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**BIELE-007**

00401

# B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

## Term-End Examination

## December, 2013

## BIELE-007 : NANO - ELECTRONICS

*Time : 3 hours* *Maximum Marks : 70*

*Note : (i) Attempt **any seven** questions.*

*(ii) All questions carry **equal** marks.*

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**1.** (a) What are the methods available for oxide layer formation ?

(b) How do we measure the oxide layer thickness in VLSI technology ? **2x5=10**

**2.** (a) Describe the following terms in detail-Velocity saturation.

(b) Hot electron effects. **2x5=10**

**3.** What is Fin FET technology ? How a Fin FET transistor design is inspired by the thin-body MOSFET technology ? **10**

**4.** What is silicon-on-nothing proces in nano technology? Explain the structure of double gate transistor using silicon-on-nothing process. **10**

**5.** Explain the term quantum heterostructure, and discuss the example of quantum heterostructure confining the carrier in quasi-two dimension i.e. 'quantum wells'. **10**

6. Explain coulomb blockade effects and discuss the coulomb blockade in a tunnel junction with neat sketch. **10**

7. Explain the structure of resonant tunneling transistor with its high frequency performance in detail. **10**

8. Explain the chemical vapour deposition (CVD) technique to synthesize carbon nano tubes by catalytic growth process. **10**

9. What are the importance of carbon nanotubes based devices? Explain one of them in detail. **10**

10. (a) What is spin field-effect transistor (Spin FET) ?
    (b) Write a short note on Heterostructure based devices. **2x5=10**