Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **16NT3001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NANOMATERIALS CHARACTERIZATION METHODS** | **Maximum Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1 |  | Discuss in detail the various imaging modes of SEM. | CO3 | 20 |
|  |  | (OR) |  |  |
| 2 | a. | With a neat diagram explain the working principle of AFM. | CO3 | 10 |
|  | b. | Distinguish between SEM and AFM. | CO3 | 6 |
|  | c. | List the applications of AFM. | CO3 | 4 |
| 3. |  | Discuss in detail the basics, instrumentation and various factors involved in scanning near – field microscopy. | CO2 | 20 |
|  |  | (OR) |  |  |
| 4 | a | Illustrate the interaction of electron with samples and image formation. | CO1 | 15 |
|  | b | Explain photo luminescence. | CO3 | 5 |
| 5 | a. | Explain the instrumentation and application of RHEED. | CO2 | 10 |
|  | b. | Schematically explain the principle, instrumentation and advantages of EELS(Electron energy loss spectroscopy). | CO1 | 10 |
|  |  | (OR) |  |  |
| 6 | a. | Explain the instrumentation and application of Dynamic light scattering(DLS). | CO1 | 10 |
|  | b. | Summarize the principle and application of nano indentation. | CO1 | 10 |
| 7 |  | Discuss the construction and working of STEM. Mention its applications. | CO2 | 20 |
|  |  | (OR) |  |  |
| 8 |  | Explain the principle, construction and working of Transmission Electron Microscopy. | CO3 | 20 |
|  | **Compulsory** | |  |  |
| 9. | a. | Explain the basic principle, instrumentation, procedure and indexing of XRD in detail with a neat diagram. | CO1 | 10 |
|  | b. | Which microscope is used to obtain internal details of the sample by allowing electrons to pass through it and explain its instrumenataion. | CO3 | 10 |