 40

Course Title: Chemistry
 Level-Term: L1-T1
 Exam Date: June 26, 2025

Teacher's Initial: AAA
 Time: 2 Hours

[Answer All the Questions, you must maintain the order while answering]

- Q1. (a) Define Exothermic & Endothermic reactions with example. CO-1 [2+2+4=8]
 (b) Describe Chemical Equilibrium with graphical presentation. (C1)
 (c) $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3 + 45.2\text{Kcal}$
 Highlight the effect of changing temperature and pressure of the above reaction at equilibrium.
- Q2. (a) What is the difference between Molarity & Molality? CO-2 [2+4+2=8]
 (b) Determine the pH and pOH for the following entities. (C1)
 0.5% Na_2CO_3 , 0.2% CH_3COOH .
 (c) What is the molarity of a solution prepared by dissolving 75.5 g of pure KOH in 660ml of solution?
- Q3. (a) Differentiate between Homogeneous Mixture & Heterogeneous Mixture. CO-2 [2]
 (b) Calculate the mole fraction of HCl in a solution of Hydrochloric acid in water containing 23.5% HCl by weight. CO-2 [3+3=6]
 (c) Calculate the molality of a solution prepared by dissolving 10g of Toluene ($\text{C}_6\text{H}_5\text{CH}_3$) in 250g of Benzene (C_6H_6). (C3)
- Q4. (a) What are Acids and Bases according to Bronsted-Lowry theory? Write down its limitations. CO-2 [2+3+3=8]
 (b) What is a buffer solution? Write down the process of calculating pH of a basic buffer with Henderson's Hasselbalch Equation. (C1)
 (c) What is the pH of a buffer 0.35 moles ethanoic acid and 0.400 moles acetate ion and the total volume is 3.5L when you add 0.125 moles HCl? [K_a = 1.75×10^{-5}]

Q5. (a) What are alcohols? Categorize about the classification of alcohols?

CO-3
(C4)

[2]

(b) How would you prepare toluene and phenol? Illustrate the reactions.

[3+3=6]

(c) Illustrate the mechanisms of S_N1 and S_N2 reactions.

Or

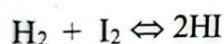
(a) Outline the Common Ion effect.

CO-3
(C4)

[2+3+3=8]

(b) Establish the relation between K_p & K_c with the help of the law of mass action.

(c) At a certain temperature 0.1 mole of H_2 and 0.1 mole of I_2 were placed in a one litre flask. The purple color of Iodine vapour was used to monitor the reaction. After a time, the equilibrium,



Was established and it was found that the concentration of I_2 decreased to

0.025 mole/L. Estimate the value of K_c for the reaction.