DII-003-020402 Seat No. _____

M. Sc. (Sem. IV) (CBCS) Examination

May / June – 2015

Physics : ET - II

(Materials Characterization)

Faculty Code : 003

Subject Code : 020402

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions: (1) All questions carry equal marks.

(2) Symbols have their usual meanings.

(3) Full marks are indicated at the right end of each question.

1 Answer in brief any **seven** of the following: **14**

(a) Why Beryllium is one of the most suitable window materials for X-rays to leave the tube ?

(b) What are K_α and K_β transitions ?

(c) Which values of 2θ is sufficient to cover the most useful part of the power pattern ?

(d) What is meant by TEM ? Which information we get from TEM ?

(e) If the sample is an insulator which kind of coating is necessary in taking SEM Image ?

(f) Give the names of different polarizabilities.

(g) The FTIR spectrotometer is based on principle of which optical instrument ?

(h) What is the change transfer process in UV-Vis studies ?

(i) What are the applicatins of thermogravimetry ?

(j) Differentiate between Two-Probe and Four-Probe resistivity measurement techniques.

2 Attempt any **two** of the following:

(a) Discuss about the production of X-ray in detail. How monochromatic X-rays are achieved ? **7**

(b) Explain the effect of stress on the powder pattern. **7**

(c) Explain influence of crystal symmetry and multiplicities on powder pattern. **7**

3 (a) Discuss physical Basis and primary mode of operation, Instrumentation and sample requirement with reference to scanning Electron Microscopy. **7**

(b) Discuss scanning Force Microscopy in detail. **7**

OR

3 (a) What is ferroelectricity? Explain P-E loop in detail. **7**

(b) Discuss vander Pauw method in detail. **7**

4 (a) With neat diagram explain the function of double bean UV-Vis spectrophotometer. **7**

(b) What is the theory of infrared absorption ? Discuss vibrational modes, infrared ranges and instrumentation with refernce to FTIR technique. **7**

5 Attempt any **two** of the following:

(a) Vibrating sample magnetometer - A short note. **7**

(b) The Function of DTA - A short note. **7**

(c) SQUID magnetometer - A short note **7**

(d) Scanning Tunneling Microscopy - A short note. **7**
