LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

SIXTH SEMESTER – **APRIL 2023**

17UPH6MS01 – MATERIALS SCIENCE

Date: 12-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	PART – A	**(10 x 2 = 20 Marks)**
Q. No.	**Answer ALL questions**	
1	Mention the various levels of structure in materials.	
2	Name any four useful ceramic materials.	
3	What is meant by super plastic behavior?	
4	Define Poisson's ratio.	
5	Distinguish between hard and soft magnetic materials.	
6	What is a dielectric material?	
7	What are 'smart gels'?	
8	Give examples for 'moving' smart materials.	
9	List the benefits of NDT.	
10	What is photo-elastic method of NDT?	
	PART – B	**(4 x 7.5 = 30 Marks)**
	Answer any FOUR questions	
11	Explain the different kinds of equlibriums employing a tilting rectangular block.	
12	Draw the tensile stress-strain curve for a plastic material and explain the various regions of interest.	
13	a) Write a note on secondary bond formation in different kinds of materials. b) Highlight the medical applications of shape memory alloys (SMA).	(5) (2.5)
14	Explain the effects of temperature and frequency on polarization.	
15	Discuss about ferrofluids in detail. List their uses.	
16	With a neat diagram describe the working of a metallurgical microscope.	
	PART – C	**(4 x 12.5 = 50 Marks)**
	Answer any FOUR questions	
17	Discuss the atomic model of elastic behavior and derive the relation between the three moduli of elasticity and the Poisson's ratio.	
18	Discuss in detail the formation of a) ionic bond with specific reference to NaCl crystal b) covalent bond	 (7) (5.5)
19	Explain the classification of magnetic materials with suitable examples and diagrams.	
20	Discuss on shape memory alloys (SMAs), one way and two way memory effects. Write the uses of SMAs.	
21	Draw the block diagram of a scanning electron microscope (SEM) and explain its principle, construction and working.	
22	a) With a neat diagram, discuss the formation of "domain structure". b) Describe the ultrasonic method of NDT. Mention the advantages of this method.	(4.5) (6+2)