TOTAL PAGES: 2

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PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2025
(Fourth Semester)

Branch – **PHYSICS**

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	In the precipitation method for the growth of the crystal, the solvent melts are often known as_____ a) Electrolyte b) α-particle c) β- particle d) Fluxes	K1	CO1
	2	In Crzochralski crystal growth process, the materials are heated up to a) 950°C b) 1000°C c) 1420°C d) 1200°C	K2	CO1
2	3	Hydrothermal method need to be carried out in_____ a) Open container b) Closed container c) In a test tube d) In conical flask	K1	CO2
	4	What is the work of mineralizer in the hydrothermal method? a) It increases the amount of water b) It speeds up the reaction c) It increases the solubility of reaction mixture d) It helps in forming the cold seal	K2	CO2
3	5	The substrates used in the process of vacuum evaporation is a) Ceramics, glass, silicon b) Plastics c) Amorphous solids d) F-block elements	K1	CO3
	6	_____ is thin film formation technique. a) Spray pyrolysis b) CVD c) Thermal evaporation d) All of the above	K2	CO3
4	7	For single crystal X-ray diffraction studies _____ should be the length and diameter of the crystal . a) 5mm b) 5m c) 100mm d) 0.05 mm	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	Plasma is created by Magnetic fields which is known as... a) stable state b) shifted state c) metastable state d) all of above	K1	CO5
	10	Plasma have _____ collisions a) Continous b) Frequent c) In frequent d) Both a and b	K2	CO5

Cont...

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.	Explain any one theory on crystal growth.	K2	CO1
		(OR)		
	11.b.	Classify crystal growth techniques on the basis of phase change.		
2	12.a.	Differentiate between high temperature solution growth and hyrdrothermal growth.	K3	CO2
		(OR)		
	12.b.	Identify the demerits in using a solution growth method for the growth of the crystals.		
3	13.a.	Analyse on the gas phase and plasma phase for thin film deposition.	K4	CO3
		(OR)		
	13.b.	Identify the merits and demerits of CVD.		
4	14.a.	Explain the mechanical properties in thin films.	K4	CO4
		(OR)		
	14.b.	Analyse on the techniques used in determining the structural defects in thin films.		
5	15.a.	What is plasma? Assess the importance of different types of plasma and justify it with a neat figure.	K5	CO5
		(OR)		
	15.b.	Write the importance of thermal plasma sources and their applications.		

Cont...

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	What is known as nucleation? Explain homogeneous and heterogeneous nucleation processes in crystal growth.	K1	CO1
2	17	Give the importance of Mier's solubility curve and its saturation ratio.	K3	CO2
3	18	Enlist types of CVD and explain any two types in detail.	K4	CO3
4	19	Explain any two structural characterizations in detail with necessary sketch.	K5	CO4
5	20	Explain on the concept of plasma discharges and its applications.	K5	CO5

Z-Z-Z END