JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II - SEMESTER EXAMINATIONS, APRIL/MAY-2012
CMOS ANALOG AND MIXED SIGNAL DESIGN
(DIGITAL SYSTEMS AND COMPUTER ELECTRONICS)

Time: 3hours   Max. Marks: 60

Answer any five questions
All questions carry equal marks
- - -

1.a) Draw a standard cascode current sink circuit and explain its operation and output characteristics.

b) Calculate the temperature coefficient of the Threshold referenced circuit, where $\left(\dfrac{W}{L}\right)_1 = 20$, $V_{DD} = 5V$ and $R = 100k\Omega$. Assume the other required values. Resistor R is Polysilicon and has a temperature coefficient of 1500 ppm/^{0}C, $\alpha = 2.3 \times 10^{-3} V/^0C$.

2.a) Show that the sensitivity of the reference circuit shown in the figure is unity.

b) Draw a layout of current mirror circuit.

3.a) Draw a neat current sink inverter circuit and explain the operation.

b) If $W_1 = 2\mu m$, $L_1 = 1\mu m$, $W_2 = 1\mu m$, $L_2 = 1\mu m$, $V_{DD} = 5V$, $V_{GG1} = 3V$ for a CMOS current sink inverter circuit having two transistors M_1 and M_2. Calculate output-swing limits.

4. Draw the four feed back topologies and derive the expression for feedback factor and show the effect of feedback on voltage gain in all the 4 topologies.

5. Design an op-amp with ideal op-amp characteristics. Explain the steps, conditions and requirements to design an op-amp.

6.a) Explain the principle of Miller Compensation of two stage op-amp

b) How can we improve the performance of open-loop comparator?

7. Explain the function of switched capacitor voltage amplifier using the parallel resistor emulation.

8. Write a brief note on:
a) Mixed signal layout
b) ADC architecture (any one has to be discussed)

* * * * * *