LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – NOVEMBER 2017

PH 5405 - MATERIAL SCIENCE

Date: 15-11-2017   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART – A

ANSWER ALL THE QUESTIONS   (10×2=20)

1. Give two examples for organic polymers.

2. Define bond energy and bond length.

3. Draw the planes corresponding to the miller indices (110) and (001).

4. Define the term space lattice.

5. Differentiate between slip and twinning of plastic deformation.

6. What is dielectric breakdown?

7. What are the advantages of ultrasonic testing?

8. Define resolving power of a microscope?

9. What are elastomers?

10. Give the expression for young's modulus of a composite material.

PART –B

ANSWER ANY FOUR QUESTIONS   (4×7.5=30)

11. Discuss stable, unstable and metastable states with the help of a tilting rectangular block.

12. Give the lattice specifications of 7 crystal systems.

13. Explain the working of a metallurgical microscope with a neat diagram.

14. Outline the theory of ferroelectrics using the structure of barium titanate as an example.

15. Discuss "elastic modulus as a parameter in design".

PART –C

ANSWER ANY FOUR QUESTIONS

                                                                     (4×12.5=50)

16. Discuss in detail the three important steps involved in the formation of ionic bond with specific reference to NaCl crystal.

17. Outline the atomic model of elastic behaviour. Obtain the relation between young's modulus(Y),Bulk modulus(K), Rigidity modulus(G) and Poisson's ratio(μ).

18. Identify the various polarization mechanisms available and discuss the effect of frequency on dielectric constant.

19. Explain in detail the scanning electron microscope with neat diagram.

20. With necessary diagram explain the powder method of X-Ray diffraction.

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