SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc.(Physics) END SEMESTER EXAMINATIONS NOVEMBER - 2023
SEMESTER - III
22PPHET3003 - Crystal Physics

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. What is heterogeneous nucleation? Explain.
2. Explain the slow cooling method of crystal growth technique.
3. Describe the salient features of covalent and metallic bondings. Give examples.
4. Explain the concept of reciprocal lattice.
5. Explain Vickers hardness test to determine the hardness number of a crystal.
6. Briefly explain about disc and cap shaped nucleus.
7. Obtain an expression for solubility of super saturation solution.
8. Determine the glancing angle on the cube (1 1 0) of a rock salt crystal (a=0.2814 nm) corresponding to second order diffraction maximum for the X-ray of wavelength 0.071 nm.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Derive Gibbs Thompson equation for vapour.
10. Describe the principle and structure of gel growth technique for crystallization.
11. What are ionic crystals? Explain the formation of an ionic crystal and obtain an expression for its cohesive energy.
12. Draw the block diagram of a FTIR spectrometer and explain its instrumentation and working.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Discuss the different steps in the analysis of crystal structure and explain how it helps in structural determination.

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