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10NT36

**Third Semester B.E. Degree Examination, Dec.2014/Jan.2015**  
**Applications of Nanotechnology in Science and Engineering**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1 a. What are Photovoltaics? Mention the main drawbacks of a conventional photo voltaic cell. (04 Marks)
- b. What are Tandem cells? Explain the construction and working of a Tandem cell. (06 Marks)
- c. Explain briefly about the components of a SOFC. (06 Marks)
- d. What is 'biomimetics'? How biomimetic is used in production of energy? (04 Marks)
- 2 a. Write a note on applications of nano technology in animal production and health care. (10 Marks)
- b. What is Nanobarcode technology? Mention its applications. (07 Marks)
- c. Write a short note on nanoscale carriers. (03 Marks)
- 3 a. Explain briefly about the specific space program benefits with nanotechnology. (10 Marks)
- b. Write a note on 'Jovian Balloon'. (03 Marks)
- c. How nanotechnology assist the future space station? (07 Marks)
- 4 a. What is desalination? Explain the desalination using nano filtration. (07 Marks)
- b. Write a note on i) protein - polymer bio - mimetic membrane ii) aligned CNT membrane and iii) thin film nano composite membrane. (03 Marks)
- c. Explain briefly about nano oligodynamic metallic particles. (10 Marks)

**PART - B**

- 5 a. How nano technology assisted the improvements in antibacterial and antistatic properties of textiles? (10 Marks)
- b. Write a brief note on nano technology research efforts towards textile industry. (06 Marks)
- c. Explain about the different coating methods to fabrics. (04 Marks)
- 6 a. Write a note on nano technology assisted 'smart helmets' for soldiers. (10 Marks)
- b. Explain about the applications of nano technology for military operations at sea. (06 Marks)
- c. What are the applications of nano technology in aeronautics? (04 Marks)
- 7 a. What are Quantum dots? Explain the properties and applications of quantum dots. (10 Marks)
- b. What are single electron devices? Write a note on single electron transistors. (06 Marks)
- c. Write a short note on molecular nano electronics. (04 Marks)
- 8 a. Explain about the nano assembly technology and nano coating technology in mechanical manufacturing. (06 Marks)
- b. What are the advantages of nano technology in manufacture engineering? (04 Marks)
- c. Explain about the merits and demerits of construction assisted by nano technology. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.