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End Semester Examination, December 2024
BSc (H) Forensic Science – 3rd Semester
Chemistry-III (BSFS207A)

Time: 2.5 hrs.

Max Marks: **50**

Note: *All Questions are compulsory. Marks are indicated against each question.*

PART-A

Q.1 Attempt any five questions:

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|---|------------------|
| (a) What are the four possible electronic transitions? | [CO-1] [L-1] 2 |
| (b) Define the red and blue shift in UV-visible spectroscopy. | [CO-1] [L-1] 2 |
| (c) State the Boyle's law for gases? | [CO-1] [L-1] 2 |
| (d) What is the ideal gas equation? | [CO-1] [L-1] 2 |
| (e) Define critical temperature and critical pressure. | [CO-1] [L-1] 2 |
| (f) Describe the equilibrium constant for two reactions. | [CO-1] [L-1,2] 2 |
| (g) Describe five properties of amorphous solids? | [CO-1] [L-1,2] 2 |

2x5

PART-B

- Q.2 Show the Nernst distribution law and derive it thermodynamically for two immiscible liquids. [CO-2] [L-3] **10**

OR

Apply the Nernst distribution law in the determination of equilibrium constant of potassium tri-iodide complex. [CO-2] [L-3] **10**

- Q.3 State and derive the Bragg's Law for crystalline structure? [CO-3] [L-4] **10**

OR

Explain the various types of crystal defects and their impact on the properties of solids. [CO-3] [L-4] **10**

- Q.4 Derive this Clausius-Clapeyron equation relates the change in vapor pressure with temperature. [CO-4] [L-5] **10**

OR

State Le Chatelier's principle and apply it to the following reaction:

$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$. How would the equilibrium position change if the pressure is increased and changes in concentration of reactant? [CO- 4] [L-5]

10

Q.5 Explain Beer-Lambert's law in UV absorption spectroscopy. How Chromophores and auxochromes influence the UV absorption spectra of organic compounds. [CO-5] [L-3] **10**

OR

Draw the structure of suitable example and explain the Woodward-Fieser rule for the determination of absorption maxima for this compound in UV-Visible spectroscopy. [CO- 5] [L-3] **10**