

7213

M.Sc. IInd SEMESTER EXAMINATION, 2019

CHEMISTRY

Paper – III

Physical Chemistry - II

Time: Three Hours

Maximum Marks: 80

PART – A (खण्ड – अ)

[Marks: 20]

Answer all questions (50 words each).

All questions carry equal marks.

सभी प्रश्न अनिवार्य हैं। प्रत्येक प्रश्न का उत्तर 50 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – B (खण्ड – ब)

[Marks: 40]

Answer five questions (250 words each),

selecting one from each unit. All questions carry equal marks.

प्रत्येक इकाई से एक-एक प्रश्न चुनते हुए, कुल पाँच प्रश्न कीजिए।

प्रत्येक प्रश्न का उत्तर 250 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – C (खण्ड – स)

[Marks: 20]

Answer any two questions (300 words each).

All questions carry equal marks.

कोई दो प्रश्न कीजिए। प्रत्येक प्रश्न का उत्तर 300 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – A

- Q.1 (i) What is the criterion for reversible and irreversible processes in terms of free energy?
- (ii) Write the relation between the mean ionic activity coefficient and ionic strength.
- (iii) What do you mean by canonical ensemble?
- (iv) What is units of molecular partition function?
- (v) Write the thermodynamic criteria for irreversible process.
- (vi) From which equation, surface area is estimated?
- (vii) Write full form of CMC related to micelles.
- (viii) Write Gibbs equation of free energy.
- (ix) Tafel plot is between which two factors?
- (x) Write one limitation to Debye – Huckel theory.

PART – B

UNIT – I

Q.2 What is chemical potential and how it vary with temperature and pressure?

OR

Q.3 Define activity coefficient of an electrolyte and how it vary with concentration?

UNIT – II

Q.4 Define canonical, microcanonical and grand canonical ensembles with suitable examples.

OR

Q.5 What do you mean by Partition function? Give its significance.

UNIT – III

Q.6 What is Prigogine's Principle of Maximum Entropy Production?

OR

Q.7 What do you mean by 'phenomenological laws'? Explain this term using Onsager Reciprocal Relation.

UNIT – IV

Q.8 Describe Gibbs adsorption isotherm for adsorption from solution.

OR

Q.9 Describe the factors which affect the CMC of micelles.

UNIT – V

Q.10 Describe the theory of double layer at semiconductor – solution interface.

OR

Q.11 Write short notes on –

- (i) Ion – solvent interactions and
- (ii) Structure of electrified interfaces

PART – C

Q.12 Describe the Debye – Huckel theory for electrolyte solution.

Q.13 Derive the expression for N indistinguishable particles by Bose – Einstein Statistics.

Q.14 Explain the use of irreversible thermodynamics in biological processes.

Q.15 Explain micellization, hydrophobic interaction and reverse micelles.

Q.16 Describe the effect of light at semiconductor – solution interface.
