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



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

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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. | Derive the expression for Heisenberg uncertainty principle. | CO1 | 7 |
| b. | Graphically relate melting point, surface area and bandgap with the size of nanoparticles. | CO1 | 3 |
| c. | Derive the expression for De-broglie hypothesis of electron wave length. | CO1 | 7 |
| d. | State Planks theory. | CO1 | 3 |
| **(OR)** | | | | |
| 2. | a. | Demonstrate the B-H characteristic for magnetic materials. | CO2 | 10 |
| b. | Write a note on an instrument which is used to study the mechanical properties of nanomaterials. | CO2 | 10 |
|  |  |  |  |  |
| 3. |  | Discuss the 4 major factors which plays important role in electrical properties of nanomaterials. | CO2 | 20 |
| **(OR)** | | | | |
| 4. |  | Experimentally explain how optical property has impact on nanomaterials. | CO2 | 20 |
|  |  |  |  |  |
| 5. | a. | Elaborate the term “Quantum dots”. | CO1 | 10 |
| b. | Classify the different magnetite materials with suitable diagrams. | CO2 | 10 |
| **(OR)** | | | | |
| 6. | a. | Compare the Quantum Well, Quantum Wire and Quantum Dot structures with suitable electron confinements. | CO1 | 15 |
| b. | Diagrammatically represent various DOS with an example each. | CO1 | 5 |
|  |  |  |  |  |
| 7. | a. | What are the physical properties of nanomaterials that change accordingly with size? | CO2 | 10 |
| b. | Explain what happens to melting point when the surface energy increases. | CO2 | 10 |
| **(OR)** | | | | |
| 8. | a. | What is quantum confined stark effect? | CO2 | 5 |
| b. | Write a note on coupled wells. | CO2 | 5 |
| c. | Differentiate between the blue shift and red shift in optical absorption. | CO2 | 10 |
|  | | **Compulsory:** |  |  |
| 9. |  | Explain in detail spintronically enabled magnetic sensors. | CO2 | 20 |