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



**End Semester Examination – Nov/Dec – 2017**

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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. | State Quantum confinement theory based on size reduction at different dimensions. | CO1 | 15 |
| b. | Give examples for 1D,2D,3D and 0D materials. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | What happens to band gap in semiconductors upon size reduction at various dimensions? | CO1 | 5 |
| b. | Distinguish the density of states of bulk and quantum states with suitable diagrams. | CO1 | 15 |
|  |  |  |  |  |
| 3. | a. | List out physical properties of nanomaterials that change accordingly with size. | CO2 | 10 |
|  | b. | What happens to melting point when the surface energy increases? | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Name the primary reason for the increased hardness of the materials upon size reduction and discuss. | CO2 | 10 |
|  | b. | Describe the gibs free energy for nanoscale materials. | CO2 | 10 |
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| 5. | a. | Classify the carbon nanotubes based on its chirality with suitable schematic. | CO2 | 10 |
|  | b. | How the electrical properties are altered based on the chirality of CNT. | CO2 | 10 |
| (OR) | | | | |
| 6. |  | Demonstrate the electrical properties of CNT’s through the Van hove singularities and step potential. | CO2 | 20 |
|  |  |  |  |  |
| 7. | a. | Define the following terms.  i) absorption edge, ii) blue shift. | CO2 | 10 |
|  | b. | Demonstrate the UV-V is spectrophotometer characterization to find the Absorption, Band gap of a semiconductor. | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Describe the surface Plasmon resonance phenomena and explain how it is more pronounced in nanomaterials. | CO2 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Draw suitable B-H characteristic for hard, soft and Super paramagnetic materials and explain the different regions of interest. | CO2 | 10 |
|  | b. | Describe the Collosal and giant magneto resistance in nanomaterials. | CO1 | 10 |

ALL THE BEST