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

DD294

M. Sc. EXAMINATION, May 2019

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

CHEMISTRY

CH652B

Material and Nanotechnology, 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 any *Five* questions.

1. What do you mean by ceramics ? Discuss in detail the structure and properties of ceramic materials. **10**

2. (a) Explain in detail the phase diagram of any multicomponent system. **10**

(b) What is a phase diagram ? Explain the application of phase diagram in predicting the material behaviour of ceramics. **10**

3. (a) What is polymorphism ? How is it different from allotrope ? **10**

(b) What are nitrides ? Discuss about the properties and applications of nitrides. **10**

4. (a) Write a short note on silicate and non-silicate glasses ? **5**

(b) What is ceramic processing ? Discuss in detail about the powder metallurgy techniques. **15**

5. (a) Explain the sol-gel method of synthesis of nanoparticles. What are the advantages and disadvantages of this method ? **10**

(b) What do you mean by sol gel coating ? Give the different process for sol gel coating. **10**

6. Write detailed notes on the following :

(a) Top-down approach : Methods and examples

(b) Bottom-up approach : Methods and examples.

(c) 0, 1, 2 and 3 dimensional nanomaterials and nanostructures with example. **8+8=4**

7. (a) What is Ferro electricity ? Write the different applications of Ferroelectric materials. **10**

(b) Write short notes on the following : **10**

Meissner effect and Super conductor.

8. What do you mean by refining ? Discuss in detail the vacuum distillation, zone refining and electro-refining methods. **20**