

Code No. : B02/302

Second Semester Online Examination, May-June, 2022

M. Sc. CHEMISTRY

Paper III

[Thermodynamics, Electrochemistry and Surface Chemistry]

Time : Three Hours]

[Maximum Marks : 80

Note : Part A and B of each question in each unit consist of 'very short answer type question' which are to be answered in one or two sentences. Part C 'Short answer type' and D 'Long answer type' of each question should be answered within the word limit mentioned.

UNIT-I

1. (A) What is partial molar properties ? **2**
 (B) Determine the number of components, number of phases and the degree of freedom for the system. **2**



- (C) Explain activity coefficient.

(word limit 200-250) **4**

OR

Explain salting out effect.

P.T.O.

- (D) What is chemical potential ? Derive Gibb's Duhern equation and discuss the variation of chemical potential with temperature and pressure. (word limit 400-450) **12**

OR

Explain three component system with phase diagram involving two partially miscible liquid pairs giving suitable examples.

UNIT-II

2. (A) Write the equation for translational partition function. **2**
 (B) What do you mean by entropy flow ? **2**
 (C) Discuss Maxwell-Boltzmann distribution law. (word limit 200-250) **4**

OR

Derive the expression for rotational partition function.

- (D) Discuss Fermi-Dirac statistics and Bose - Einstein statistics.

(word limit 400-450) **12**

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OR

Describe Onsager reciprocity relations and irreversible thermodynamics for coupled reactions.

UNIT-III

3. (A) Define ionic strength. **2**
(B) What is over potential ? **2**
(C) Explain halfwave potential and its significance. *(word limit 200-250)* **4**

OR

Explain ion-solvent interactions.

- (D) Discuss the thermodynamics and electrified interface equations.

(word limit 400-450) **12**

OR

What is exchange current density ? Derive Butler-volmer equation.

UNIT-IV

4. (A) What is surface tension and its capillary action ? **2**
(B) What do you mean by surfactants ? **2**

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- (C) Explain CMC and factors affecting CMC of surfactants.

(word limit 200-250) **4**

OR

Explain free radical mechanism of polymerisation.

- (D) How to determine molar mass of polymers by viscometry and osmometry.

(word limit 400-450) **12**

OR

Derive BET equation. How to estimate the surface area of the adsorbent ?

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