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Question Paper Code: 51005

Ph.D COURSE WORK EXAMINATION, MAY 2018

Elective

Course Work

15PPH105 – PHYSICOCHEMICAL METHODS FOR CHARACTERIZATION OF
NANOMATERIALS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) With Scherer formula using X-Ray powder diffraction method, how will you determine lattice parameter, structure and particle size of a given nanomaterials. CO1- U (20)

Or

- (b) Principle, block diagram and working of single crystal diffraction techniques. CO1- U (20)

2. (a) Discuss the principle and instrumentation of Thermogravimetry analysis for nanostructured samples. CO2- U (20)

Or

- (b) Explain differential scanning calorimetric method to analyze the crystalline nature of a given material. CO2- U (20)

3. (a) Discuss the principle instrumentation and applications of HRTEM and atom probe field ion microscopy. CO3- U (20)

Or

- (b) (i) Explain X-ray characterization technique used for elemental analysis of nanomaterials using Energy Dispersive Analysis X-ray Spectroscopy. CO3- U (10)
- (ii) How will you correct the errors occur during qualitative analysis study of nanomaterial sample using X-ray spectrometer. CO3- U (10)
4. (a) Discuss Raman spectroscopy and also few applications of Coherent Anti-stokes Raman Spectroscopy. CO4- Ana (20)
- Or
- (b) Discuss briefly the characterization technique using NMR spectroscopy and its applications. CO4- Ana (20)
5. (a) (i) Give the principles of nanoindentation. CO5- U (10)
- (ii) Explain the mechanical properties of materials in small dimensions. CO5- U (10)
- Or
- (b) (i) What is the principle behind Nanoindentation technique to study the mechanical properties of the nanomaterials? CO5- U (10)
- (ii) Discuss the mechanical properties of materials in nano dimension. CO5- U (10)
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