

Subject *Q*

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T1 EXAMINATION- FEBRUARY 2020

B.Tech VI Semester

COURSE CODE: 10B11PH611

MAX. MARKS: 15

COURSE NAME: Materials Science

COURSE CREDITS: 04

MAX. TIME: One Hour

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

- Q1.** A field strength 'E' is applied to a dielectric. Show that the stored energy per unit volume in the polarized atom is equal to $(1/2)\alpha E^2$, where ' α ' is the polarizability. [3-marks] [CO-1]
- Q2.** What is meant by local electric field in a solid dielectric? Deduce an expression for the local field for structures possessing cubic symmetry. [3-marks] [CO-2]
- Q3.** A solid dielectric material has 5×10^{28} identical atoms/m³. If the polarizability is 3.6×10^{-40} Fm², calculate the ratio of Lorentz field and the external electric field. [3-marks] [CO-3]
- Q4.** What is strain hardening? How it is useful to improve the strength of engineering materials? [3-marks] [CO-4]
- Q5.** What are ferroelectric ceramics? Discuss the processing of ferroelectric ceramics. [3-marks] [CO-5]