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5761

M. Tech. EXAMINATION, May 2017

(Second Semester)

SYNTHESIS OF MATERIALS

MSN-602

Materials Science and Nanotechnology

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. All questions and parts carry equal marks.

1. Describe the methods used for synthesis of

various types of ceramic materials. Explain in detail any *two* methods of synthesis of $BaTiO_3$. **20**

2. Explain the following processes : **20**

(a) Ball millling

(b) Melt solidification

(c) Solid state reactions

(d) Chemical methods of synthesis

3. Describe Sputtering and Chemical vapour deposition methods of materials synthesis. What are their relative advantages and disadvantages ? **20**

4. Describe the sol-gel method of materials synthesis using examples. **20**

5. What do you understand by the melting and solidification method of synthesis ? For what types of materials synthesis it can be used for ? Explain using a phase diagram with appropriate labels. **20**

6. Write notes on the following : **20**

(a) Lihography

(b) Spinel structures

(c) Glass Ceramics

(d) Nano-composites

7. What are Nanomaterials ? What are the different methods used for the synthesis of nanomaterials-metallic, ceramic, polymer or biomaterials ? Describe using examples. **20**

8. (a) Describe the production of Nickel and its alloys and mention their properties.

(b) Describe the production of Titanium and its alloys and mention their properties.

10×2=20