

Code No: D0608

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
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

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- 1) a) Explain how layout techniques improve the matching in MOSFET mirrors?
b) Derive the expression for sensitivity of I_0 due to V_{dd} , temperature coefficient TC of I_0 . [12]
- 2) a) Draw the circuit of a Beta multiplier referred self biasing circuit and derive the expression for temperature coefficient.
b) Using the Beta multiplier current reference, design a $10\mu A$ current source. Estimate the temperature coefficient and assume $V_{dd} = -V_{ss} = 2.5v$. [12]
- 3) a) Explain two different types of gate drain connected load amplifiers.
b) Draw the circuit of a shunt-shunt feedback amplifier and explain its working along with parameter calculations. [12]
- 4) a) Explain the operation of a wide swing differential amplifier.
b) Design a two stage CMOS OPAMP with the following specifications $A_0=55000$, $GBW=1.2MHz$, $SR=2.5V/\mu sec$. [12]
- 5) a) Explain the design and analysis of a Tran conductance amplifier..
b) Draw the circuit for cross coupled pair differential amplifier with active loads and derive the expression for A_v . [12]
- 6) a) Explain dynamic comparator and dynamic biasing of current mirror circuits.
b) Find the device dimensions of the input stage for a 2-stage comparator to meet the following specifications. Input common Mode Range is 1.5 v to 9v, $V_{dd}=10v$, $V_{ss}= 0v$. [12]
- 7) a) Design a Zero temperature coefficient voltage Beta Multiplier reference at 300^0k with $V_{ss}= 0v$ and $V_{dd}=5v$. Determine the sensitivity for changing V_{dd} and Temperature T.
b) Explain the basic building blocks of a switched capacitor circuit. [12]
- 8) a) Design a bit current steering DAC using the generic current steering DAC. Assume that each current I is 5 mA and find the total output current for each input node.
b) Explain different characteristics Parameters of ADC and DACs. [12]
