

End Semester Examinations - 2015-16 Even Semester - May 2016

15PH3015 Physics of Nanomaterials

Set B

Time : 3 hrs
Total Marks: 100

1. a. Explain De-Broglie hypothesis and derive the electron wavelength (5 marks)
b. Describe the Quantum well, Quantum wire and Quantum Dot with suitable diagrams (10 Marks)
c. What are the Physical significance of the wave function (5 Marks)
- OR**
2. a. Recall The planks hypothesis and Uncertainty principle with suitable examples (5 marks)
b. Derive the Schrodinger wave equation for a particle in one dimensional square well potential (15 marks)
3. a. Describe the Molecular beam epitaxial method of preparing nano films with suitable diagrams. (10 marks)
b. Write short notes on the following terms i) RHEED ii) Effusion cell (10 Marks)
- OR**
4. a. What are the different types of sputtering methods available for uniform deposition of nanomaterials explain any one method with neat diagrams (10 marks)
b. With neat schematic explain the spray pyrolysis process of thin film deposition. Enumerate its advantages and disadvantages (10 marks)
5. a) Write short notes on different forms of carbon (10 marks)
b) Demonstrate the preparation methods of carbon nano tubes and explain the Coulomb blockade effect (10 marks)
- OR**
6. a) Draw schematic of different forms of Carbon nanotubes (5 Marks)
b) Describe the electrical properties of carbon nanotubes by mentioning the van Hove singularities (15 Marks)
7. What is quantum Hall effect? Explain in detail about quantum Hall effect. (20 marks)
- OR**
8. Explain the principle, construction and working of a single electron transistor (20 marks)
9. compulsory
a. Give an overview of MEMS and its applications. (10)
b. Explain the phenomenon of magnetoresistance. Briefly describe the process of achieving magnetoresistance behavior in nanomagnets. (10 marks)

Wishing you All the Best