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



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

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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. | Demonstrate the quantum confinement at different dimensions with suitable diagrams. | CO1 | 15 |
| b. | Justify that the bohr exciton is treated as a gas model. | CO1 | 5 |
| **(OR)** | | | | |
| 2. | a. | Apply schrodinger wave equation for a one dimentional square well potential and evaluate the energy and the wave function. | CO1 | 15 |
| b. | Calculate the electron wavelength when it is accelerated by 100eV. | CO1 | 5 |
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| 3. | a. | Demonstrate the CVD technique of nanomaterial synthesis with neat schetch. | CO2 | 15 |
| b. | List out the materials that could be deposited by the CVD method with advantages and disadvantages of the technique. | CO2 | 5 |
| **(OR)** | | | | |
| 4. | a. | Classify the lithographic technique and illustrate the steps involved in Photolithographic technique. | CO2 | 15 |
| b. | Mention the role of effusion cell in MBE with neat diagram. | CO2 | 5 |
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| 5. | a. | Differentiate between the Zig-Zag, Arm chair and chiral carbon nanotubes with its structure. | CO3 | 10 |
| b. | Justify the chiral dependent electrical properties with coulomb blockade and differential conductance. | CO3 | 10 |
| **(OR)** | | | | |
| 6. | a. | Demonstrate the super paramagnetism in nanomaterials with hysteris curve for it. | CO3 | 5 |
| b. | Classify the magnetic materials based on the atomic magnet orientation in it. | CO3 | 15 |
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| 7. | a. | Compare the surface to volme ratio for a bulk and nano scale materials with a calculation for each. | CO4 | 10 |
| b. | Showcase the colour change in size reduction with a example and a diagram and mention about the blue shift responsible for it. | CO4 | 10 |
| **(OR)** | | | | |
| 8. | a. | Deduce the gibs relation for the change in melting point due to size reduction. | CO4 | 5 |
| b. | Demonstrate the self purification and structural perfection in nanoscale sytems with atomic arrangement. | CO4 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Demonstrate the negative resistance behavior of tunnel devices with I-V plot and working with a energy band diagram. | CO5 | 20 |