

Code No: **RT41037****R13****Set No. 1****IV B.Tech I Semester Supplementary Examinations, February/March - 2018****MATERIAL CHARACTERIZATION TECHNIQUES****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any THREE questions from Part-B*

PART-A (22 Marks)

1. a) Write the classification of material characterization techniques. [4]
- b) Explain about dilatometry in brief. [4]
- c) Write about the applications of optical spectroscopy. [3]
- d) Write about advantages of image analysis. [4]
- e) Explain about unit cell. [3]
- f) Write about the importance of magnification control. [4]

PART-B (3x16 = 48 Marks)

2. Explain about microscopic techniques in detail. [16]
3. Explain about Differential Scanning calorimetry (DSC) in detail. [16]
4. Explain in detail about X-ray spectrometry. [16]
5. Write about Optical metallography in detail. [16]
6. a) What are the main crystal structures? Explain with neat diagram. [8]
- b) Explain about single crystal diffraction. [8]
7. a) Write the properties of an ideal image. [4]
- b) Explain about operating conditions of SEM and preparation of SEM specimen. [12]