

R09

Code No: 09A1BS02

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech I Year Examinations, May/June-2013

ENGINEERING PHYSICS

(Common to all Branches)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

- 1.a) Explain the terms:  
i) basis ii) space lattice iii) unit cell  
b) Obtain the relations between the edge of the unit cell and atomic radius for the BCC and FCC lattices  
c) Draw a diagram that depicts the variation of interatomic force as a function of spacing in terms of its attraction and repulsive components.
- 2.a) Distinguish between edge and screw dislocations. What is Burger's vector?  
b) State and explain the Bragg's law  
c) Mention different kind of point defects in crystal
- 3.a) Describe Davisson and Germer experiment to verify the wave nature of matter  
b) An electron is moving under a potential field of 15 kV. Calculate the wavelength of the electron waves.  
c) Distinguish between Fermi-Dirac distribution and Bose-Einstein distribution
4. a) On the basis of band theory, how the crystalline solids are classified into metals, semiconductors and insulators.  
b) Explain the concept of effective mass of an electron.
- 5.a) What is Hall effect? Derive an expression for Hall coefficient for p-type semiconductor.  
b) For semiconductor, the Hall coefficient is  $-6.85 \times 10^{-5} \text{ m}^3/\text{coulomb}$  and electrical conductivity is  $250 \text{ m}^{-1}\Omega^{-1}$ . Calculate the density and mobility of charge carriers.  
c) Write a short note on Light Emitting diode (LED)
6. a) Explain the following  
i) Dielectric constant ii) Electric polarization  
iii) Displacement vector iv) Electric susceptibility  
b) Find the electric susceptibility of a dielectric gas having dielectric constant of 1.000041.  
c) Define the magnetization and show that  $B = \mu_o (H + M)$