

R18

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)

Max. Marks: 75

Time: 3 hours

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)

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|------|---|-----|
| 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)

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

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- 8.a) Explain interaction of radiation with matter. [5+5]
b) Discuss working principle and applications of Ruby laser.

OR

- 9.a) Derive an expression for numerical aperture of an optical fiber. [5+5]
b) Compare working of step index and graded index fibers.

- 10.a) Write a note on Maxwell's equations. [5+5]
b) Explain classification of magnetic materials.

OR

- 11.a) Derive an expression for internal fields in a solid. [5+5]
b) Discuss about hysteresis behavior of ferromagnetic material.

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