**G – 4478**

Reg. No. : ...........................

Name : ...............................

# Second Semester M.Sc. Degree Examination, July 2019

## Chemistry/Polymer Chemistry

## CH/CL/CM/CA/PC 223 PHYSICAL CHEMISTRY II

**(Common for Chemistry (2016  Admission Onwards) and
Polymer Chemistry (2018 Admission)**

Time : 3 Hours                                                                     Max. Marks : 75

## PART – A

Answer **any two** among (a), (b) and (c) from each question.  Each sub – division carries **2** marks.

1.  (a)   What is spherical harmonics?

    (b)   Draw the radial distribution diagram of 1s and 2p orbitals.

    (c)   What are Legendre polynomials?

2.  (a)   How can you find the intensity of spectral lines in microwave spectra?

    (b)   Define force constant.

    (c)   What are group frequencies?

3.  (a)   Write Glansdorff-Pregogine equation.

    (b)   What is meant by irreversible process?

    (c)   State and explain the principle of minimum entropy production.

4. (a) What are ensembles?

   (b) Define thermodynamic probability.

   (c) What is meant by super cooled liquid?

5. (a) What is Wein effect?

   (b) Define electrode potential.

   (c) Write and explain Nernst equation.

**(2 × 10 = 20 Marks)**

## PART – B

Answer either (a) or (b) from each question. Each question carries **5** marks.

6. (a) Solve particle in a ring and its phi equation.

   (b) How can you find the potential energy of hydrogen like atoms?

7. (a) What is the difference between harmonic and anharmonic oscillator?

   (b) Explain the principle and application of laser Raman spectrum.

8. (a) Explain the influence of temperature on 3 component system.

   (b) Explain isothermal evaporation.

9. (a) Explain the theory of paramagnetism with examples.

   (b) Explain Liquid helium.

10. (a) Explain Debye-Huckel limiting law.

    (b) State and explain Butler-Volmer equation.

**(5 × 5 = 25 Marks)**

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PART – C

Answer **any three** questions and each question carries **10** marks.

11. (a) Express the wave equation for hydrogen like atoms in polar coordinates and separate in to R, theta and phi equations.

    (b) Explain HFSCF method and Fock operator.

12. (a) Explain the principle and applications of rotational spectrum.

    (b) Explain mutual exclusion principle with an example.

13. (a) What are electrokinetic effects?

    (b) Explain the entropy production from matter flow, heat flow and current flow.

14. Discuss the relation between M-B, F-D and B-E statistics.

15. Explain the theories of over voltage.

**(3 × 10 = 30 Marks)**

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