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

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

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| **Code :** | **17PH3014** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PHYSICS 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 Planks Hypothesis. | CO1 | 5 |
| b. | Demonstrate the Size reduction of a material by X-Cut ,Y-cut ,Z-Cut to make quantum well, quantum wire and quantum dot respectively. | CO1 | 15 |
| (OR) | | | | |
| 2. | a. | State De-Broglie Hypothesis and calculate the wavelength of electron energized by 100 eV. | CO1 | 10 |
| b. | Apply schorodinger wave equation for a Quantum Well of infinite potential. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | With suitable schematic demonstrate the working of Chemical Vapour deposition. | CO2 | 15 |
| b. | Illustrate the mechanism of Effusion cell in MBE technique. | CO2 | 5 |
| (OR) | | | | |
| 4. | a. | Differentiate the two types of size reduction methodologies to bring down a material to nanoscale. | CO2 | 8 |
| b. | Explain the formation of superlattice and self assembled monolayers during nonmaterial synthesis. | CO2 | 12 |
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| 5. | a. | State the Quantum Mechanical tunneling with suitable schematic of forward and reverse biasing of a PN junction. | CO3 | 14 |
| b. | State hall effect and explain the parameters that can be determined with that experiment. | CO3 | 6 |
| (OR) | | | | |
| 6. | a. | Demonstrate the method to find the electrical properties of Gold nanoparticles mixed in thiols. | CO3 | 14 |
| b. | State columb blockade effect arise due to step potential at nano scale materials. | CO3 | 6 |
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| 7. | a. | Illustrate the difference in the aspect ratio of the Bulk and the Nanomaterials with a calculation. | CO4 | 10 |
| b. | Demonstrate the colour change in the gold nanoparticle upon size reduction and analyse the reason. | CO4 | 10 |
| (OR) | | | | |
| 8. | a. | Classify the magnetic nano particles with a neat diagram and the domain modifications upon the application of field. | CO4 | 10 |
| b. | Introduce the concept giant magneto resistance and the colossal magnetic field with neat schematic diagram. | CO4 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Describe the role of nanomagnetism in device applications. | CO5 | 6 |
| b. | Demonstrate the working of a single electron transistor with circuit and characteristics. | CO6 | 14 |