

**Code No: 151AE****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech I Year I Semester Examinations, December – 2019/January - 2020****APPLIED PHYSICS****(Common to ECE, EIE)****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 as sub questions.

**PART – A****(25 Marks)**

- 1.a) Explain wave particle duality. [2]
- b) Define diffusion and drift mechanisms. [2]
- c) Illustrate about LED materials. [2]
- d) What is coherence? [2]
- e) What are piezoelectric materials? [2]
- f) Explain about Heisenberg's uncertainty principle. [3]
- g) What is Fermi level? [3]
- h) Illustrate working of a PIN diode. [3]
- i) Explain losses in optical fibers. [3]
- j) Define ampere's and Faraday's law. [3]

**PART – B****(50 Marks)**

- 2.a) Discuss about de Broglie's hypothesis.
  - b) Prove de Broglie's hypothesis using Davission and Germer's experiment. [5+5]
- OR**
- 3.a) Derive an expression for time independent Schrodinger's wave equation.
  - b) Explain the Born interpretation of wave function. [5+5]
- 4.a) Estimate concentration of electrons in n-type semiconductor.
  - b) Evaluate I-V characteristics of a pn-junction diode. [5+5]
- OR**
- 5.a) Explain the phenomena of carrier generation and recombination.
  - b) Discuss about working, IV characteristics of Zener diode. [5+5]
- 6.a) Compare radiative and non-radiative recombination mechanisms.
  - b) Explain figures of merits of a LED device. [5+5]
- OR**
- 7.a) Discuss about construction, principle and working of a semiconductor laser.
  - b) Evaluate working of a solar cell in terms of characteristics. [5+5]

- 8.a) Explain interaction of radiation with matter.  
b) Discuss working principle and applications of Ruby laser. [5+5]
- OR**
- 9.a) Derive an expression for numerical aperture of an optical fiber.  
b) Compare working of step index and graded index fibers. [5+5]
- 10.a) Write a note on Maxwell's equations.  
b) Explain classification of magnetic materials. [5+5]
- OR**
- 11.a) Derive an expression for internal fields in a solid.  
b) Discuss about hysteresis behavior of ferromagnetic material. [5+5]

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