M.Sc. DEGREE EXAMINATION,APRIL 2020
II Year III Semester
Crystal Physics

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. What are the conditions to initiate the nucleation process?
2. Define critical radius of an embryo.
3. Differentiate saturation and supersaturation.
4. Write the principle of vapor phase epitaxy method.
5. Differentiate Thermal gravimetric and Differential thermal analysis.
6. Write a short note on chemical etching.
7. State the Bragg's Law of X-ray diffraction.
8. Write the concept of reciprocal lattice.
9. Write a short note on packing of molecules.
10. What is meant by bond order?
11. Name some of softwares used for structure determination.
12. What are properties of hydrogen bonding?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. What is nucleation? Explain the homogeneous and heterogeneous nucleation.
14. Deduce the Gibbs Thomson equation for nucleation from vapor.
15. Explain the construction detail in slow evaporation growth process.
16. Describe the growth process of Bridgman technique with suitable diagram.
17. Explain the principle and importance of FTIR spectroscopy.
18. Write a note on significance of WinGX program.
19. Explain the importance of five membered and six membered rings in conformation.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Discuss the energy formation during nucleation in (i) Spherical nucleus and (ii) Cylindrical nucleus.
21. Write about the principle, types of gel growth method. Describe the single diffusion method for gel growth.
22. Describe the powder X-ray diffraction method for determination of crystal structure.
23. Write the construction and working of X-ray diffractometer with suitable diagram.
24. Explain the characteristics of covalent, ionic and van der Waals bonding with examples.

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