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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T3 Examination- December 2019

PhD(Physics and Materials Science)

COURSE CODE:13P1WPH112 MAX. MARKS: 35

COURSE NAME: Materials Characterization

Credit: 03 MAX. TIME: TWO HOURS

Note: *All parts are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Q1. (a) What is infrared spectroscopy and what information can FTIR provide? **[3]**

(b) Discuss the modes of vibrations in FTIR spectroscopy? **[2]**

(c) What analytical information can be obtained using IR techniques? **[2]**

Q.2. (a) Explain the measurement principle of VSM with the help of diagram. **[3]**

(b) What are ferromagnetic materials? **[1.5]**

(c) Discuss in detail about the hysteresis obtained in VSM. **[2.5]**

Q.3. (a) What is XPS and its working principle? **[2]**

(b) Discuss about K.E. and B.E. and Fermi level referencing case in XPS. **[3]**

(c) Explain the quantitative analysis in XPS with examples. **[2]**

Q.4. Discuss I-V curves

(a) I-V characteristic curve for an ideal resistor **[2]**

(b) I-V characteristic curve for a semiconductor **[2]**

(c) I-V characteristic curve for a diode **[2]**

Q.5. (a) Discuss anatomy of XRD with detailed description. **[3]**

(b) Explain the working of AFM with the help of diagram and, what the main working modes of AFM are. **[3]**

(c) Discuss MFM and LFM in short. **[2]**
