

USN

--	--	--	--	--	--	--	--	--	--

10NT46

Fourth Semester B.E. Degree Examination, June/July 2015
Introduction to Nanoelectronics

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1
 - a. Write a brief note on quantum electronic devices. (08 Marks)
 - b. Explain split – gate transistor, with neat sketch. (06 Marks)
 - c. Discuss the quantum dot array in detail. (06 Marks)
- 2
 - a. Explain tunnel junction and add a note on applications of tunneling. (08 Marks)
 - b. Write a short note on tunneling through potential barrier. (06 Marks)
 - c. Discuss Coulomb blockade in detail. (06 Marks)
- 3
 - a. Explain the principle of single electron transistor, with neat diagram. Mention its applications. (08 Marks)
 - b. Explain SET circuit designing and applications. (12 Marks)
- 4
 - a. What are grapheme transistors? Explain. (07 Marks)
 - b. Define Fin FET. Explain construction of Fin FET in detail. Add a note on SG and IG Fin FETS. (07 Marks)
 - c. Give a note on fabrication of quantum dot FET. (06 Marks)

PART - B

- 5
 - a. What are CNTs? Explain the classification and structures of CNTs. (07 Marks)
 - b. Explain briefly about the applications of CNTs. (08 Marks)
 - c. Mention the characterization tools which can be used for characterization of CNT. Add a note on properties of CNT. (05 Marks)
- 6
 - a. Give a short note on single walled and multiwalled carbon nanotubes. (04 Marks)
 - b. Explain I-V characteristics of P – CNTFET and N – CNTFET. (08 Marks)
 - c. Write a note on CNTFET based digital and analog circuits. (08 Marks)
- 7
 - a. Explain tunneling diode with I – V characteristics. (08 Marks)
 - b. Give a note on three terminal resonant tunneling diode. (06 Marks)
 - c. Give a short note on memory applications and basic logic circuits based on RTDs. (06 Marks)
- 8
 - a. Write a note on computational methods. (04 Marks)
 - b. Explain Monte – Carlo method of computation. (08 Marks)
 - c. What is quantum computing? What are the advantages of quantum computing? Add a note on quantum bits. (08 Marks)

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.