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Question Paper Code : 14121

M.E. DEGREE EXAMINATION, JANUARY 2015.

First Semester

VLSI Design

VL 7103 — SOLID STATE DEVICE MODELING AND SIMULATION

(Common to M.E. Applied Electronics)

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the equivalent circuit representation of MOS Transistor?
2. What are the factors to be considered for developing a MOSFET model for deep submicron RF applications?
3. What is the importance of device modelling?
4. How Newton-Raphson technique better in terms of convergence?
5. What are the advantages of multistep method?
6. What is the function of circuit simulator?
7. Write the drift-diffusion equation and mention its significance?
8. What is meant by grid generation?
9. List out the simulation software's used for computation of characteristics?
10. What are the advantages of small-signal analysis?

PART B — (5 × 16 = 80 marks)

11. (a) Explain unified MOSFET C-V Model with necessary analytical expressions. (16)

Or

- (b) Explain in detail about the high frequency behaviour of MOS Transistor. (16)

12. (a) Discuss the prime importance of circuit and device simulations in VLSI. (16)

Or

(b) Explain the solution of nonlinear network using Newton-Raphson technique. (16)

13. (a) Explain how stiff equations are solved by multistep methods. (16)

Or

(b) Explain in detail about general purpose circuit simulator. (16)

14. (a) Explain Poisson equation. Explain the finite difference method for solving Poisson equations. (16)

Or

(b) Discuss the methods used for solving hydrodynamic equations in two dimensional space. (16)

15. (a) Describe the simulation steps for obtaining the characteristics of MOS capacitor. (16)

Or

(b) Discuss the small signal model for MOSFET device. How it is useful for characteristics computation. (16)