



Roll no.....

End Semester Examination, December 2024
B.Sc. (H) FS – Vth Semester
(CHEMISTRY V-BSFS307A)

Time: 2.5 hrs.

Max Marks: **50**

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

PART-A

In Part A Out of the seven questions given you have to attempt 5 questions:

- Q1. (a) What is Henry's law? [CO-1] [L-3] **2**
(b) What is Equivalent Conductance? [CO-1] [L-5] **2**
(c) What is a Calomel electrode? [CO-1] [L-6] **2**
(d) What is molecularity of a reaction? [CO-1] [L-5] **2**
(e) For a zero order reaction, what is the effect of concentration on the rate of reaction? [CO-1] [L-2] **2**
(f) Write the chemical reaction and the Nernst equation for the following cell:
 $\text{Zn(s)}/\text{Zn}^{2+}(\text{aq.}) // \text{Cu}^{2+}(\text{aq.})/\text{Cu(s)}$ [CO-1] [L-2] **2**
(g) What is Van't Hoff factor? [CO-1] [L-6] **2**

PART-B

In part B there is an internal choice in all of the 4 questions Attempt any one part:

- Q.2 (a) What is the Depression of Freezing point? Explain the relation of depression in freezing point with the molecular weight of solute. **7**
(b) 1.20 g of a substance dissolved in 100 g of water lowered its freezing point by 0.37°C . Find the molecular weight of the substance. Molal depression constant of water is $0.86^{\circ}\text{C/molality}$. **3** [CO-1] [L-2]

OR

- (a) What is relative lowering of vapour pressure, derive its relation with molecular weight of solute. **7**

Given that the K_f of water is 1.86 K.Kg/mol , what is the freezing point of water if 14.9 g of KCl was dissolved in 125 g of water? **3** [CO-1][L-2] **10**

- Q.3 (a) Define Ostwald's dilution law and its limitations. **5**
(b) What is Arrhenius theory of electrolytic dissociation, give its postulates. **5** [CO-2] [L-4]

OR

- (a) Give the conductometric titration plot for weak acid and weak base (CH_3COOH and NH_4OH) and for strong acid and weak base (HCl and NH_4OH). **5**
(b) What is transport number of cation and anion and how it is calculated. **5** [CO-3] [L-3]

Q.4 What is an electromotive force? How the emf of cell can be determined and why Emf of cell needs to be measured. 10 [CO-3] [L-4]

OR

Give the function of each of the following electrodes:

- (i) Reference electrode
- (ii) Standard Hydrogen electrode
- (iii) Calomel electrode
- (iv) Metal ion electrode
- (v) Inert electrode

[CO- 3] [L-6]

10

Q.5 Derive the rate expression for second order reaction and plot the graph between Rate of reaction versus concentration and concentration of reactant versus time with complete explanation.

OR

What is Arrhenius equation? Explain its importance and plot the graph between Activation energy and temperature of the reaction. 10 [CO- 5] [L-4]