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 – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **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. | Define Quantum dot and Exciton Bohr radius. | CO1 | 6 |
| b. | Classify the size reduction of bulk materials in to different like 1D, 2D and 3D with suitable schematic. | CO1 | 14 |
| (OR) | | | | |
| 2. | a. | Compare the Quantum Well, Quantum Wire, Quantum Dot structures with suitable electron confinements. | CO1 | 10 |
| b. | Distinguish the density of states of bulk, quantum states with suitable diagrams. | CO1 | 10 |
| 3. | 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 |
| (OR) | | | | |
| 4. | a. | Name the primary reason for the increased hardness of the materials upon size reduction and discuss. | CO2 | 10 |
|  | b. | Based on Gibs why is the melting point changes with the nanoscale? | CO2 | 10 |
| 5. | a. | Classify the carbon nanotubes based on its chirality with suitable schematic diagram. | CO2 | 10 |
|  | b. | What are the electrical properties of carbon nanotubes. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | What happens with the size of a material is reduced from bulk to nano in terms of band gap? | CO2 | 10 |
|  | b. | Demonstrate the electrical properties of CNT’s through the Van hove singularities and step potential. | CO2 | 10 |
| 7. | a. | Describe the processoe of optical absorption in nanomaterials and the regions of interest like absorption edge, blue shift | CO2 | 10 |
|  | b. | Using the Uv-Vis absorbance spectrum how will you interpret the presence of nanoparticles.explain with suitable graphical representations | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Describe the surface Plasmon resonance phenomena and explain how it is more pronounced in nanomaterials | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Demonstrate the B-H characteristic for hard, soft and Super paramagnetic materials. | CO2 | 10 |
|  | b. | Classify the different magnetite materials with suitable diagrams | CO1 | 10 |

ALL THE BEST