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10NT46

Fourth Semester B.E. Degree Examination, June/July 2016
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. What are the advantages of quantum electronic devices over microelectronic devices? **(05 Marks)**

b. Explain Short channel MOS transistor and Split Gate Transistor. **(10 Marks)**

c. Briefly explain quantum dot array. **(05 Marks)**

2 a. What is Tunneling? What are its applications? **(03 Marks)**

b. Explain Tunneling through a potential barrier using Potential energy profile. **(06 Marks)**

c. What is Coulomb blocade? What are its conditions? **(04 Marks)**

d. Explain Coulomb blocade in nanocapacitors. **(07 Marks)**

3 a. Explain the principles of single electron transistor. **(08 Marks)**

b. Explain briefly SET circuit design. **(12 Marks)**

4 a. Write a note on grapheme transistor. **(08 Marks)**

b. Explain Nano wire FET. **(08 Marks)**

c. Explain briefly FinFETs. **(04 Marks)**

PART – B

5 a. What are Carbon nanotubes? Explain its properties. **(13 Marks)**

b. What are the applications of Carbon nanotubes? **(07 Marks)**

6 a. Write a note on CNTFET. Sketch its I-V characteristics. **(08 Marks)**

b. Explain the design of inverter using CNTFET. **(06 Marks)**

c. Briefly explain memory cell using CNTFET. **(06 Marks)**

7 a. Explain briefly tunneling diode. **(10 Marks)**

b. What are RTD based basic logic circuits and dynamic logic circuits? **(10 Marks)**

8 a. What are the different computational methods in nanoelectronics? **(06 Marks)**

b. Explain Modeling of nanodevices. **(06 Marks)**

c. What are the applications of nano devices? **(08 Marks)**

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