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15NT81

## Eighth Semester B.E. Degree Examination, Feb./Mar. 2022 Nano-Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain quantum electronics. Write a note on upcoming electronic devices. (08 Marks)  
b. Write a note on short channel MOS transistor and electron – spin transistor. (08 Marks)

OR

- 2 a. Discuss principle of SET with the neat sketches. (10 Marks)  
b. Enumerate the applications of SET in modern electronic devices in detail. (06 Marks)

### Module-2

- 3 a. Write a note on applications of CNTs. (08 Marks)  
b. Explain Quantum dot FET with the neat sketch. (08 Marks)

OR

- 4 a. Write a note on Structure and properties CNTs. (06 Marks)  
b. With a neat sketch, explain graphene transistor. (10 Marks)

### Module-3

- 5 a. With a neat sketch, explain SWNT and mention their applications. (08 Marks)  
b. Explain memory cell using CNTFET. (08 Marks)

OR

- 6 a. Explain IV characteristics of P-CNTFET with sketch. (08 Marks)  
b. Discuss CNTFET based digital and analog circuits with neat sketch. (08 Marks)

### Module-4

- 7 a. With a neat sketch explain RTD. (08 Marks)  
b. Explain digital circuits based on the RTBT. (08 Marks)

OR

- 8 a. Discuss about three terminal resonant tunneling devices. (08 Marks)  
b. Explain digital circuit based on RTDs. (08 Marks)

### Module-5

- 9 a. Explain tunnel junctions and applications of tunneling in detail. (10 Marks)  
b. Discuss about coulomb blockade in detail. (06 Marks)

OR

- 10 a. Describe tunneling through potential barriers. (08 Marks)  
b. Write a note on hot electron effects in MOSFET. (08 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.