M.E. Electrical Engineering First Year First Semester Examination- 2018

MATERIALS TECHNOLOGY

Time : 3 Hours   Full Marks : 100

Answer **any five** questions

1.(a) Discuss analytically potential energy and force as a function of inter-atomic spacing   15

   (b) Give the mechanical model of an elastic crystal lattice   5

2. Derive the space dependent and time dependent parts of the wave function ψ, the intensity of which can be used to define the probability of finding the electron at a given location in space and at a particular time.   20

3.(a) State Pauli's exclusion principle and electron states in a multi-electron atom.   10

   (b) Explain the notations for the quantum numbers and their values.   10

4. Discuss Miller Indices with proper graphical example.   20

5. Discuss in details the one dimensional atomic model and draw the energy levels of the electrons.   20

6. Discuss in details the two dimensional atomic model and compare it briefly with the one dimensional model.   20

7.(a) Discuss in details atomic magnetic moment.   10

   (b) Write about the parallel and anti-parallel magnetic moments.   10

8. Write short notes on :

   (a) A.C. Permittivity, (b) Polarization of dielectric molecules.   10+10