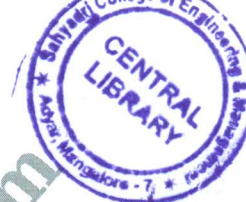


# CBCS SCHEME



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15EC551

## Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019 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. Define Nanotechnology. Mention its potential Applications. (08 Marks)  
b. State and Explain Moore's law for its continued miniaturization. (08 Marks)

OR

- 2 a. Write an elaborate note on Top-down and Bottom-up approach and compare them. (10 Marks)  
b. Explain briefly with simple schematic diagram, the principle of molecular beam epitaxy (MBE) for fabricating nanolayers. (06 Marks)

### Module-2

- 3 a. With diagram, explain the concept of Scanning Tunneling Microscope (STM) (10 Marks)  
b. Explain the Quantum Confinement in Semiconductor nanostructures. (06 Marks)

OR

- 4 a. Write an elaborate note on diffraction technique. (06 Marks)  
b. Discuss the concepts of Quantum wells, Quantum Dots and Quantum wires. (10 Marks)

### Module-3

- 5 a. What are the requirements of ideal semiconductor nanostructures. (08 Marks)  
b. Explain Lithographic process? What are its limitations? (08 Marks)

OR

- 6 a. Draw the schematic representation of the conduction band of a resonant tunnel diodes for (i) no voltage applied (ii) increasing applied voltage. (08 Marks)  
b. Write a note on (i) Cleaved edge over growth (ii) Growth on Vicinal substrate. (08 Marks)

### Module-4

- 7 a. What are Carbon Nano Tubes (CNTs)? Also explain various forms of CNTs. (10 Marks)  
b. Mention the various applications of CNTs. (06 Marks)

OR

- 8 a. Explain the wrapping arrangement in Carbon nanotubes and its effect on electronic properties. (08 Marks)  
b. Write an elaborate note on Coulomb blockade device. (08 Marks)

### Module-5

- 9 a. What are Nanosensors? What are its requirements? (08 Marks)  
b. With Schematic representations, explain self assembly. (08 Marks)

OR

- 10 a. Explain the working principle of Injection lasers and its applications. (10 Marks)  
b. Describe briefly electrochemical sensors with an example. (06 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.