



B.E DEGREE EXAMINATIONS: APRIL 2015

(Regulation 2009)

Eighth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

ECE146: Nanotechnology

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The Schrodinger Equation is given by
 - a) $H\psi = E$
 - b) $H = E\psi$
 - c) $H\psi = E\psi$
 - d) $H\psi^2 = E\psi$
2. The pair Potential works best in
 - a) Noble Gases
 - b) Noble Gas Solids
 - c) Noble Solids
 - d) Noble Liquids
3. If C_{60} is doped with alkali atom it will become
 - a) Semiconductor
 - b) Insulator
 - c) Conductor
 - d) Magnetic material
4. The Strength of Carbon Nano tube is
 - a) 10 times that of Steel
 - b) 25 times that of Steel
 - c) 100 times that of Steel
 - d) 1000 times that of Steel
5. The wall thickness of Carbon nano tube is about
 - a) 0.55 n m
 - b) 0.34 n m
 - c) 0.45 n m
 - d) 0.43 n m
6. Inert Gas Condensation technique is used to synthesize
 - a) Nano Magnetic Particle
 - b) Nano metallic Particle
 - c) Nano Crystalline Particle
 - d) Nano Films Particle
7. When the sample is irradiated with X ray the Electron coming out will be
 - a) Only auger
 - b) Only Photo electrons
 - c) Auger & back Scattered
 - d) Auger and Photo electrons

- (ii) With respect to properties of the semiconducting Nano Particles explain Exciton, (7)
weak confinement , strong confinement, absorption edge ,photo fragmentation
and columbic explosion

(OR)

- b) (i) Describe with diagram experimental arrangement for synthesizing carbon (7)
nanotubes by laser evaporation.
(ii) Explain electrical and mechanical properties of carbon nanotubes (7)

23. a) Explain the steps in the formation of a quantum wire or quantum dot by electron
beam lithography

(OR)

- b) (i) Explain the methods to fabricate carbon nano tube (7)
(ii) Compare the three methods to synthesize nano particles (7)

24. a) (i) Elaborately discuss the X ray diffraction structure determination of a crystal (7)
(ii) Describe the Histogram of grain size in Nano crystalline Ti N determined from (7)
TEM micrograph

(OR)

- b) (i) Give explanatory note on constant height and constant current imaging mode of (7)
a scanning tunneling microscope
(ii) Explain the scanning mechanism for scanning tunneling microscope. (7)
Describe with figure the basic principle of operation of atomic force
microscope.

25. a) (i) Briefly explain with illustration the principle behind MEMS accelerometer used (7)
to activate airbags in automobiles
(ii) Describe Schematic representation of the elements of a molecular switch (7)

(OR)

- b) (i) Discuss the key operating principles and design criteria of optically coupled (7)
Nand gates
(ii) Discuss with an illustration a switchable catenane that changes its conformation (7)
when subjected to a voltage.
Explain the application of Carbon nano tube in Fuel cell.
