

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 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

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|---|----|--|------|
| 1 | a) | What are different classifications of nanostructures? Give examples of each. | (6) |
| | b) | Distinguish between nanoclusters and nanotubes. | (4) |
| 2 | a) | List the unique properties and applications of quantum dots. | (6) |
| | b) | What is a quantum wire? List few practical examples. | (4) |
| 3 | | Explain how the electronic and optical properties of material at nano level. | (10) |
| 4 | | Explain with an example the variation in mechanical and chemical properties of material at nano scale. | (10) |

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

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| 5 | a) | Explain the various CVD reaction types with suitable examples. | (6) |
| | b) | What are the various steps involved in a typical CVD technique? | (4) |
| 6 | a) | With a neat sketch explain the process of ball milling for powder production. | (6) |
| | b) | List any two top down and bottom up method of nanofabrication with example. | (4) |
| 7 | a) | Explain with diagram the working of electron gun used in SEM? | (6) |
| | b) | What are the various detectors used in a SEM? | (4) |
| 8 | | With a neat sketch explain the working of Raman Spectroscopy. | (10) |

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

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| 9 | a) | Write short note on covalent and non-covalent approaches followed in molecular machines. | (6) |
| | b) | What are the difficulties in developing molecular devices? | (4) |
| 10 | a) | What are the classifications of nano sensors? | (6) |
| | b) | What are the physical properties used for sensing? | (4) |
| 11 | a) | Explain three basic geometries of CNT. | (6) |
| | b) | What are nanostructured coatings? | (4) |
| 12 | a) | Explain two step method of preparation of nanofluids. | (6) |
| | b) | Explain how viscosity and specific heat of nanofluids vary compared to base fluids with suitable examples. | (4) |
| 13 | a) | Explain different properties of CNT? What are its applications? | (6) |
| | b) | What is nanocomposite? What are its applications? | (4) |
| 14 | a) | Explain the mechanism of enhanced thermal conductivity of nanofluids? | (6) |
| | b) | What are nanofilters? | (4) |