

Total No. of Questions : 8]

SEAT No. :

P3832

[Total No. of Pages : 2

[4760] - 279

M.E. (E & T/C) (VLSI & Embedded Systems)

ANALOG AND DIGITAL CMOS IC DESIGN

(2008 Pattern)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answer any three questions from each section.*
- 2) *Answer to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn whenever necessary.*
- 4) *Use of electronics calculator is allowed.*
- 5) *Assume suitable data if necessary.*

SECTION - I

- Q1)** a) Where and how MOSFET is used as diode/active resistor? [8]
b) Use self biased high swing cascade current sink configuration to design a current sink of $250\mu\text{A}$ and a V_{\min} of 0.5V. Assume suitable data. [8]
- Q2)** a) Explain in detail the concept of BGR with its necessity. [8]
b) On which principle Current mirrors are based? Explain in short non-ideal effect of current mirrors. What is use of Current mirror? [8]
- Q3)** a) What is design technique for low noise Op-amp? Explain with the help of necessary expression. [8]
b) Sketch an equivalent model of MOSFET. Explain how to use it as switch. Give the expression for drain current and ON resistance. [8]
- Q4)** Write Short Notes on any Three : [18]
a) Current and Voltage references
b) Current amplifiers
c) Micropower Op-amp
d) Current Sink and Source

P.T.O.

SECTION - II

- Q5)** a) Explain CMOS NORA logic dynamic digital topology in detail. [8]
b) Explain metastability problem in digital design. How designers can avoid it? [8]
- Q6)** a) What is λ parameter? Explain CMOS layout rules. [8]
b) Design a Lift controller for 4 floor building. Assume standard specifications. Draw the minimized state diagram. [8]
- Q7)** a) What is transmission gate? State its advantages and disadvantages for realizations of logical functions. Realize 4:1 Multiplexer using Transmission Gate. [8]
b) Define PDP and EDP. Derive the expressions for static and dynamic dissipations. [8]
- Q8)** Write short notes on any Three : [18]
a) Domino Logic.
b) Technology Scaling and its effects.
c) Stick Diagram and CMOS Layout
d) Sources and elimination techniques of hazards.
e) MOSFET Models.

