## S.Y. M.Sc. (Physics) Fourth Semester Old MSC24103 - Optional Paper-III - Material Science-II

## P. Pages: 1

## Time : Three Hours

## \* 1 8 9 1 \*

GUG/W/18/2420

Max. Marks : 80

1.	Either			
	a)	Explain elastic behaviour of solid using atomic model and show that it depends on the type of bonding.	8	
	b)	Explain the strength of materials using qualitative model of Peierls-Nabarro relation.	8	
		OR		
	c)	What is corrosion? What is electro-chemical reaction of corrosion?	8	
	d)	What is corrosion inhibition? What is a role of inhibition elements?	8	
2.	Either			
	a)	Derive an expression for static and frequency dependent permittivity.	8	
	b)	Discuss the Lorentz Cavity.	8	
	OR			
	c)	Discuss construction and working GMR materials.	8	
	d)	Explain origin of spin glass behaviour of magnetic materials.	8	
3.	Eith	er		
	a)	Discuss the concept of equilibrium and non equilibrium processing. How it affect material synthesis?	8	
	b)	How the glass are formed? Give atleast two example.	8	
	OR			
	c)	How the $TiO_2$ is prepared using gas evaporation technique?	8	
	d)	How the nanocrystalline solid are obtained using hydrothermal process? Give example.	8	
4.	Either			
	a)	Explain quantitative phase analysis using method with internal and external standards.	8	
	b)	Describe, how does unknown sample identification occur by X-ray powder diffraction technique.	8	
		OR		
	c)	What is role of electron microscopy in material characterization?	8	
	d)	What is the working principle of XPS? How it is used for chemical analysis?	8	
5.	,	Attempt the following		
		a) Passivation.	4	
		b) Domain wall.	4	
		c) Role of viscosity of melt on glass formation.	4	
		d) Role of Rietveld refinement in structural analysis.	4	
		*****		