Registration No: | | | | | | | | | | |

Total Number of Pages : 02 **M.Sc.**

16MCYF305

3rd Semester Regular Examination 2017-18

Solid State Chemistry

BRANCH : M.Sc. (AC)

Time : 3 Hour

Max Marks : 70

Q.CODE : B576

Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) 'While solid KCl is colorless as such, it imparts color to flame' – why?

b) Define lattice energy for ionic crystals. Name the most important equation for calculation of it.

c) How many types of extrinsic semi-conduction arise and why?

d) What are Zeolites? Mention at least two important applications.

e) What are the basic chemical components of Portland cement?

f) Which one of the primitive cubic crystals is the most closed packed in nature and why?

g) According to Bravais lattice scheme of classification of crystals, how many primitive crystal systems and their characteristics are described?

h) What are Quasicrystals? Mention at least two important applications.

i) Which kind of primitive cubic structure will have the least Schottky and Frenkel vacancies?

j) Are optical microscopes sufficient for value addition choice of coarse minerals for industry setup? Discuss

Q2 **a)** Discuss how Schottky and Frenkel defects occur in crystals. How does the bulk density of the crystals change in the above defect structures? **(5)**

b) Give the mathematical expressions for the number of defect sites for the above defects taking place in ionic crystals. **(5)**

Q3 **a)** Describe briefly, the techno-outline of Portland cement manufacture **(5)**

b) Discuss the mechanism of setting of cement. **(5)**

Q4 **a)** On the basis of band theory qualitatively describe the band picture of a metal, an Insulator and a semiconductor. **(5)**

b) Compare and contrast the properties between substitutional and interstitial solid solutions. **(5)**

Q5 **a)** Describe the law which shows non steady state of diffusion with examples **(5)**

b) What is Kirkendall effect explain its utility **(5)**

Q6 **a)** What is Bragg's relation? Explain why white light cannot be used for determination of crystal structure? **(5)**

b) Find the $d_{(hkl)}$ value for a tetragonal system? **(5)**

Q7 **a)** What is the importance of Electron microscope in the study of solids? Explain its working principle **(5)**

b) Explain the corrosion resistance in Duralumin. **(5)**

Q8 **Write short notes on (Any Two)** **(5X2)**

a) Stereographic Projections.
b) Screw axes & Glide Planes.
c) Epitaxy Method.
d) Madelung constant.