Total No. of Questions : 8]

SEAT No. :

P4010

[Total No. of Pages : 2

[5155] - 258
M.E. (E & T/C) (VLSI & Embedded Systems)
DIGITAL CMOS DESIGN
(2013 Pattern)

Time : 3 Hour] *[Max. Marks : 50*

Instructions to the candidates :

1) ***Answer any five questions.***
2) ***Assume suitable data, if necessary.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Use of non programmable pocket calculator is allowed.***

Q1) a) Explore various wiring parasitics in detail. What are its effects on performance of the circuit? How to take care of them? **[5]**

b) What is SPICE? Explore SPICE model for enhancement type MOFET device in detail. **[5]**

Q2) a) Starting with derivation for power dissipation, explain its relation with the propagation delay of CMOS circuit. **[5]**

b) Explore cross talk & causes of it. What are solutions while design? **[5]**

Q3) a) Starting with different operating regions of MOSFET, explore equivalent circuits along with parasitics. **[4]**

b) Draw layout view & cross section of CMOS Inverter. Mention dimensions. **[4]**

c) Write note on interconnects. **[2]**

Q4) a) What is need of logical efforts? What are the techniques involved? How does it lead to optimization of CMOS circuit? **[4]**

b) Explain the delay estimation techniques in detail. Give suitable example. **[4]**

c) What are the advantages of transistor sizing? **[2]**

P.T.O.

Q5) a) With the help of Voltage Transfer Characteristics of CMOS Inverter, explain overall threshold & cares to be taken for symmetry. **[4]**

b) Design D flip flop using transmission gates. What are limitations? **[4]**

c) What is meant by active area on chip? Give example. **[2]**

Q6) a) Draw FSM diagram for coffee vending machine. Write HDL code. **[4]**

b) Design CMOS logic for F = A + BCD. Compare with other methods with respect to area on chip. **[4]**

c) Write note on metastability. **[2]**

Q7) a) Explore dynamic circuits in detail. **[4]**

b) What is need of NORA logic? Explain operation of such typical logic. **[4]**

c) What is effect of lowering threshold voltage of MOSFET on speed? Explain. **[2]**

Q8) a) Explore high speed design techniques in detail. **[4]**

b) What is necessity of sense amplifier circuit? With the help of diagram, explain the operation of such typical circuit. **[4]**

c) Write note on static CMOS. **[2]**

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