Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B.Tech.

Mid Semester Examination (Spring, 2023)

Branch : ECE **Semester** : VIth

Title of the Course : Basics of VLSI **Course Code** : ECB 351

Time: 1 Hour 30 Minutes **Maximum Marks: 25**

Note: *All questions are compulsory.*

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Understand MOS transistor theory, its circuit models and short channel effects	**Remembering** (Level I) **Understanding** (Level II)
CO2	Calculate Noise Margins & Propagation Delay of CMOS Inverter and analyse the combinational CMOS circuit for speed, power & area	**Applying** (Level III) **Analyzing** (Level IV)
CO3	Implement combinational & sequential CMOS circuit with various topologies like domino logic, PTL, etc.	**Creating** (Level VI)
CO4	Evaluating memories with efficient architectures to improve access times, power consumption	**Evaluating** (Level V)

Course Outcomes(CO's)	CO1	CO2
Questions No.	Q1, Q2, Q3	Q4, Q5

Answer the following questions.

Q1. Explain the structure and operation of a MOSFET and justify its input and output characteristics. **[5 Marks]**

Q2. Write short notes on: **[5 Marks]**
a. Body bias effect
b. Impact Ionization

Q3. Draw and explain the variation of the distributed (gate-to-channel) oxide capacitances as a function of gate to source voltage. **[5 Marks]**

Q4. Draw the circuit of a CMOS inverter and explain the VTC of the static CMOS inverter. **[5 Marks]**

Q5. Derive the expression for the dynamic power dissipation of the CMOS. **[5 Marks]**