

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. END SEMESTER EXAMINATION APRIL/NOV - 2021

SEMESTER - III

20PPHET3003 - Crystal Physics

<b>Total Duration : 3 Hrs</b>		<b>Total Marks : 75</b>
MCQ	: 30 Mins	MCQ : 15
Descriptive	: 2 Hrs.30 Mins	Descriptive : 60

Section B

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

1. Derive the expression for critical free energy of formation of cap shaped nucleus.
2. Discuss the growth of crystals from gel using single diffusion method.
3. Explain the formation of Vanderwaals bonding with suitable examples.
4. What are the steps involved in the crystal structure determination?
5. Write notes on thermal characterization.
6. Differentiate between homogeneous and heterogeneous nucleation.
7. Derive Bragg's law. Explain the concept of reciprocal lattice.
8. Discuss about Micro-hardness etching.

Section C

Part A

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

9. Derive Gibbs Thomson equation for vapour and energy of formation of a nucleus.
10. Explain the principle, construction, working and the significance of vapour phase epitaxy.
11. Describe the principle, construction and working of XRD.
12. Describe in detail on soft wares for structure determination and visualization.

Part B

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

13. Discuss about the conformations of rings with emphasis on five membered and six membered rings.