



JBZ-003-1203003

Seat No. _____

M. Sc. (Sem. III) (CBCS) Examination

December - 2019

ET - 01 : Physics

(Synthesis of Materials)

Faculty Code : 003

Subject Code : 1203003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Attempt all questions.
(2) All questions carry equal marks.

- 1** Answer in brief any seven : **14**
- (1) What are topotactic and epitactic reactions?
 - (2) Who governs how efficiently the absorbed microwave radiation is converted to heat?
 - (3) What is the principle of sol-gel method?
 - (4) What is a co-precipitation technique?
 - (5) What is spin coating?
 - (6) Explain : Vacuum evaporation.
 - (7) With figure, define monocrystalline solid.
 - (8) Explain solid to solid phase transformation with one example.
 - (9) List out the different techniques of growth of crystals from melt.
 - (10) What are the limitations of hydrothermal method of crystal growth?
- 2** Answer the following questions: Any **Two** out of three : **14**
- (1) Explain the experimental procedure of ceramic method with special reference to "mixing" and "heat treatment".
 - (2) What is microwave synthesis? Explain the preparation of Y_{123} HTSC compound through Microwave synthesis.
 - (3) How will you analyze the product prepared through ceramic method? Discuss in detail.

- 3** Answer the following questions : All Are Compulsory : **14**
- (a) Explain the synthesis technique of doped Tin Dioxide in detail.
 - (b) How will you prepare $La_{0.7}Sr_{0.3}MnO_3$ (LSMO) manganite sample through Co-precipitation method? Explain in detail.

OR

- 3** Answer the following questions : All Are Compulsory : **14**
- (a) Discuss with necessary figure: Zone melting technique of crystal growth.
 - (b) State the basic principle of Czochralski method of crystal growth and discuss the parameters Diameter control, Pull rate and Rotation rate.

- 4** Answer the following questions : Any **Two** out of Three : **14**
- (1) With necessary figure and example, discuss a method of crystal growth by gel. Mention its advantages.
 - (2) What are the three processes that can be selected to obtain crystals by the vapour method? Discuss sublimation with necessary figure and example.
 - (3) Discuss with necessary figure: Hydrothermal method of crystal growth.

- 5** Write Any **Two** short notes : **14**
- (1) Vacuum Evaporation.
 - (2) Preparation of LSMO thin film through spin coating.
 - (3) Sputtering method.
 - (4) Molten salt method.
