**Unit I**

**Short answer Type Questions**

1. Explain with a neat sketch formation of N-Channel Enhancement MOSFET? With it V-I Characteristics?
2. Define the threshold voltage of a MOS device and explain its significance?
3. Define the Body Effect give its expression? How does it influence the threshold voltage of a MOS Transistor?
4. Define threshold voltage of MOSFET gives its expression?
5. Define the Sub-Threshold conduction of MOSFET give its expression?
6. Explain the operation of BiCMOS inverter
7. Give the expression of Tranconductance gm?
8. Define the figure of merit?

**Long answer Type Questions**

1. Derive the equation for Ids in Saturation and Non Saturation regions
2. Explain the Fabrication process of NMOS,CMOS and BiCMOS
3. Draw and explain the voltage transfer characteristics of CMOS Inverter? Give its region of operation?
4. Define and Explain the Channel length Modulation of MOSFET derive its expression?
5. Define the Rise time and Fall time of inverter and write the expressions for the same?
6. Derive the ratio for NMoS inverter driven with another inverter Z pu and Z dn as 4:1 or 8:1?

**Unit II**

**Short answer Type Questions**

1. Define the sheet resistance and gives its expression?
2. Draw the transmission gate structure for 2:1 Multiplexer?
3. Define the types of design rules with an example?
4. Draw the Stick and Layout diagram of an inverter?
5. Calculate the gate capacitance value of 2 µm technology with relative in minimum sized transistor with gate to channel capacitance value of 8 x 10-4 pF /µm2
6. Calculate the ON resistance from vdd to gnd for the given inverter circuit show in figure if Rsp =2.5X10^4 , Rsn=10^4

**Long answer Type Questions**

1. Discuss about lamda-based design rules and draw the layout for NAND or NOR CMOS gate
2. Define the Rise time and Fall time of inverter and write the expressions for the same?
3. For 5 µm technology Calculate the total area of capacitance CT for multilayer is shown in figure. Find the CP, Cm, Cg? Given data capacitance across Metal1 to substrate 0.075 pF x 10-4/µm2,Polysilicon to substrate 0.1 pF x 10-4/µm2, Gate capacitance Value 1 Cg



1. Write a short notes on (a) Sheet Resistance (b)Area Capacitance (c) delay model

**Unit III**

**Short answer Type Questions**

1. Draw a 1T-DRAM and 3T-DRAM cell?
2. Draw the architecture of carry skip adder?
3. Define the types of design rules with an example?
4. Draw the D-Flip-Flop using transmission gates?
5. Draw the NOR-based ROM design or NAND – based ROM design?
6. Draw a Content Addressable Memory (CAM) cell? Give its properties

**Long answer Type Questions**

1. Explain the operation read and write of the 6T- SRAM ?
2. Explain the following shifter? (a) Crossbar switch (b)4 –bit Barrel Shifter?
3. Explain the implantation of Manchester chain adder and carry select adder?
4. Write a short notes on (a) Sheet Resistance (b)Area Capacitance (c) Delay
5. Explain the operation of Multipliers booth or baugh-woolley?

**Unit IV**

**Short answer Type Questions**

1. Define the terms of Controllability and Observability?
2. What is ATPG?
3. Compare the Functionality test and Manufacturing Test?
4. How layouts can be designed for improved testability?

**Long answer Type Questions**

1. What is the need of testing and explain the two categories of testing?
2. Explain the scan based test Techniques?
3. What are the different levels of testing? What is the manufacturing of chip?

**Unit V**

**Short answer Type Questions**

1. Explain with a neat sketch formation of N-Channel Enhancement MOSFET? With it V-I Characteristics?
2. Draw the MOSFET equivalent circuit and give its gain equation?
3. Define the Body Effect give its expression? How does it influence the threshold voltage of a MOS Transistor?
4. Define threshold voltage of MOSFET gives its expression?
5. Define the Sub-Threshold conduction of MOSFET give its expression?
6. Define the characteristics of common source amplifier?

**Long answer Type Questions**

1. Draw the small signal model for Common Source Amplifier with current mirror and Explain with its characteristics?
2. Draw and Explain the Source degeneration and Cascode amplifier with Current Mirror?
3. Draw and Explain the Wilson Current Mirror?