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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations March-2021

SEMICONDUCTOR PHYSICS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Distinguish the classical free electron theory and quantum free electronic theory. 6M
b Write a about Fermi Dirac distribution? 6M

OR

- 2 a Describe the various sources of electrical resistance in metals. 6M
b Define the terms i)Mean free path ii)Mobility iii) Drift Velocity 6M

UNIT-II

- 3 a Distinguish between intrinsic and extrinsic semiconductors. 7M
b Derive Einstein's relation in semiconductors? 5M

OR

- 4 a Explain the Hall Effect in semiconductors. 8M
b Write the applications of Hall Effect. 4M

UNIT-III

- 5 a Describe the behavior of particle in a one dimensional infinite potential well in terms of Eigen values and function. 8M
b An electron is confined to a one dimensional potential box of 2\AA length. 4M
Calculate the energies corresponding to the second and forth quantum states (in eV).

OR

- 6 Write Maxwell's equations in differential and integral form and derive an expression for energy flow by electromagnetic waves. 12M

UNIT-IV

- 7 a Explain the any four important characteristic of laser beam. 4M
b Describe the construction and working principle of NdYAG Laser with the help of a neat diagram. 6M

OR

- 8 a What is the acceptance angle of an optical fibre and derive an expression for it. 8M
b An optical fiber has a core refractive index of 1.44 and cladding refractive index of 1.40. Find its numerical aperture and θ_a . 4M

UNIT-V

- 9 a Explain why surface area to volume ratio very large for nano materials. 8M
b Find the surface area to volume ratio of Sphere using surface area and volume calculation for the given radius is 5 meter? 4M

OR

- 10 a What are the techniques available for synthesizing nanomaterials? 4M
b Explain ball milling technique for synthesis of nanomaterial. 8M

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