

Reg. No: 

--	--	--	--	--	--	--	--	--	--

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
**(AUTONOMOUS)**  
**B.Tech I Year I Semester (R16) Regular Examinations December 2016**  
**ENGINEERING PHYSICS**  
 (Common to CE, EEE & ME)  
 (For Students admitted in 2016 only)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- Q.1** a. Describe Fraunhofer diffraction due to single slit. 10M  
 b. The first diffraction minima due to a single slit diffraction is at  $\theta=30^\circ$  for a light of wavelength  $5000 \text{ \AA}$ . Find the width of the slit. 2M

**OR**

- Q.2** a. Explain the construction and working of Nd:YAG laser with suitable energy level diagram. 9M  
 b. Explain population inversion. 3M

**UNIT-II**

- Q.3** a. Show that FCC is mostly closed packed structure than BCC and SC. 8M  
 b. What are Miller indices? Draw (1 0 0) and (1 1 0) planes in a cubic lattice. 4M

**OR**

- Q.4** a. Define reverberation and reverberation time. 2M  
 b. What are ultrasonic waves? Describe the application of Ultrasonic in non destructive testing (NDT) of material. 10M

**UNIT-III**

- Q.5** a. Show that the energy of an electron confined in a one dimensional potential well of width 'a' and infinite depth is quantized. 10M  
 b. Calculate the wavelength associated with an electron raised to a potential of 1600 V. 2M

**OR**

- Q.6** a. Derive the electrical conductivity of metals using Quantum free electron theory. 8M  
 b. What are the advantages of Quantum free electron theory? 4M

**UNIT-IV**

- Q.7** a. What is Hall effect? Derive the expression for Hall voltage and Hall coefficient. 10M  
 b. Write any two distinguish features between direct and indirect band gap semiconductors. 2M

**OR**

- Q.8** a. Explain B-H curve of a ferromagnetic material. 8M  
 b. Define (i) magnetization (ii) magnetic flux density (iii) relative magnetic permeability and (iv) Magnetic susceptibility? 4M

**UNIT-V**

- Q.9** a. Explain BCS theory of superconductors. 8M  
b. What is Meissner effect in superconductor? 4M

**OR**

- Q.10** a. What is Quantum Confinement? 2M  
b. Describe the synthesis of nanomaterials by Ball milling technique. 10M

**\*\*\* END \*\*\***