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II Semester M.Sc. Degree Examination, November - 2022

CHEMISTRY

Physical Chemistry - II

(CBCS 2019-20 Scheme)

Paper : Ch - 203

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer question No.1. and any Five of the Remaining.

Answer any Ten of the following questions.

(10×2=20)

1.
 - a) State the phase rule and mention its importance.
 - b) Define the terms activity and activity coefficient.
 - c) What are ensembles? Give examples.
 - d) What are coupled reactions? Illustrate with an example.
 - e) What is meant by uncompensated Heat?
 - f) Write the Sackur- Tetrode equation and mention its significance.
 - g) Use the mathematical form and define the surface excess.
 - h) How is the capacitance of an electrical double layer calculated?
 - i) What is meant by ionic atmosphere?
 - j) Write the Ilkovic equation and define the terms involved in it.
 - k) Sketch a typical polarogram and outline the analytical parameters.
 - l) Depict the Stern model of electrified interface.

2.
 - a) Distinguish between Bose-Einstein and Fermi-Dirac Statistics. (4+6=10)
 - b) What is translational partition function? Obtain the expression for it.

3.
 - a) Give an account of excess thermodynamic functions. (4+6=10)
 - b) Derive Gibbs-Duhem-Margules equation. Mention its importance.

[P.T.O]





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61913

4. a) Write a short note on the following.
- i) Onsager's reciprocity relations.
 - ii) Measurement of rate of entropy production.
- b) State and Explain the Phenomenological laws. Mention their importance. (6+4=10)
5. a) Derive the Debye-Huckel Onsager conductance equation.
- b) What is Debye-Huckel limiting law? Why it is so called? (6+4=10)
6. a) Define partial molar volume. How is it Measured by the method of intercepts?
- b) Derive the electro capillary Lippmann equation. (5+5=10)
7. a) Discuss the Guoy-Chapman Theory of Structure of electrified interface.
- b) Give an account of Butler-Volmer equation. (5+5=10)
8. a) Define electrocatalysis and discuss the tunneling of electrons for H₂ evolution with reference to electrocatalysis.
- b) Write a brief note on the following: (5+5=10)
- i). Dropping mercury electrode.
 - ii). Membrane electrodes.

