



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

Course Code: 0531-111

Section: A, B, C, D, E, F, G, H

Full Marks: 40

Course Title: Chemistry

Level-Term: L1-T1

Exam Date: December 22, 2025

Teacher's Initial: AAA, SRA

Time: 2 Hours

[Answer Any 5 Questions, you must maintain the order while answering]

- Q1. Define Exothermic & Endothermic reactions with example.** CO-1 [2+6]
Describe the effect of changing temperature and pressure at equilibrium for the following reaction. C(1)

$$\text{N}_2 + 3 \text{H}_2 \rightleftharpoons 2 \text{NH}_3 \quad \Delta H = -98 \text{ KJ}$$
- Q2. What is the difference between Molarity & Molality?** CO-1 [2+2+4]
What is the mole fraction of HCl in a solution of Hydrochloric acid in water containing 12% HCl by weight? C(1)
Determine the pH of a buffer composed of 0.1M acetic acid (CH_3COOH) and 0.6M acetate (CH_3COO^-) knowing that the acid dissociation constant K_a is 1.8×10^{-5} .
- Q3. Differentiate between Homogeneous Mixture & Heterogeneous Mixture.** CO-2 [3+3+2]
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). C(2)
Calculate the mass percentage of glucose in a solution prepared by dissolving 10g of glucose into 100g of water.
- Q4. What are Acids and Bases according to Arrhenius theory? Write down its limitations.** CO-2 [3+3+2]
Determine the pH and pOH for the following entities. C(1)
 0.5% H_2SO_4 , 0.2% CH_3COOH .
Describe why $\text{Ca}(\text{OH})_2$ is weaker base than KOH.
- Q5. Establish the relation between K_p & K_c with the help of the law of mass action.** CO-3 [4+4]
C(4)
 Some nitrogen and hydrogen gases are pumped into an empty five-litre glass bulb at 500°C . When equilibrium is established, 3.00 moles of N_2 , 2.10 moles of H_2 and 0.298 mole of NH_3 are found to be present.

Estimate the value of K_c for the reaction.

Q6. Explain hydrocarbons with examples.

Illustrate the preparation of toluene by Friedel- Craft alkylation.

Illustrate the mechanism of S_N1 reaction.

CO-3 [1+3+4]

C(4)