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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17NT3025** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PHYSICOCHEMICAL METHODS FOR CHARACTERIZATION OF NANOMATERIALS** | **Max. Marks :** | **100** |

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

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| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Explain the principle and applications of dynamic light scattering in determining the particle size of nanomaterials. Provide suitable examples. | CO1 | 20 |
| **(OR)** | | | | |
| 2. |  | What are the types of molecular vibrations? Explain the factors affecting vibrational frequency in IR spectroscopy. | CO1 | 20 |
|  | | | | |
| 3. |  | Give a detailed account on characterisation of nanomaterials using X-ray diffractometry. | CO2 | 20 |
| **(OR)** | | | | |
| 4. |  | Elaborate the grain size analysis of naomaterials using XRD. | CO3 | 20 |
|  | | | | |
| 5. |  | Explain the principles, working, and applications of thermogravimetry. | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Explain the working principle, mechanism, and advantages of differential scanning calorimetry. | CO4 | 20 |
|  | | | | |
| 7. |  | Discuss the working and applications of X-ray photoelectron spectroscopy. | CO4 | 20 |
| **(OR)** | | | | |
| 8. |  | Explain the principle and applications of electron energy loss spectroscopy. | CO5 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain the principles and applications of nanoindentation. | CO5 | 20 |