2010-2011
M. Tech. III SEMESTER EXAMINATION
(NANOTECHNOLOGY)
(NANOSENSORS AND NANODEVICES)
(AP-519)

Maximum Marks : 75 Duration : Three Hours

Note : Answer ALL questions.

1(a) What are the physical effects for transduction in nanotechnology enabled sensors? 7

(b) Distinguish between static and dynamic characteristics of sensor and describe dynamic characteristics in Zero order, I order and II order systems. 12

2 Explain the operation mechanism and sensing applications of the Conducting Polymer Transistor. Also discuss the Humidity sensor based on it. 19

3 What are immobilization techniques? Give the descriptions of DNA and Glucose biosensors. 18

OR

4(a) What is a biochip? Write down its working and applications. 6

(b) Draw and explain the simple circuits of OR, AND, NOT and NAND gates based on Carbon Nanotubes. 12

5 What do you understand by Resonant tunneling? Describe the construction, working and applications of a Single Electron Transistor (SET). 19
2010-2011
M. Tech. III SEMESTER EXAMINATION
(NANOTECHNOLOGY)
(CARBON NANOTUBE AND ITS FUNCTIONALIZATION)
(AP-520)

Maximum Marks : 75

Note : Answer ALL questions.

1. What are the various methods for the preparation of single wall carbon nanotubes (SWCNTs) and multi wall carbon nanotubes (MWCNTs)? Describe the details of any two methods with their limitations.

2. Describe the electrical, optical, mechanical, and vibrational properties of carbon nanotubes.

OR

Why are CNTs more important than other materials? Give the detailed applications of CNTs in fuel cells and display devices.

3. Explain covalent and non-covalent functionalization of CNTs. Describe functionalization of nanotube ends and defects.

4. What do you understand by sidewalls functionalization of CNTs? Explain (i) Fluorination and (ii) Addition of carbenes and nitrenes sidewalls functionalization.

OR

What is Fullerene? Discuss the method of preparation and its applications.
2010-2011
M.TECH. III SEMESTER EXAMINATION
(NANOTECHNOLOGY)
Nanoentrepreneurship
(AP-521) OE-III

Max Marks: 75 Time: Three Hours

Answer any four questions. All questions carry equal marks.

1) (a) Discuss the important business related laws that exist in India.

(b) What is a demat account? What are its advantages?

(c) What are mutual funds? For what type of people are they suited?

(d) Explain the concept of Corporate Social Responsibility and give arguments both in its favour and against it.

2) (a) Compare the cooperative model of doing business with the company model. For what type of business is each one suited?

(b) What is a franchise? What are its advantages and disadvantages?

(c) Why did the idea of independent company directors arise? What new developments have taken place in this area?

(d) What type of work do business consultants perform. What is the scope for nanotechnologists in this area?

3) (a) What is meant by AGM? What type of activities are held in an AGM?

(b) What type of information do business reports contain? Why are they highly expensive?
(c) Human history can be looked upon as the story of the introduction of new materials. The oldest material was stone and the newest are nanomaterials. Discuss some of the materials that arose in between these two.

(d) Discuss five nanotechnology based products that have hit the market anywhere in the world during 2010.

4) (a) "During a gold rush the price of digging equipment always goes up". Discuss the relevance of this statement in reference to nanotechnology.

(b) Compare the future wave of nanotechnology business with the big wave of information technology business of the last twenty years. What lessons can be learnt?

(c) What have been the roles of Sabir Bhatia and Anita Goyal in nanotechnology business?

(d) What are the major catalogs on internet of nanotechnology products. Discuss the types of information they contain.

5) (a) Discuss a few nanotechnology ventures that are operating in the National Capital Region.

(b) Who was Richard Smalley? What lessons can nanotechnology entrepreneurs learn from his life?

(c) Write a note on nanotechnology as a genuine business versus nano as an empty slogan.

(d) Write a note on the most prominent business family since the time that modern business started in India.