

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

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019**

**Course Code: ME468**  
**Course Name: Nanotechnology**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any three full questions, each carries 10 marks.*

Marks

- |   |   |      |
|---|---|------|
| 1 | a) Explain the concept of super lattices structure of material?                                     | (6)  |
|   | b) What is mean by nano clusters?   | (4)  |
| 2 | a) Explain in detail the concept of quantum dots and quantum wells.                                 | (6)  |
|   | b) What is miniaturization? What are the challenges involved in it?                                 | (4)  |
| 3 | What are the important mechanical properties of material at nano level? Explain any four in detail. | (10) |
| 4 | Define size effect. Describe it in detail with respect to thermal properties of materials.          | (10) |

**PART B**

*Answer any three full questions, each carries 10 marks.*

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|---|---|------|
| 5 | a) What are the advantages and limitations of PVD techniques?   | (6)  |
|   | b) What are the different types of reactors used in CVD process?  | (4)  |
| 6 | a) Compare the working of Scanning Electron Microscope and Transmission Electron Microscope.            | (6)  |
|   | b) Why objects in nanoscale cannot be seen by visible light? How do we characterize nanostructures?     | (4)  |
| 7 | With a neat sketch explain the working of Molecular Beam Epitaxy fabrication technique.                 | (10) |
| 8 | Describe the working of atomic force microscope. What are the precautions required while operating AFM? | (10) |

**PART C**

*Answer any four full questions, each carries 10 marks.*

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|----|---|-----|
| 9  | a) Explain the concept of nano-biosensors.                                    | (6) |
|    | b) What is smart dust?  | (4) |
| 10 | a) What is meant by single walled and multiwalled Carbon Nano Tubes.          | (6) |
|    | b) Explain the following : (a) Nano composites (b) Nano crystalline materials | (4) |

- 11 a) Explain the following (a) Nano magnetic materials (b) Nano layered structures (6)  
b) Describe the working of electro chemical sensor. (4)
- 12 a) What are the differences between molecular machines and macroscopic machines? (6)  
b) What are molecular switches? (4)
- 13 a) Explain the variation of thermo physical properties of nanofluids by the addition of nanoparticles. (6)  
b) What are the applications of nano fluids? (4)
- 14 How to prepare nano fluid? Explain any three methods for producing nanofluids. (10)

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