

**R09**

Code No: 09A1BS02

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, November/December – 2013

ENGINEERING PHYSICS

(Common to all Branches)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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- 1.a) Derive an expression for estimation of cohesive energy of a solid.
- b) Copper has FCC structure and atomic radius 0.1278 nm. Calculate the inter planar spacing for (111) and (321) planes. [15]
- 2.a) Describe with a neat diagram, Laue's method of determination of crystal structure.
- b) X-rays of wavelength  $1.5418 \text{ \AA}$  are diffracted by (111) plane in a crystal at an angle  $30^\circ$  in the first order. Calculate the inter atomic spacing. [15]
- 3.a) Derive an expression for density of states of an electron.
- b) Calculate the de-Broglie wavelength of an electron which has been accelerated from rest on application of potential of 400 Volts. [15]
- 4.a) What is Bloch theory? Explain in detail.
- b) Write the conclusions given by Kroning-Penny model. [15]
- 5.a) What is hall-effect? Derive an expression for Hall-Coefficient for n-type semiconductor.
- b) Write notes on "Liquid Crystal Display". [15]
- 6.a) Explain the following:
  - i) Dielectric constant.
  - ii) Electric susceptibility.
  - iii) Polarizability.
- b) Define magnetization and show that  $B = \mu_0 (H+M)$ , Give an account on ferromagnetic materials. [15]
- 7.a) Describe the construction and working of Ruby laser.
- b) Calculate the Numerical Aperture and acceptance angle for an optical fiber with core and cladding refractive indices being 1.48 and 1.45 respectively. [15]
- 8.a) Derive Sabine formula for reverberation time.
- b) Write the application of Nanotechnology in electronic industry. [15]

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