(Pages : 2) **F – 4686**

Reg. No. : .....

Name : .....

First Semester M.Sc. Degree Examination, February 2019
Branch : Chemistry/Polymer Chemistry
CH/CL/CM/CA/PC 213 – PHYSICAL CHEMISTRY – I
(Common for Chemistry) (2016 Admission Onwards) and
Polymer Chemistry (2018 Admission)

Time : 3 Hours Max. Marks : 75

SECTION – A

Answer **any two** from **a**, **b**, **c** of **each** question. **Each** subquestion carries **2** marks. **(10×2=20 Marks)**

1. a) State uncertainty principle and comment on its significance.
   b) Derive the operator for momentum.
   c) What is spin-orbit coupling ?

2. a) Explain the difference between physisorption and chemisorption.
   b) Explain the principles of ESCA.
   c) Briefly explain enzyme catalysis.

3. a) Explain Euler's relation.
   b) State Lewis Randall rule.
   c) How fugacity and pressure are related ?

4. a) What is collision theory ?
   b) What is the principle of flash photolysis ?
   c) State laws of photochemistry.

5. a) Explain Chapman equation.
   b) What are different types of molecular velocities ?
   c) How dipole-dipole interactions differ from hydrogen bond interactions ?

P.T.O.

SECTION – B

Answer either **a** or **b** of **each** question. **Each** question carries **5** marks. **(5×5=25 Marks)**

6. a) Derive equation of state for real gases.
   b) Explain the barometric method of determination of vapor pressure.

7. a) Explain fluorescence and its quenching.
   b) Explain Lindmann theory of unimolecular reactions.

8. a) How do we determine the activity and activity coefficients of electrolytes ?
   b) Explain the effect of temperature and pressure on chemical equilibrium.

9. a) Explain BET theory.
   b) Explain diffraction method of characterization of catalysts.

10. a) Explain quantum mechanical tunneling with examples.
    b) Explain postulates of quantum mechanics.

SECTION – C

Answer **any three** questions. **Each** question carries **10** marks. **(3×10=30 Marks)**

11. Determine the eigenvalues and eigenfunctions of simple harmonic oscillator.

12. Explain any two methods for determining the surface area of solids.

13. Explain Maxwell relations and its significances.

14. Explain the kinetics of H_2-Br_2 reaction.

15. Explain the method of determination of diameter of a molecule.

———————