

**R16**

Code No: 132AA

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year II Semester Examinations, May - 2019****ENGINEERING PHYSICS – II****(Common to EEE, ECE, CSE, EIE, IT, ETM)****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) Explain dual nature of light. [2]
- b) Define de-Broglie's hypothesis. [3]
- c) Define Fermi energy level at 0K. [2]
- d) Draw V-I Characteristic curve of PN junction diode. [3]
- e) Define Polarization vector. [2]
- f) Explain pyro electricity. [3]
- g) Define magnetic susceptibility. [2]
- h) Distinguish between soft and hard magnetic materials. [3]
- i) What is nano size? Explain briefly. [2]
- j) Write any two applications of nanomaterials. [3]

**PART-B****(50 Marks)**

- 2.a) With neat diagram explain Davisson and Germer's experiment.
  - b) Describe formation of energy bands in solids. [5+5]
- OR**
- 3.a) Derive Schrödinger's time independent wave equation.
  - b) Explain physical significance of wave function ( $\psi$ ). [5+5]
- 4.a) Distinguish between direct and indirect band gap semiconductors.
  - b) Determine the concentration of the charge carriers in conduction band of intrinsic semiconductors. [4+6]
- OR**
- 5.a) Explain formation of PN junction diode.
  - b) Describe construction and working principle of Solar Cell. [4+6]
- 6.a) Derive an expression for Clausius-Mosotti relation.
  - b) Describe Ferro electricity of a dielectric material. [5+5]
- OR**
- 7.a) Derive an expression for electronic polarizability.
  - b) Discuss Piezo electricity of a dielectric material. [5+5]

- 8.a) Discuss classification of magnetic materials.  
b) Explain hysteresis curve based on domain theory of ferro magnetism. [5+5]
- OR**
- 9.a) What is Meissner's effect? Write any two applications of superconductors.  
b) Derive an expression for Bohr magneton. [5+5]
- 10.a) Explain how surface to volume ratio varies in nano materials.  
b) Describe preparation of nanomaterials by using Sol-Gel method. [4+6]
- OR**
- 11.a) Explain Quantum confinement.  
b) Explain how the nanomaterials are characterized by using SEM and TEM. [4+6]

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