

Total No. of Questions : 8]

SEAT No. :

P4299

[Total No. of Pages : 2

[5255]-1054

M. E. (E & TC) (VLSI & Embedded Systems)

DIGITAL CMOS DESIGN

(2017 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 nonprogrammable calculator is allowed.

- Q1)** a) What is technology scaling? Explain the types & effects in detail. [5]
b) Explain any one type of CMOS fabrication process in detail. [5]
- Q2)** a) Derive the expressions for static & dynamic power dissipations in CMOS logic. Compare these dissipations. [5]
b) Explore delay estimation techniques in detail. [5]
- Q3)** a) Draw ac equivalent ckt of MOSFET & explain various performance parameters. [4]
b) Explain various resistances & capacitances pertaining to MOSFET & wire interconnect that are involved in layout. [4]
c) Draw layout cross section diagram of CMOS Inverter and mention the dimensions. [2]
- Q4)** a) Certain logic has load of 10 pF, supply voltage of 1 Volt & operates at 1GHz. Calculate total dissipation if number of MOSFETs is 100 & leakage current per MOSFET is 1 pA. Calculate power delay product for this logic if propagation delay is 10ps. [4]
b) What is cross talk? What are the sources & solutions? [4]
c) Write note on fan in & fan out. [2]

P.T.O.

- Q5)** a) Design CMOS logic for $Y=ABC + D + EF$. Calculate active area. Assume technology of 90 nm. [4]
b) Draw a flip flop using Transmission Gates (TG) & its timing diagram.[4]
c) Explain the concept of tristate logic? [2]
- Q6)** a) Draw FSM diagram & write HDL code for 1110 Moore sequence detector.[4]
b) What are the sources of metastability? What are the solutions? Explore with example. [4]
c) What are the merits & demerits of Transmission Gates? [2]
- Q7)** a) With the help of schematic, explain the concept of ratioed ckts. [4]
b) Explore domino logic in detail. [4]
c) Write note on materials for performance improvement. [2]
- Q8)** a) Explain dynamic ckts. [4]
b) What are the methodologies for high speed design? Explain any one of them. [4]
c) What is need of BiCMOS? Explain in brief. [2]

