(r) What are super ionic conductors ? Explain their mechanism of conduction. 6

## UNIT IV

4. (a) Explain in brief piezoelectric and pyroelectric behaviour in solids. 5

(b) Discuss Meissner effect in superconducting material. 5

(c) What are Lasers and Masers actions ? Give their applications. 6

**OR**

(p) What are superconductors ? How are they classified ? Explain. 5

(q) Discuss in brief the different applications of superconducting materials. 5

(r) Explain the different types of polarization densities in dielectric materials. 6

## UNIT V

5. (a) Explain in brief, why zinc ferrite is antiferromagnetic, while nickel ferrite is ferromagnetic. 6



**AQ – 1000**

Third Semester M. Sc. (Part – II) Chemistry Examination

(CBCS Pattern)

Paper – XII Special Paper – II

# INORGANIC CHEMISTRY

(Solid State Chemistry)

P. Pages : 5

Time : Three Hours] [Max. Marks : 80

**Note :** (1) All questions are compulsory.
(2) All questions carry equal marks.
(3) Use of scientific calculator is allowed.

## UNIT I

1. (a) Why is NaCl having an octahedral structure whereas CsCl having body centred cubic structure ? 5

(b) Draw and describe the structure of spinel type of compound. 5

(c) Show that the critical radius ratio for :

(i) Triangular co–ordination is 0·155 and

(ii) Tetragonal co–ordination is 0·225. 6

**OR**

(p) Draw and describe Wurtzite structure of ionic solid. 5

(q) Why $Mn_3O_4$ has normal spinel structure where as $Fe_3O_4$ has inverse spinel structure ? Explain. 6

(r) Describe the tetrahedral and octahedral voids in crystalline solids. 5

## UNIT II

2. (a) What is meant by Schottky and Frenkel defects ? What are the consequences of these defects ? 6

(b) What is meant by non–stoichiometric defects of crystals ? Explain the meaning of metal excess defect and give its consequences. 5

(c) Explain plane defects in solids. 5

**OR**

(p) What are F– and H– centres in solids ? Explain. 5



(q) What is Burjer vector ? Describe Burjer circuit for identification of dislocation in solids. 6

(r) Derive a mathematical derivation for determining the concentration of Frenkel defects in solids. 5

## UNIT III

3. (a) Explain the origin of valence band and conduction band in solids. 5

(b) What is Hall effect ? Discuss the experimental method for determination of charge carrier in solids. 6

(c) What are ionic conductors ? Discuss their mechanism of conduction and applications. 5

**OR**

(p) What are semiconductors ? Explain what is meant by n–type and p–type semiconductors. 5

(q) Discuss Seebeck effect in solids. 5

(b) Classify the magnetic materials on the basis of susceptibility and temperature. 5

(c) Discuss in brief, "Pauli and Langevin paramagnetism". 5

**OR**

(p) What are hard and soft magnets ? Give their applications. 5

(q) Describe in brief "the exchange interaction" between the spin moments of neighbouring atoms in the magnetic solids. 6

(r) Give the classification of magnetic materials on the basis of susceptibility and temperature. 5