

# CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

15NT53

## Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018 Characterization Techniques

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing one full question from each module.*

### Module-1

- 1 a. Explain in detail about Rayleigh criterion and Abbe criterion. (08 Marks)  
b. Explain the electron diffraction and interference with suitable diagram. (08 Marks)

OR

- 2 Write short notes on :  
a. Electron lenses  
b. Scan coils  
c. Different types of sources  
d. Lens aberrations. (16 Marks)

### Module-2

- 3 a. Write a short note on XANES. (04 Marks)  
b. Write a short note on EXAFS. (04 Marks)  
c. Explain the working of XPS in detail along with neat schematic diagram. (08 Marks)

OR

- 4 a. Explain the basic principles of single crystalline XRD and provide its advantages and disadvantages. (08 Marks)  
b. Explain the basic principles of XPS. Mention its advantages and disadvantages. (08 Marks)

### Module-3

- 5 a. Explain the working principle of scanning electron microscope (SEM) with schematic diagram. (08 Marks)  
b. Explain the working principle of transmission electron microscope (TEM) with schematic diagram. (08 Marks)

OR

- 6 a. Explain the working principle of atomic force microscope (AFM) with schematic diagram. (08 Marks)  
b. Explain the working principle of scanning tunnelling microscope (STM) with schematic diagram. (08 Marks)

### Module-4

- 7 a. Explain the working principle UV – visible spectrometer along with schematic diagram. (08 Marks)  
b. Explain the working principle of Raman spectrometer along with schematic diagram. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

**OR**

- 8 a. Explain the working principle of FTIR spectrometer along with schematic diagram. (08 Marks)
- b. Define zeta potential. Explain the process of measuring zeta potential and its applications. (08 Marks)

**Module-5**

- 9 a. Explain the working principle of potentiometry with schematic diagram. (08 Marks)
- b. Explain the working principle of cyclic voltametry. (08 Marks)

**OR**

- 10 a. Explain the DC reversal measurement circuit using a four wire lead arrangement for nanotech and other sensitive devices. (08 Marks)
- b. Explain lock in amplifier method to measure AC signals for low power nanotech and other sensitive devices. (08 Marks)

\* \* \* \* \*