

IV B. Tech I Semester Regular Examinations, November – 2022**NANOTECHNOLOGY****(Open Elective)****Time: 3 hours****Max. Marks: 75**

*Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks*

UNIT-I

- 1 a) What is the Quanta of energy? Mathematically bring out an expression for it. [7]
b) With the help of neat schematic describe band structure for insulators and conductors. [8]
- (OR)
- 2 a) What are optical phenomena bonding in solids? Briefly explain them. [7]
b) What is the difference between Isotropic and anisotropic property of substance? Explain it by suitable examples. [8]

UNIT-II

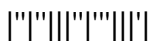
- 3 a) What are applications of Silicon carbide? [7]
b) What are the different techniques to prepare nanoparticle? [8]
- (OR)
- 4 a) Briefly explain suitable method to prepare Aluminium nanoparticles. [7]
b) How does X-ray diffraction data pattern uses in characterizing materials? [8]

UNIT-III

- 5 a) What are the steps involved in preparation for strength measurement? [7]
b) Bring out an comparative study between mechanical data of “ α ” and “ β ” - SiC. [8]
- (OR)
- 6 a) What are the steps involved in measurement of flexural strength? [7]
b) How does flexural strength as a function of temperature of α - silicon carbide? [8]

UNIT-IV

- 7 a) What is memory switching? [7]
b) How does Glass is manufactured using Nanoparticles? [8]



Code No: R194103N

R19

Set No. 1

(OR)

- 8 a) What is NonLinear Refractive index? [7]
b) What is accidental anisotropy Birefringe- Elasto optic effect? [8]

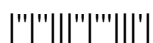
UNIT-V

- 9 a) Explain Deposition of Metal Chalcogenides. [7]
b) Explain the Epitaxial Growth of quantum Dots and In Situ Studies of Epitaxial Growth. [8]

(OR)

- 10 a) Briefly discuss sputtering of Non crystalline powder. [7]
b) Discuss Plasma enhanced CVD. [8]

JNTU FAST UPDATES



Code No: R194103N

R19

Set No. 2

IV B. Tech I Semester Regular Examinations, November – 2022

NANO TECHNOLOGY

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*Answer any FIVE Questions
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UNIT-I

- 1 a) What is Isomer Shift? [7]
b) What is difference between stimulated and spontaneous emissions? [8]
(OR)
- 2 a) What is quadrupole splitting? [7]
b) Briefly discuss on transition dipole bracket. [8]

UNIT-II

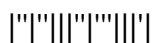
- 3 a) Briefly discuss Gas Phase condensation technique for synthesis of nanoparticles. [7]
b) What is sintering of SiC? Explain the role of Dopants. [8]
(OR)
- 4 a) Briefly discuss DC Arc Plasma technique for synthesis of nanoparticles. [7]
b) Briefly discuss attrition milling. Suggest the influence of different fluid media against particle size for alumina particles. [8]

UNIT-III

- 5 a) Briefly discuss Weibull Theory. [7]
b) Briefly discuss data analysis of theoretical strength. [8]
(OR)
- 6 a) Briefly discuss Stress Intensity factor. [7]
b) Schematically represent applied stress vs spatial elongation curve. [8]

UNIT-IV

- 7 a) Briefly write electro- optic and acousto- optic effect. [7]
b) Explain briefly Electrical conduction in Bismuth glasses. [8]



(OR)

- 8 a) Briefly write short note on (A). Gold ruby glass (B) Silver Ruby. [7]
b) Explain briefly Electrical conduction in Selenium glasses. [8]

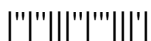
UNIT-V

- 9 a) Discuss Gas phase condensation of nanoparticles. [7]
b) Briefly discuss electron deposition of nanocomposites. [8]

(OR)

- 10 a) Discuss Sol-gel techniques to synthesis Nanopowder. [7]
b) Write short notes on different methods of PECVD o produce thin films. [8]

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UNIT-I

- 1 a) What is Hyper fine splitting? [7]
b) Briefly discuss on the Optical transition. [8]
(OR)

- 2 a) What is spin Canting? [7]
b) Bring out expressions for spontaneous emissions. [8]

UNIT-II

- 3 a) Briefly discuss Sono hydrolysis technique for synthesis of nanoparticles. [7]
b) What is sintering of SiC? Explain the role of Carbon. [8]
(OR)

- 4 a) Briefly discuss Ultra sonic flame Pyrolysis technique for synthesis of nanoparticles. [7]
b) Briefly discuss on microwave sintering of nanoparticles. What are the merits of it? [8]

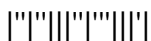
UNIT-III

- 5 a) Briefly discuss fracture toughness and its significance. [7]
b) With a schematic represent the variation of Weibull modulus strength at 1400 ° C temperature for α - silicon carbide. [8]
(OR)

- 6 a) With a schematic represent the variation of fracture toughness as function of temperature for α - silicon carbide [7]
b) Discuss data analysis approach for calculating theoretical strength. [8]

UNIT-IV

- 7 a) What is difference between Linear and Non- Linear refractive Index? [7]
b) Explain briefly Electrical conduction in Bismuth glasses and Selenium. [8]



(OR)

- 8 a) Briefly discuss electro – optic effect. [7]
b) What is tunnelling conduction in nanoparticles? [8]

UNIT-V

- 9 a) What are the common alkoxides for Sol- Gel processing? [7]
b) Describe High energy attrition milling process to synthesis nanopowder. [8]

(OR)

- 10 a) What are common reactions occur in Non- aqueous process? [7]
b) What are the advantages of electro-deposition for synthesis of the nano scale materials? [8]

JNTU FAST UPDATES



Code No: R194103N

R19

Set No. 4

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NANO TECHNOLOGY

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UNIT-I

- 1 a) What is collective magnetic excitation? [7]
b) Briefly discuss Quantum Mechanical Covalency. [8]
(OR)
- 2 a) What is meant by Interpretation of Mossbauer data? [7]
b) Briefly discuss anisotropy in a Single crystal. [8]

UNIT-II

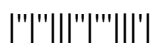
- 3 a) With the help of schematic explain the variation of α - SiC in different atmosphere. [7]
b) What is sintering of SiC? Explain the role of Sintering atmosphere. [8]
(OR)
- 4 a) Explain the variation of bulk density of sintered α - SiC with AlN with the help of a neat schematic. [7]
b) What is the principle of Scanning Electron microscope? How does Alpha Etch differ to Beta Etch? [8]

UNIT-III

- 5 a) What is importance of Single Edge Notch Bend specimen technique? [7]
b) With a schematic represent the variation of Weibull modulus strength at room temperature for α - silicon. [8]
(OR)
- 6 a) Briefly discuss basic concept of Nanocrystalline SiC. [7]
b) Discuss data analysis of theoretical strength of nanomaterial. [8]

UNIT-IV

- 7 a) What is Photochromy? [7]
b) What is Verwey Transition of nanoparticles? [8]



Code No: R194103N

R19

Set No. 4

(OR)

- 8 a) Briefly discuss on Luminescent glasses. [7]
b) Briefly discuss impurity states Electronic conduction. [8]

UNIT-V

- 9 a) How glass- metal nanocomposites are synthesized? [7]
b) What is dye doped gel glasses? [8]

(OR)

- 10 a) How does Metal – silica and metal oxide – silica nanocomposites are synthesized? [7]
b) How does GDLC films composites are synthesized? [8]

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