

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

Max. Marks: 100

Duration: 3 Hours

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

Marks

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| 1 | a) Discuss the classification of nano structures. | (7) |
| | b) Define super lattices. | (3) |
| 2 | a) Explain the concept of nanoclusters. | (5) |
| | b) What do you mean by quantum wells? | (5) |
| 3 | a) Explain the effect of size reduction in mechanical properties of materials. | (6) |
| | b) Discuss the magnetic properties of nanomaterials. | (4) |
| 4 | a) Make a comparison of properties of CNT with that of steel. | (5) |
| | b) Explain how the electronic properties of materials change at nano level. | (5) |

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

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| 5 | a) Discuss the CVD process used for the synthesis of nanomaterials | (7) |
| | b) What are the advantages of PVD process. | (3) |
| 6 | a) Explain the photolithography process used to fabricate electronic chips | (6) |
| | b) Explain briefly, any one method to synthesize CNT. | (4) |
| 7 | What is the purpose of TEM? Explain its working principle. | (10) |
| 8 | a) Explain the principle of X-ray Diffraction. | (6) |
| | b) Discuss any one characterisation technique used for surface analysis. | (4) |

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

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| 9 | a) Explain the concept of nanocrystalline materials and nanolayered structures. | (8) |
| | b) List the engineering applications of nanocomposites. | (2) |
| 10 | a) Explain the characteristic properties of Carbon Nano Tubes. | (6) |
| | b) List the applications of CNT. | (4) |
| 11 | a) Discuss the challenges in developing molecular devices. | (5) |
| | b) Explain the working of electrochemical sensors. | (5) |

- 12 a) Explain the preparation of nano coatings. (6)
b) List some of the applications of nano coatings. (4)
- 13 a) Why the thermo physical properties of nanofluids differ compared to the corresponding basefluids? (6)
b) What are the mechanisms for enhanced thermal conductivity of nanofluids. (4)
- 14 a) Differentiate between single step and two step methods in the preparation of nanofluids. (6)
b) Explain the working of Nano filters. (4)
