Total No. of Questions : 8] **SEAT No. :**

P4830 **[Total No. of Pages : 2**

[5060] - 735
M.E. (E & TC) (VLSI & Embedded Systems)
DIGITAL CMOS DESIGN
(2013 Pattern)

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

Instructions to the candidates :-

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

Q1) a) With the help of cross sectional view & equivalent circuit of MOSFET, explain various parasitic capacitances involved. Compare these capacitances for different operating regions of MOSFET. **[5]**

b) What is meant by technology? What is current technology? List layout design rules in detail. **[5]**

Q2) a) Along with the suitable example, explain RC delay model. How is it helpful to designer? **[5]**

b) What is significance of static & short circuit power dissipation? How to minimize them? **[5]**

Q3) a) Explore CMOS fabrication process in detail. **[4]**

b) Explain technology scaling & its types along with suitable examples. **[4]**

c) What is lambda parameter? Mention utility. **[2]**

Q4) a) Derive the expression for power delay product. What is its significance in design? What is its relation with fan out? **[4]**

b) Explore the methodology involved in logical efforts. Give suitable example. **[4]**

c) Write note on propagation delay. **[2]**

P.T.O.

Q5) a) Design CMOS logic for Y = ABC + DEFGH & calculate active area on chip. **[4]**

b) Draw a typical logic circuit susceptible to hazards. Explain the causes of hazards & explain along with timing diagram in detail. **[4]**

c) What is pass transistor logic? **[2]**

Q6) a) What are merits of Transmission Gate (TG)? Design one bit latch using TGs. Compare with conventional method. **[4]**

b) Draw FSM diagram for 1011 Mealy sequence detector & write HDL code for it. How to make this circuit immune to metastability? **[4]**

c) Compare CMOS NAND & NOR in detail. **[2]**

Q7) a) Explain cascode voltage switch logic with appropriate example. **[4]**

b) What is need of domino logic? Explore in detail. **[4]**

c) What are merits of BiCMOS circuit? Give example. **[2]**

Q8) a) List the low power design techniques. Explore any one in detail. **[4]**

b) What materials are being used for improvement of performance? Explain in brief. **[4]**

c) Write note on comparison of logic families. **[2]**

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