JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKEUP EXAMINATION- 2016

B.Tech VI Semester

COURSE CODE: 10B11PH611   MAX. MARKS: 25

COURSE NAME: Materials Science

COURSE CREDITS: 04   MAX. TIME: 1Hr 30 Min

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

I. What is meant by local field of an atom? Derive an expression for the field corresponding to Lorentz cavity. Explain the difference between local field and Maxwell field.   **[5]**

II. An atom of oxygen on being polarized produces a dipole moment of 0.5×10^{-22} C-m. If the distances of the centre of negative charge cloud from the nucleus be 4×10^{-17} m. Calculate the polarizability of oxygen atom.   **[4]**

III. What is meant by glass transition temperature? Discuss the factors to plan a polymer with an increased glass transition temperature.   **[4]**

IV. Polyethylene sample containing 4000 chains with molecular weight 2500 g/mol, 8000 chains with molecular weights between 7500 g/mol, 7000 chains with molecular weights between 12500 g/mol and 2000 chains with molecular weights between 17500 g/ mol. Determine both number and weight average molecular weights. Also calculate polydispersity index.   **[4]**

V. Explain Meissner Effect. Show that perfect diamagnetism is an essential condition for superconductivity.   **[4]**

VI. What are ferroelectric ceramics? Why they are considered smart materials?   **[4]**