R09

Code No: C5707

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech I Semester Examinations March/April-2011
DEVICE MODELING
(VLSI SYSTEM DESIGN)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks
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1. Write and explain in detail about Boltzman Transport Equation in 1-D and 3-D forms. [12]

2.a) Briefly explain general form of the continuity equation.
b) Explain about forward beta parameter extraction. [12]

3.a) Describe in detail the modeling of a bipolar transistor using the Gummel-Poon model as implemented in the simulator SPICE.
b) Briefly explain about Small-signal model of Junction Diode. [12]

4.a) Derive the Threshold voltage for NMOS Enhancement transistor.
b) Explain the operation of NMOS Enhancement transistor. [12]

5.a) Derive the design equations for MOS devices.
b) With neat diagrams explain p-well CMOS process steps. [12]

6. Explain different fabrication process of CMOS transistor. [12]

7.a) Explain the Operating Principles of HBT.
b) Explain about Band Gap Engineering. [12]

8. Write short notes on any **TWO** of the following:
(i). Modified current continuity equation
(ii). An overview of Wafer fabrication
(iii). Integrated Passive Devices. [12]

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