

PD-264 CV-19
(532) M.Sc. Chemistry (Second Semester)
Examination June 2021
PHYSICAL CHEMISTRY
Paper - III

Time : Three Hours]

Maximum Marks : 80
Minimum Passing Marks : 29

नोट : दोनों खण्डों से निर्देशानुसार उत्तर दीजिये। प्रश्नों के अंक उनके दाहिनी ओर अंकित हैं।

Note : Answer from both the Sections as directed. The figures in the right hand margin indicate marks.

SECTION-A

1. Answer the following questions:- [1 X 10]
- State third law of Thermodynamics.
 - What is 'ionic atmosphere'?
 - Describe a property of Helmholtz Free Energy.
 - Give expression for activity.
 - What is 'hole'?
 - Write expression for Lipmann equation.
 - Explain the term corrosion.
 - Write Ilkovic equation.
 - What is Scattering Intensity?
 - Write Wierl equation.
2. Answer the following questions :- [2 X 5]
- Write general form of Boltzmann distribution law.
 - What are the two conditions for the ensemble to be in statistical equilibrium?
 - Explain Relaxation effect.
 - Explain the term Electro-catalysis.
 - What are low energy electrons.

SECTION-B

Answer all questions :-

[12 X 5]

UNIT-I

3. (a) Discuss the concept of fugacity.
(b) Derive the expression for calculation of fugacity of a gas.

OR

Explain the significance partial molar properties. Describe a method to determine the partial molar properties.

UNIT-II

4. (a) What is partition function?
(b) Calculate the translational partition function of a molecule of oxygen gas at 1 atm. and 298 K moving in a vessel & volume 24.4 dm³. ($k=1.38 \times 10^{-23} \text{ J K}^{-1}$; $h = 6.62 \times 10^{-26} \text{ J s}$, $m = 5.313 \times 10^{-26} \text{ kg}$ for O₂)

OR

Discuss Bose – Einstein statistics.

UNIT-III

5. Write notes on following:-
(a) Tafel Plot
(b) Electrocapillary curve

OR

Discuss Debye-Huckel-Onsagar treatment and its extension.

UNIT-IV

6. Write notes on following:-
(a) Core conductor model
(b) Nernst plank equation

OR

- (a) What are the conditions for performing polarographic determinations.
(b) Describe two applications of polarography briefly.

UNIT-V

7. What do you understand by electron diffraction? Describe the measurement technique for diffraction intensity.

OR

Explain neutron diffraction. Discuss magnetic scattering and it's measurement.