(b) What is Bragg's law and how is the structure of solids determined using Braggs law ?

Unit IV

7. (a) What are the fundamental problems in the study of pure liquid electrolytes ? **5,15**

(b) Explain hole model of structure of molten salts and derive an expression that a hole has a radius between r and $r+dr$.

8. (a) What do you mean by ionic liquids and thermal loosening of ionic liquids ? How are these different than simple liquids ? **10**

(b) How does Furth approach calculate the work of hole formation ? **10**

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CC-300

M. Sc. EXAMINATION, Dec. 2017

(Third Semester)

(Main & Re-appear)

ELECTROCHEMISTRY AND SOLID STATE CHEMISTRY

CH-625-B

Physical Chemistry Special-I

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Define the following terms :

(i) outer potential

(ii) electrical double layer

(iii) inner potential

(iv) surface potential

(v) work function. **2×5**

(b) Derive an expression for the fundamental equation for thermodynamics of polarisable interface and discuss its significance. **10**

2. (a) Give the structure of electrified interface and explain this structure with the help of Helmholtz-Perrin model. **10**

(b) Explain Gouy-Chapman model of electrified interface. Give its merits also. **10**

Unit II

3. (a) What do you mean by overpotential for the interface out of equilibrium ? **5**

(b) Deduce Butler-Volmer equation and explain its significance in tems of low and high overpotnetial. **15**

4. (a) Explain the meaning of symmetry factor (β). **5,15**

(b) Calculate the amount of decrease in activation energy for the given input electrical energy. How does symmetry factor depend upon overpotential ?

Unit III

5. (a) Define the following terms : **12,8**

(i) Unit cell

(ii) Atomic coordinates

(iii) Bravais lattices

(iv) Miller Indices

(b) Derive relationship between atomic radius and edge length in the simple cubic cell.

6. (a) When silver crystallizes, it forms face-centered cubic cells. The unit cell edge length is 408.7 pm. Calculate the density of silver. **8,12**