



H1129

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## APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

### Scheme for Valuation/Answer Key

*Scheme of evaluation (marks in brackets) and answers of problems/key*

**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) Concept - 4 marks + explanation - 2 marks (6)  
b) Definition 4 marks (4)
- 2 a) Quantum dots – 3 marks and quantum wells – 3 marks (6)  
b) Miniaturization – 1 mark, Challenges – Property variations, fabrication challenges, characterization difficulties, time scale, spatial scale challenges – 3 marks (4)
- 3 a) Different properties 4 marks, details 6 marks (10)
- 4 a) Size effect – 2 marks, Thermal properties – Thermal conductivity, Melting point, Specific heat, Viscosity etc – 8 marks (10)

#### PART B

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

- 5 a) Advantages – 3 marks, Limitations – 3 marks (6)  
b) Reactors – Horizontal, vertical, pancake model (Top and bottom) – 1 mark each (4)
- 6 a) Comparison between SEM and TEM – 3 differences ( 2marks each) (6)  
b) Reasons (size versus wavelength) – 2 marks + Characterization – 2 marks (4)
- 7 a) MBE – working principle – 3 marks, Construction – 3 marks, Figure – 4 marks (10)
- 8 a) AFM working principle and construction – 4 marks, Figure - 4 marks (10)  
Precautions – 2 marks

#### PART C

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

- 9 a) Bio sensors 3 marks, applications 3 marks (6)  
b) Definition 2 marks, explanation 2 marks (4)
- 10 a) Two explanations - 3 marks each (3x2) (6)  
b) Nanocomposites – 2 marks + Nano crystalline – 2marks (4)
- 11 a) Nano magnetic materials – 3 marks + nanolayer – 3 marks (6)  
b) Electrochemical sensors – explanation; 3 marks+ 1 example – 1mark (4)



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- 12 a) 3 differences 2 marks each (3x2) (6)  
b) Molecular switches explanations 4 marks (4)
- 13 a) Thermal conductivity, viscosity and specific heat variation – 2 marks each (3x2). (6)  
Any other thermophysical property can also be considered.  
b) 4 applications – 1 mark each (4x1) (4)
- 14 a) Preparation – 4 marks. Any three nanofluid preparation methods – 2 marks each (10)  
(3x2)

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