

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E-IIIrd SEMESTER-EXAMINATION – MAY- 2012****Subject code: 732902****Date: 10/05/2012****Subject Name: VLSI Circuits and Design****Time: 10:30 am – 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Notations/ symbols used have usual meanings.

- Q.1** (a) Draw the VLSI design flow in terms of Y –chart and explain it in detail. **04**
 (b) Discuss different criteria for VLSI testing. **04**
 (c) Explain the following process for VLSI fabrication with sketches: (i) oxidation (ii) Photo-lithography. **06**
- Q.2** (a) Discuss MOSFET capacitances in details. **07**
 (b) Derive an equation for saturated drain current considering channel length modulation for MOS transistor. **07**
- OR**
- (b) What do you meant by MOSFET scaling? Discuss constant-field scaling and constant voltage scaling? **07**
- Q.3** (a) Explain the design of (i) CMOS NOT gate (ii) Two –input NAND gate. **08**
 (b) Enlist various design parameters that are used to design a CMOS OPAMP circuit. **06**
- OR**
- Q.3** (a) Realize the optimized CMOS logic circuit for **08**
 (i) $Y = \overline{AB} + A\overline{B}$ and (ii) $Y = AB + CD$.
 (b) Discuss the single –stage CMOS amplifier. **06**
- Q.4** (a) Compare CMOS and BJTs for various aspects. **07**
 (b) Implement a two – input NAND logic using BiCMOS. **07**
- OR**
- Q.4** (a) Draw the BiCMOS device structure and explain fabrication of same. State disadvantage(s) of BiCMOS **07**
 (b) Write short note on: FPGA. **07**
- Q.5** (a) Enlist op-amp's two structures and state its application. Stare design parameters of a CMOS op-amp amplifier and list its various building blocks. **07**
 (b) Design OR / NOR gate using Complementary Pass Transistor Logic. **07**
- OR**
- Q.5** (a) Give comparison for **07**
 (i) RAM –ROM (Memory)
 (ii) Gate array design –Standard cell based design.
 (b) Describe NORA CMOS logic. Why it is not very popular? **07**
