

**B.Tech. – VIEP – ELECTRONICS AND  
COMMUNICATION ENGINEERING (BTECVI)**

**Term-End Examination**

00449

**December, 2017**

**BIELE-007 : NANO-ELECTRONICS**

*Time : 3 hours*

*Maximum Marks : 70*

---

**Note :** *Attempt any seven questions. All questions carry equal marks. Assume missing data, if any, suitably.*

---

---

1. Explain the following terms :  $4 \times 2 \frac{1}{2} = 10$
- (a) Threshold voltage
  - (b) Lithography
  - (c) Tunnelling effect
  - (d) Hot electronic effect
2. (a) Explain the concept of quantum wire, quantum well and quantum dot. 6
- (b) Draw and discuss the symmetric structure of a single electronic transistor. 4

3. What is meant by spin based devices ? Discuss the characteristics of SpinFET. 10
4. Explain the working of CNFET and discuss the characteristics. 10
5. (a) Draw the energy band structure of a p-n diode and explain.
- (b) Explain a Coulomb Blockade. 5+5
6. What is a strained silicon device ? Discuss its characteristics. 10
7. Discuss the structure of multiple gate MOSFET and its operation. 10
8. Explain the working of type-I, type-II and type-III heterojunction devices and state their uses. 10
9. (a) Discuss the merits of novel MOS based devices.
- (b) What is Silicon-On-Nothing ? 5+5
10. Explain the electronic transport phenomenon in quantum dots. 10
-