Student ID:

Islamic University of Technology (IUT)

Marks:

Organization of Islamic Cooperation (OIC)

Department of Electrical and Electronic Engineering

Course no. : Phy 4421 Course Title : Semiconductor Devices

Class Test : 1C Date : 24-12-2021 Time : 20 Minutes Marks : 15

1. Define direct bandgap and indirect bandgap semiconductors with examples. Which kind of semiconductor is suitable for making LED? Why? 4+2

2. Without using equations, mention the applications of Hall effect. 3

3. A Ge sample is doped with 2×10^{17} phosphorous atoms/cm^3. Find equilibrium electron and hole concentrations at 300 K. Also locate the Fermi level, E_F in Ge bandgap from the valence band edge, E_V. Ge bandgap $E_g = 0.67$ eV, Boltzmann constant $k = 8.62\times10^{-5}$ eV/K, intrinsic carrier concentration $n_i = 2.5\times10^{13}$ cm^{-3}. 3+3