

CRYSTAL GROWTH, THIN FILMS AND PLASMA PHYSICS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	A crystalline material in which the crystal lattice is found to be continuous throughout the material is called _____. a) single crystal b) poly crystal c) growing crystal d) semi crystal	K1	CO1
	2	Which method is most suitable for silicon crystal growth in silicon wafer preparation? a) Float Zone Process b) Bridgeman-Stockbarger Method c) Czochralski Crystal Growth Process d) Laser heated pedestal growth	K2	CO1
2	3	When the Solute atoms are small enough to occupy the space between the Solvent atoms _____ solutions are formed. a) interstitial b) molecular c) ionic d) cationic	K1	CO2
	4	Ultra-fine crystallites, known as the nuclei of a _____ phase, forms from the liquid. a) liquid b) solid c) gas d) plasma	K2	CO2
3	5	In the chemical vapour deposition the films formed are formed by decomposition of what kind of substances? a) Liquid molecules b) Conducting polymers c) Gaseous molecules CO3 d) Solid molecules	K1	CO3
	6	Which technology is used to get resistors and capacitors cheap? a) Thick film technology b) Thin film technology c) Thin and thick film technology d) None of the mentioned	K2	CO3
4	7	The amount of a particular crystalline phase in a mixture may be determined by which of the following method? a) X-ray powder diffraction b) Qualitative phase analysis c) Quantitative phase analysis d) X-ray powder refraction	K1	CO4
	8	Nanoindentation is a technique commonly used for measuring thin film mechanical properties such as a) hardness and stiffness b) thickness c) roughness d) strain	K2	CO4
5	9	The electrical charge of plasma must be a) quasi neutral b) positive c) negative d) none of the above	K1	CO5
	10	Density of plasma is _____ ion-electron pair/cm ³ . a) 10 ¹² b) 10 ²⁰ c) 10 ²¹ d) 10 ²	K2	CO5

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SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Differentiate between CVD and PVD methods.	K2	CO1
		(OR)		
	11.b.	Bring out the difference between Czochralski and Bridgman techniques in crystal growth.		
2	12.a.	Discuss on melt techniques. Which crystals are grown by Verneuil flame fusion technique?	K5	CO2
		(OR)		
	12.b.	Bring out the importance of solid phase, write a note on spherical nucleus.		
3	13.a.	Examine on the concept solubility and super solubility. The growth method and how to control growth parameter.	K4	CO3
		(OR)		
	13.b.	List out and explain on different type of substrate for thin film deposition.		
4	14.a.	Analyse the grain growth and microstructure in thin films.	K4	CO4
		(OR)		
	14.b.	Explain the mechanical properties in thin films.		
5	15.a.	Infer the importance of thermal plasma sources and their applications.	K5	CO5
		(OR)		
	15.b.	Bring out the importance of basic concepts in generating thermal plasmas.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Compare high temperature solution growth and hydrothermal growth.	K3	CO1
2	17	Describe any two methods of crystal growth from solutions.	K3	CO2
3	18	Explain thermal evaporation technique and CVD with a neat sketch.	K4	CO3
4	19	Explain about mechanical Testing and the strength of thin films.	K4	CO4
5	20	Comment on the importance of glow discharge and its applications in detail.	K5	CO5

Z-Z-Z

END