(b) Explain the phase diagram for two completely miscible components systems. 10

7. (a) Explain Fugacity of gases and its determination. 7

(b) Predict Eutectic point for systems forming solid compounds A_XB_Y with congruent melting points. 7

Unit IV

8. Obtain an expression for energy of a three dimensional rigid rotator. 14

9. (a) Explain the postulates of Quantum Mechanics. 4

(b) Using Variation principle, obtain the ground state energy of Helium Atom. 10

14/12/17 (M)

Roll No. .....

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10262

M. Sc. EXAMINATION

(For Batch 2017 & Onwards)

(First Semester)

CHEMISTRY

CHP(H) - 102

Physical Chemistry–I

Time : Three Hours *Maximum Marks :* 70

Note : Attempt *Five* questions in all including Q. No. **1** which is compulsory. Select *one* question from each Unit. All questions carry equal marks.

1. (i) Define Phase Rule. 1

(ii) What do you mean by Chain Reaction ? 2

(iii) What is Nernst Heat Theorem ? 2

(iv) Write Schrödinger wave equation. 1

(v) Write the limitations of first law of thermodynamics. 2

(vi) Discuss the influence of ionic strength on the rates of ionic reactions. 2

(vii) What are the assumptions of Collision theory ? 2

(viii) Explain variation principle. 2

Unit I

2. (a) Discuss activated complex theory and compare it with collision theory. 7

(b) What are ionic reactions ? Give double sphere model and also discuss its results. 7

3. (a) Explain Rice-Herzfeld mechanism of organic molecules considering an example. 10

(b) Give kinetic of pyrolysis of acetaldehyde. 4

Unit II

4. (a) Derive the integrated form of Clausius-Clapeyron equation for ice-water equilibria and write its significance. 10

(b) Explain the following terms : 4

(i) Chemical Potential

(ii) Entropy.

5. (a) Derive the expressions for entropy changes in reversible and irreversible processes. Also give the effects of temperature, pressure and volume on entropy change ? 10

(b) Calculate the entropy change when 1 mole of an ideal gas expands reversibly from an initial volume of 1 dm^3 to a final volume of 10dm^3 at a constant temperature of 298K. 4

Unit III

6. (a) Explain the terms ionc activity coefficients and mean activity coefficient of an electrolyte. 4