GALGOTIAS UNIVERSITY

School of Computing Science and Engineering
Bachelor of Technology in Computer Science and Engineering
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem II - C1UD124B - Semiconductor and Optoelectronic Devices

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Classify the steps for Si-wafer formation briefly. — K2 (2)

2) Interpret the difference between normal heating and annealing of a semiconductor — K1 (3)

3) Explain four postulates of quantum mechanics — K2 (4)

4) Calculate the de Broglie wavelength associated with a particle (electron) accelerated through a potential difference 100 V. — K2 (6)

5) Discuss the Heisenberg's uncertainty principle.Calculate the smallest possible uncertainty in position of an electron moving with velocity 3 × 10^7 m/s. — K3 (6)

6) Analyze Einstein's quantum theory of photoelectric effect . Find maximum kinetic energy in eV of photo electrons if the work function of the material is 3.0 eV and frequency of radiation is $2.0 * 10^{15}$ Hz. — K3 (9)

7) Explain blackbody radiation and discuss the ultraviolet catastrophe associated with it. — K4 (8)

8) If the stopping potential for the electrons emitted from a photosensitive surface illuminated light of wavelength L1 is V1. When the incident wavelength is changed to a new value L2, the stopping potential is V2. Prove that V1-V2 = [1/L1-1/L2] hc/e. — K4 (12)

OR

Discuss the quantum tunneling in a semiconductor p-n junction. — K4 (12)