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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **16NT2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PROPERTIES OF NANOMATERIALS** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Compare the Quantum Well, Quantum Wire, Quantum Dot structures with suitable electron confinements. | CO1 | 15 |
| b. | Diagrammatically represent various DOS with an example for each. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Describe the surface Plasmon resonance phenomena and explain how it is more pronounced in nanomaterials. | CO2 | 10 |
| b. | Classify the carbon nanotubes based on its chirality with suitable schematic diagram. | CO1 | 5 |
|  | c. | Tabulate the differences between GMR and AMR. |  | 5 |
|  |  |  |  |  |
| 3. |  | Describe the process of optical absorption in nanomaterials and the regions of interest like absorption edge and shift in wavelength. | CO2 | 20 |
| (OR) | | | | |
| 4. | a. | Discuss the impact of mechanical property in zero and one dimensional nanomaterials. | CO2 | 15 |
|  | b. | Difference between nanoindentation and microindentation. | CO2 | 5 |
|  |  |  |  |  |
| 5. |  | Explain the different mechanism where size plays important role in electrical properties of nanomaterials. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | What are the physical properties of nanomaterials that change accordingly with size. | CO2 | 10 |
|  | b. | What happens to melting point when the surface energy increases? | CO2 | 10 |
|  |  |  |  |  |
| 7. | a. | Write a note on Quantum dot and Exciton Bohr radius. | CO1 | 10 |
| b. | Classify the different magnetite materials with suitable diagrams. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | Derive the expression for De-broglie hypothesis of electron wave length. | CO1 | 10 |
| b. | Discuss the various properties of CNT. | CO2 | 10 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | Write a note on hall effect. | CO2 | 5 |
| b. | Differentiate hard and soft magnetic materials. | CO2 | 5 |
| c. | Explain the experimental set up of the instrumentation used to study optical property of nanomaterials. | CO2 | 10 |