

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2022

Ph.D.-II Semester (PMS)

COURSE CODE (CREDITS): 13P1WPH112

MAX. MARKS: 35

COURSE NAME: MATERIALS CHARACTERIZATION

COURSE INSTRUCTORS: VINEET SHARMA

MAX. TIME: 2 Hours

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*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

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- Q1. Discuss in detail the technique of Raman spectroscopy. Describe its various characterization modes. [5 marks]
- Q2. Give a detailed account of Photoluminescence spectroscopy. Discuss the various aspects of nano materials that can be analyzed using the same. [5 marks]
- Q3. Discuss the construction and working of Tunneling electron microscope and Atomic force microscopy. Describe the advantages and disadvantages of both these techniques. In particular which technique would you prefer to characterize the semiconducting specimen and why? [10 marks]
- Q4. Describe how UV-Vis-NIR spectroscopy can be used to analyze a semiconducting sample. Elaborate the parameters that can be analyzed using the same for a sample. [5 marks]
- Q5. What is Hall Effect and illustrate using diagram how are you going to measure the Hall voltage in a sample. Analyse the variation in Hall parameters with varying magnetic field and carrier concentration. [5 marks]
- Q6. What are the advantages of X-ray photoelectron spectroscopy (XPS) over X-ray diffraction (XRD)? How XPS helps to identify the chemical state and electronic structure in addition to the elemental composition for a material sample? [5 marks]