

Code No: 111AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD**B.Tech I Year Examinations, December-2014/January-2015****ENGINEERING PHYSICS****(Common to all Branches)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A**(25 Marks)**

- 1.a) Discuss about the properties of ionic crystals. [2m]
- b) State and explain Bragg's law. [3m]
- c) What are the boundary conditions for potential energy of a particle in an infinite square well? [2m]
- d) Discuss about the properties of microcanonical ensemble. [3m]
- e) Define electric dipole, dielectric moment, polarizability and dipole moment. [2m]
- f) Write short notes on Bohr magneton. [3m]
- g) Explain the concept of double refraction. [2m]
- h) Discuss about population inversion in lasers. [3m]
- i) Define Fermi level and explain about its characteristics. [2m]
- j) Define reverberation and reverberation time. [3m]

Part-B**(50 Marks)**

- 2.a) Discuss about seven crystal system and their corresponding Bravais lattice with the help of neat diagrams.
- b) Explain salient features of Miller indices.

OR

- 3.a) Discuss about point defects.
 - b) Estimate the number of Schottky defects at a given temperature.
- 4.a) Discuss about the properties of matter waves.
 - b) Derive Schrodinger's time independent equation.
 - c) Calculate wavelength associated with a proton of energy 1 MeV.

OR

- 5.a) Discuss about M-B, B-E and F-D statistics.
- b) Explain motion of an electron in a periodic potential.

- 6.a) Discuss about piezo electricity.
- b) Derive an expression for electronic and ionic polarizations.

OR

- 7.a) Explain domain theory of ferro magnetism on the basis of hysteresis curve.
- b) Discuss about superconductivity phenomena.

- 8.a) Discuss about the characteristics of a laser beam.
b) Describe construction, working and applications of Ruby laser.

OR

- 9.a) Explain the construction of an optical fiber.
b) Define and derive an expression for numerical aperture of an optical fiber.

- 10.a) Discuss about the basic requirements of an acoustically good hall.
b) Discuss about a method for the measurement of absorption coefficient of a material.

OR

- 11.a) Explain quantum confinement in nanomaterials.
b) Describe synthesis of nanomaterials by bottom up technique.

