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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations February-2022**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 Write the postulates of classical free electron theory. List their drawbacks. 6M
 b Discuss the advantages of quantum free electron theory over the classical free electron theory. 6M

OR

- 2 a Explain the various sources of electrical resistances in metals. 6M
 b Define the following terms: (i) Mean free path (ii) Relaxation time (iii) Mobility 6M

UNIT-II

- 3 a What is intrinsic semiconductor? Explain the formation of extrinsic semiconductor with doping. 6M
 b Derive the expression for electrical conductivity of an intrinsic semiconductor. 6M

OR

- 4 a Describe the variation of width of depletion region in forward and reverse bias of a pn-junction diode. 6M
 b Differentiate drift and diffusion currents. 6M

UNIT-III

- 5 a Derive the eigen function and eigen values of a particle, which is moving in a infinite depth of one dimensional potential box. 8M
 b An electron moving in one dimensional potential box of width 4 Å. Predicts the minimum energy and first excited energy of an electron. 4M

OR

- 6 a List the integral form of Maxwell's equation. Give their significances. 6M
 b State and explain Stoke's theorem. 6M

UNIT-IV

- 7 a Distinguish between spontaneous emission and stimulated emission. 4M
 b Discuss the construction working mechanism of He-Ne laser with neat diagram. 8M

OR

- 8 a Draw the block diagram of optical fiber communication. Describe each and every block in communication system. 8M
 b List the applications of optical fibers. 4M

UNIT-V

- 9 a What is nanotechnology? List the advantages of nanotechnology. 5M
 b Explain how the surface area to volume ratio increases in nanomaterials. 7M

OR

- 10 a Describe the ball milling method to prepare nanomaterials. 7M
 b Mention the applications of nanomaterials in the field of science and technology. 5M

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