

First Semester M-Tech Degree Examination November 2015

APJ Abdul Kalam Technological University

Eranakulam Cluster II

Branch: Electronics and Communication Engineering

Specialization: VLSI and Embedded Systems

05EC6001 CMOS ANALOG DESIGN

Time: Three Hours

Max Marks: 60

1. a) Draw the circuit diagram and obtain the output resistance of Cascode current mirror with the help of small signal model. What is its advantage compared to simple current mirror?
(5 Marks)
- b) With neat diagram, explain the various parasitic components in a MOS switch.
(5 Marks)
- c) What are the characteristics of ideal voltage reference?
(2 Marks)
2. a) Derive the expression for voltage gain, input impedance and output impedance of common gate amplifier.
(6 Marks)
- b) Derive the expression for voltage gain of current mirror loaded single ended output MOS differential amplifier and explain how the reduction in voltage gain with single ended output is compensated.
(6 Marks)
3. a) Draw the architecture of telescopic and folded cascode operational amplifier. Compare their gain.
(10 Marks)
- b) What is operational trans-conductance amplifier? Draw the schematic symbol and the circuit diagram of basic OTA. Obtain its gain and transconductance.
(8 Marks)
4. a) What is the significance of PSRR of an Op –Amp and how it can be optimized?
(10 marks)

b) What is operational trans-conductance amplifier? Draw the schematic symbol and the circuit diagram of basic OTA. Obtain its gain and transconductance.

(8 marks)

5. a) Derive the expression for voltage gain of a Common Source amplifier at high frequency.

(10 marks)

b) Explain frequency compensation technique in differential amplifiers.

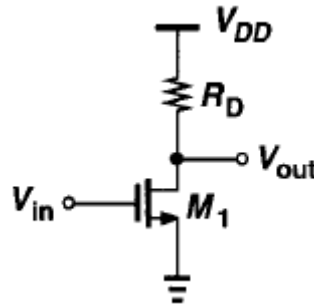
(12 marks)

6. a) For a MOS current source how does the f_c depend on the device dimension and bias current?

(4 Marks)

(b) Consider the common source amplifier shown in the figure. Use Miller theorem to obtain the frequencies of input pole and output pole. Draw its frequency response.

(6 Marks)



c) What is the significance of Noise-Bandwidth product in Op-Amps?

(6 marks)