

M.Sc.(Phy.) Semester - 3 (CBCS) Examination**Nov/Dec-2023 (NEW COURSE)****Synthesis of Materials (Elective (New))****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
 2. Figures to the right indicate marks.
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Que.1 Answer in brief any SEVEN. (14)

1. What are Topotactic and Epitaxial reactions?
2. The composition of precursor depends on which parameters, especially in co-precipitation method?
3. What is meant by dielectric heating?
4. What is Lithium Niobate? Where it is used?
5. What is vacuum evaporation?
6. What do you mean by grain and grain-boundary in multi crystalline material?
7. Draw the XRD pattern of single crystal and poly crystalline sample.
8. Name the basic techniques of crystal growth.
9. What do you mean by autoclave? What are its types?
10. What are the limitations of hydrothermal method of crystal growth?

Que.2 Answer the following questions: Any TWO out of THREE (14)

1. What is microwave synthesis? Explain the preparation of $Y_1Ba_2Cu_3O_{7-\delta}$ superconducting material through microwave synthesis.
2. What is sedimentation? What is the role of mixing of reactants with special reference to SSR Method?
3. Explain microwave synthesis method by taking a suitable example of high T_c superconducting compound.

Que.3 Answer the following questions: ALL ARE COMPULSORY

(A) Explain the synthesis technique of doped Tin Dioxide in detail. (07)

(B) Explain the preparation of CMR manganites using co-precipitation method. (07)

OR

Que.3 Answer the following questions: ALL ARE COMPULSORY

(A) Discuss the molten flux method of crystal growth with figure. (07)

(B) Explain flame fusion method of crystal growth with figure. (07)

Que.4 Answer the following questions: Any TWO out of THREE (14)

1. What is vapor method of crystal growth? Discuss sublimation in detail.
2. What is Epitaxy? Discuss Molecular Beam Epitaxy with necessary figure.
3. Discuss the Hydrothermal method of crystal growth.

Que.5 Write any TWO short notes. (14)

1. Spin coating
2. Preparation of LSMO thin film through spin coating
3. Chemical Vapor Deposition
4. Liquid Phase Epitaxy
