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M.Sc. IInd Semester EXAMINATION, 2018

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 chemical potential?

(ii) Write an expression for ionic strength.

(iii) What are the types of ensembles?

(iv) Define rotational partition function.

(v) What do you mean by irreversible thermodynamics?

(vi) State Onsager reciprocal relations.

(vii) What is micellization?

(viii) What do you mean by solubilisation?

(ix) What is over potential?

(x) Write Butler – volume equation.

PART – B

UNIT –I

Q.2 What is the significance of partial molar heat content?

OR

Q.3 Write Debye – Huckel theory for activity coefficient.

UNIT –II

Q.4 Discuss Fermi – Dirac statistics.

OR

Q.5 What is distribution law? Explain.

UNIT –III

Q.6 Give applications of non – equilibrium thermodynamics.

OR

Q.7 Discuss Prigogine's principle of maximum entropy production.

UNIT –IV

Q.8 How surface area is estimated by BET equation?

OR

Q.9 Give classification of various surface active agents.

UNIT –V

Q.10 What are Tafel plots? Discuss.

OR

Q.11 What is the effect of light at semiconductor – solution interface?

PART – C

Q.12 Give method for determination of activity and activity coefficient.

Q.13 Derive expression for chemical equilibrium and equilibrium constant in terms of partition function.

Q.14 Describe different entropy balance equations for irreversible processes.

Q.15 Write short notes on following :–

(i) Critical micelle concentration

(ii) Hydrophobic interaction

Q.16 Describe Debye – Huckel – Onsager treatment and its extension.
