No. of Printed Pages : 03 **Roll No. .....**

DD-294

M. Sc. EXAMINATION, Dec. 2017

(Fourth Semester)

(Re-appear Only)

CHEMISTRY

CH-652-B

Materical and Nano-Technology,
Inorganic Chemistry

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) Discuss the structure and bonding in ceramic materials. **10**

(b) Explain the phase diagram of $MgO\text{-}Al_2O_3$ system. **10**

2. (a) What is difference between the traditional ceramics and the new ceramics as far as raw materials are concerned ? **10**

(b) Explain the electrical and magnetic properties of ceramic materials. **10**

Unit II

3. (a) Draw and discuss the structure of graphite. **10**

(b) Describe the structure of ZrO_2. **10**

4. Write short notes on the following :

(i) Ceramic oxides

(ii) Ceramic nitrides

(iii) Polymorphism. **7,7,6**

Unit III

5. (a) What are nano-particles ? Explain sol gel process for synthesis of nanoparticles. **10**

(b) Explain the applications of sol-gel coating. **10**

6. Write short notes on the following :

(i) Peptization reactions

(ii) Porous solids

(iii) Zerogels. **7,7,6**

Unit IV

7. (a) Explain the zone refining and electro refining methods of refining used for the production of ultra pure materials. **10**

(b) Discuss the theory of ferro-electricity. **10**

8. Write short notes on the following :

(i) Ferri and ferro magnetism

(ii) Piezo electric materials

(iii) Meissner effect. **6,6,8**