B.Sc. DEGREE EXAMINATION,
MARCH/APRIL 2018

(Regular)

Third Year – Sixth Semester

Part II – Physics (Maths/Non-Maths)

Paper VII (B) — MATERIALS SCIENCE

(ELECTIVE B)

Time : Three hours Maximum : 75 marks

SECTION A — (5 × 10 = 50 marks)

Answer ALL questions.

1. a) Describe the classification of materials.

Or

b) What are polymers ? How are polymers classified on the basis of structure ?

2. a) Explain the mechanism of diffusion through solids. Derive the Fick's Law for macroscopic diffusion in a solid.

Or

b) Explain the production and removal of point defect.

3. a) Describe the mechanical properties of engineering materials.

Or

b) Define Creep. Give an account on the various states of creep rate the factors influencing the creep resistance.

4. a) Obtain an expression for paramagnetic susceptibility by using quantum theory.

Or

b) Explain Weiss theory of ferromagnetism.

5. a) Explain different types of dielectric materials. What are their applications.

Or

b) What are Ferro-electric materials ? Give properties and applications of ferro electric materials. Explain ferroelectric hystersis.

SECTION-B (5×5=25Marks)

Answer any *THREE* questions.

6. What are Ceramics ? Give application of ceramics.
7. Explain briefly quenching in materials.
8. Distinguish between brittle fracture and ductile fracture.
9. Explain hysterisis in magnetic materials.
10. What is dielectric loss? Derive an expression for it.

11. A sheet of glass has a crack of depth $1\mu m$ on the surface. Calculate its strength the young's modulus of glass is 70 crpa. The surface energy is $1J/m^2$.
12. The dielectric constant of helium at 0°C is 1.000074. Calculate its electrical susceptibility at this temperature.
13. Assuming that the polarizahility of Kr atom $2.18\times10^{-10}\ Fm^2$. Calculate its dielectric constant at 0°C and 1 atom sphere.