

Final.

Course Code: 1910003

MLRITM R19



MARRI LAXMAN REDDY
Institute of Technology and Management
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I B.Tech I Sem Regular Examination, Dec 2019/Jan 2020
APPLIED PHYSICS
(ECE)

Time: 3 Hours.

Max. Marks: 70

- Note: 1. This question paper contains two parts A and B.
 2. Part- A is Compulsory. Answer all Questions which carries 20 marks.
 3. Part - B consists 5 units. Answer any one question from each unit.
 Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10 x 2 Marks = 20 Marks)

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| 1. a) Describe the spectral distribution of a black body. | 2 M |
| b) What is the physical significance of wave function? | 2 M |
| c) What are intrinsic and extrinsic semi-conductors? | 2 M |
| d) Explain Zener breakdown. | 2 M |
| e) Explain how a solar cell works? | 2 M |
| f) What is radiative recombination in semiconductors? | 2 M |
| g) What are the conditions to achieve Laser action? | 2 M |
| h) Explain the basic principle involved in light propagation through optical fiber. | 2 M |
| i) State and explain Ampere's law. | 2 M |
| j) What is hysteresis? | 2 M |

PART - B

(5 x 10 Marks = 50 Marks)

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| 2 a) Derive Schrodinger's time independent wave equation. | 5 M |
| b) Show that the energy of particle in a potential box is quantized? | 5 M |

OR

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| 3 a) Write the postulates of Planck's Quantum theory and derive Planck's radiation formula. | 5 M |
| b) Explain the de-Broglie hypothesis and derive an expression for de-Broglie wavelength. | 5 M |

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(Dr. K. Ashok)

- 4 a) Explain carrier-generation and recombination. 5 M
 b) Explain how the Fermi energy level changes with increasing amounts of impurity in p-type and n-type semiconductors? 5 M
- OR**
- 5 a) In a pn-junction, what are the diffusion and drift currents and derive expressions for them. 5 M
 b) Explain the unbiased, forward biased and reverse biased pn-junctions with neat energy band diagrams. 5 M
- 6 a) Explain the construction and working of LED. What are the advantages and disadvantages of LEDs in electronic display? 10 M
- OR**
- 7 a) Describe the working principle of semiconductor lasers. What are the materials used in semiconductor lasers? 5 M
 b) Write a note on Avalanche Photo Diode. Review the parameters that are commonly used to assess the performance of a detector. 5 M
- 8 a) What are the various pumping methods? Describe the construction and working of a ruby laser with a neat sketch. 10 M
- OR**
- 9 a) What are step index and graded index fibres? Write the losses associated with fibres. 5 M
 b) Explain how fibre can be used a dielectric wave guide? Calculate the numerical aperture and acceptance angle of a fibre having fractional refractive index of 0.05 and core refractive index of 1.48. 5 M
- 10 a) Write the Maxwell's equations in differential and integral forms. 5 M
 b) Derive Clausius-Mossotti equation. 5 M
- OR**
- 11 a) Explain the classification of magnetic materials. 5 M
 b) Write a note on ferroelectric and piezoelectric materials. 5 M

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 7/11/2020
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