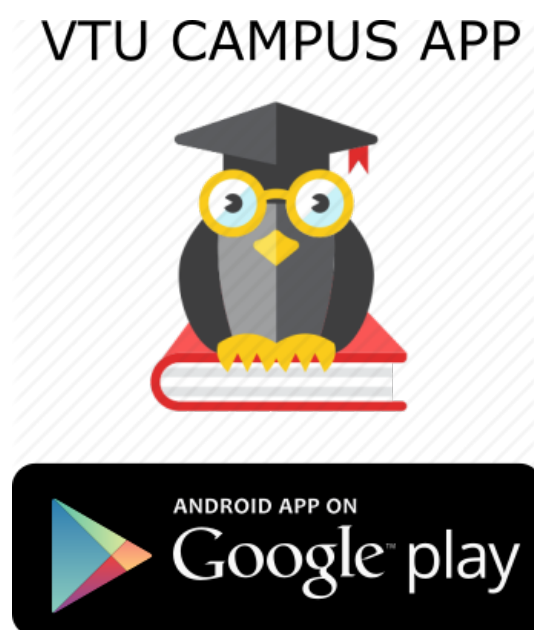




Characterization Techniques VTU CBCS Question Paper Set 2018



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10NT63

Sixth Semester B.E. Degree Examination, June/July 2016

Characterization Techniques

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Write the principles and applications of x-ray diffraction. (10 Marks)
b. Write about x-ray photoelectron spectroscopy and energy dispersive x-ray analysis. (10 Marks)
- 2 a. Explain hot stage microscopy and phase contrast microscopy. (10 Marks)
b. Write a brief note on phase contrast microscopy with a neat diagram. (10 Marks)
- 3 a. Write a note on FTIR and its principle of operation with applications. (10 Marks)
b. Explain in brief on Raman spectroscopy and its principle of operation. (10 Marks)
- 4 a. Explain working of transmission electron microscopy with a neat diagram. (10 Marks)
b. Give a note on atomic force microscopy. (10 Marks)

PART – B

- 5 a. Write about nano indentation data analysis and draw load-depth plot for nano indentation experiment. (10 Marks)
b. Explain any four models for nano indentation with equations. (10 Marks)
- 6 a. Write a note on Nuclear Magnetic Resonance and give any five applications. (10 Marks)
b. Explain:
i) Electron spin resonance
ii) Mossbauer spectroscopy (10 Marks)
- 7 a. What is surface characterization? Write principle and name its different techniques. (10 Marks)
b. Write a note on Auger electron spectroscopy with a neat diagram. (10 Marks)
- 8 a. Explain:
i) Differential thermal analysis
ii) Differential scanning calorimetry. (10 Marks)
b. Give a brief note on importance of thermal analysis for nanostructures. (10 Marks)

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Sixth Semester B.E. Degree Examination, June/July 2017
Characterization Techniques

Time: 3 hrs.

Max. Marks: 100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

- 1 a. Write the principles and applications of x-ray diffraction. (XRD) (12 Marks)
b. Discuss the principles and applications of EDAX (Energy Dispersive X-ray Analysis). (08 Marks)
- 2 a. Define surface morphology. How we can measure Etch pit density? (08 Marks)
b. Explain the use of polarized light microscopy in detail. (12 Marks)
- 3 a. Explain the principle and operation of FTIR. (10 Marks)
b. What is Raman spectroscopy? Explain the operation of Raman spectroscopy. (10 Marks)
- 4 a. Differentiate SEM and TEM. (10 Marks)
b. Discuss in detail, the principle of operation of atomic force microscopy.(AFM). (10 Marks)

PART – B

- 5 a. Explain models for interpretation of nano-indentation load-displacement curves. (10 Marks)
b. Discuss the hardness testing of thin-films and coatings. (10 Marks)
- 6 a. Explain the basic principle, instrumentation and application of Mossbauer spectroscopy. (10 Marks)
b. Explain Electron Spin Resonance (ESR). (10 Marks)
- 7 a. Explain in detail about XPS. (10 Marks)
b. Explain secondary ion mass spectroscopy (SIMS). (10 Marks)
- 8 a. Explain differential scanning calorimetry. (10 Marks)
b. Discuss in detail thermogravimetry. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Only answers to questions appear on separator and no questions written on separator.