

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

**Term-End Examination**

**December, 2012**

**BIELE-007 : NANO - ELECTRONICS**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Attempt **any seven** questions. All questions carry **equal** marks.*

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1. Discuss the challenges of MOS technology at nano scale and future scope. **10**
  
2. (a) Explain the short channel effect in MOSFET.  
(b) Explain the tunneling phenomenon through silicon dioxide at nano scale. **2x5=10**
  
3. (a) Discuss the impact of non - uniform dopant profile on poly - depletion effects. **2x5=10**  
(b) Compare the C-V curves of a thin oxide MOSFET of ideal and practical cases.
  
4. (a) What is Quantum - Mechanical effects ? **2x5=10**  
(b) What is hot electron effects ?

5. (a) Discuss the effect of drain electric field in a bulk and double gate MOSFET.  $2 \times 5 = 10$   
(b) Discuss the limitation of MOS technology.
6. Describe the electrical characteristics of SOI MOSFET :  $3+3+4=10$   
(a) Threshold voltage  
(b) Body effect  
(c) Output characteristics and transconductance
7. Describe and classify the quantum structures and also discuss its properties. 10
8. (a) Discuss the energy band diagram of Type I and Type - II heterojunctions.  $2 \times 5 = 10$   
(b) Discuss the effect of resonant tunnelling in a p-n junction diode.
9. Describe the characteristics of carbon nano field effect transistor and its applications. 10
10. Discuss the structure of spin polarized FET and its possible I-V characteristics. 10
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