Exam.Code:0976
Sub. Code: 7112

2063

M. Tech. (Micro-Electronics)
Second Semester
MIC-201: Measurement and Characterization Techniques

Time allowed: 3 Hours

Max. Marks: 50

*NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Use of scientific calculator is allowed.*

*x-x-x*

**Q1. Answer the following:-**

(a) How the excitation energy affect the KE in XPS? (2)

(b) What is the difference between Auger electrons and X-ray electrons? (2)

(c) How the carrier type and concentration can be determined by the Hall effect? (2)

(d) What pressure is best and why, while performing an XPS measurement? (2)

(e) What is Raman spectroscopy? (2)

## SECTION-A

**Q2.** (a) How the conductivity type can be found with the rectification method? Why Hall effect is not preferred? (5)

(b) Differentiate SEM and TEM. What are the parameters best judged by SEM and TEM? (5)

**Q3.** (a) How LEED measurement technique is used to surface sensitivity from the high scattering cross-section for low energy electrons? (5)

(b) What is Atomic Force Microscopy (AFM) and discuss its three major abilities? (5)

**Q4.** (a) Discuss high-energy ion scattering (HEIS) spectrometry. How this technique is used to determine the structure and composition of materials? (5)

(b) Explain the contrast mechanism in scanning microscope? (5)

## SECTION-B

**Q5.** (a) What is absorption and transmission spectra in UV-VIS spectroscopy? Discuss their significance. (5)

(b) Discuss X-ray photoelectron spectroscopy and merits over its predecessors. (5)

**Q6.** (a) Discuss the physics of EBIC technique in detail. (5)

(b) Explain Voltage contrast (VC) imaging with secondary electron (SE) signal in the scanning electron microscope. (5)

**Q7.** (a) How the crystal quality of epitaxial layer is monitored during its growth using Reflection High Energy Electron Diffusion? (5)

(b) What is the role of SIMS and RBS techniques in the development of advanced metallization systems for microelectronic applications? (5)

*x-x-x*