Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April / May – 2017**

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| **Code :** | **14EC3023** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SOLID STATE DEVICE MODELING AND SIMULATION** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Explain the behavior of MOS capacitor in all the regions when an external voltage is applied. | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | What is the operating region of this MOSFET at the following bias conditions, and what is the drain current?  Assume the body potential is 0.  VDS =0.5V, VGS = 3.0V,Threshold voltage =0.52V. Silicon dioxide and silicon permittivity are єox =3.9 x 8.9x10-14 F/cm and єsi = 11.7x8.9x10-14 F/cm. µn =500 cm2/V. sec. The gate length is 0.5 µm. The oxide thickness Tox = 20nm. The device width is 20µm. | CO2 | 10 |
| b. | Discuss the defects incorporated into the oxide during oxide growth. | CO1 | 10 |
| 3. |  | Derive an expression for threshold voltage for a uniformly doped substrate MOSFET. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | Explain the simple charge control model and Meyer model for MOSFET. | CO1 | 20 |
| 5. |  | Discuss the modeling of nonlinearities in CMOS devices. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | How will you model NQS effect for RF applications? | CO1 | 10 |
|  | b. | How will you model Flicker noise in a MOSFETs? | CO1 | 10 |
| 7. |  | Discuss the gate dielectric model, and channel charge model in detail. | CO2 | 20 |
| (OR) | | | | |
| 8. |  | Discuss the model for effective dc and ac channel length and width of the device and threshold voltage model for Nonuniform Lateral Doping due to Pocket (Halo) Implant . | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Explain the intrinsic capacitance model of a MOSFET (***capMod***= *0 )* in detail. | CO2 | 20 |