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Sixth Semester B.E. Degree Examination, June/July 2016
Nanoelectronics and Devices

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. State and explain Moore's law. Write a note on silicon electronics and its limitations. (10 Marks)
- b. Discuss the International Technology Roadmap for semiconductors. (06 Marks)
- c. Write a short note on nanocomputing. (04 Marks)
- 2 a. Derive an expression for tunneling probability for a particle tunneling through a potential Barrier. (12 Marks)
- b. Explain the potential Energy profiles for material interfaces taking metal insulator and metal semiconductor junctions. (08 Marks)
- 3 a. What is coulomb Blockade? Explain the Tunnel Junction Excited by a current source. (10 Marks)
- b. Write a note on Transport of spin and spintronics Devices and its applications. (10 Marks)
- 4 a. Write a short note on atomistic view of electrical resistance. (06 Marks)
- b. Discuss the coherent transport and Non-coherent transport in molecular electronics devices. (10 Marks)
- c. Write and explain schrodinger equation. (04 Marks)

PART – B

- 5 a. Write a brief note on Monte Carlo method. (10 Marks)
- b. What is ab initio method? Write a note on multiscale modeling. (10 Marks)
- 6 a. Derive expression for dynamic characteristics of First and second order sensors. (10 Marks)
- b. Write a short note on following physical effects : (10 Marks)
 - i) Hall effect
 - ii) Barkhausen effect
 - iii) Doppler effect
 - iv) Faraday – Henry law effect
- 7 a. Write a note on medically significant measurand and the functional specifications of Medical sensors. (10 Marks)
- b. Write short notes on flow sensors and volume sensors. (10 Marks)
- 8 a. Write short notes on following : (10 Marks)
 - i) Temperature sensors
 - ii) Chemical sensors.
- b. Explain briefly about optical and radiation sensors and gas sensor. (10 Marks)