

APJ Abdul Kalam Technological University

Ernakulam II Cluster

First Semester M.Tech Degree Examination December 2017

Duration: 3 Hours

05EC6001: CMOS ANALOG DESIGN

Max. Marks: 60

- 1) a) Derive the output impedance of MOS current source. (4 Marks)
b) Draw the circuit diagram and obtain the output resistance of modified Wilson current mirror with the help of small signal model. What is its advantage compared to simple current mirror? (8 Marks)
- 2) a) Derive the expression for voltage gain and input and output impedances of common source amplifier with degeneration resistor. (6 Marks)
b) Derive the input and output common mode ranges of a resistive loaded differential amplifier. (6 Marks)
- 3) a) Derive the expression for voltage gain of single stage current mirror loaded opamp. (10 Marks)
b) Enumerate different CMFB sensing techniques employed in opamps. (8 Marks)

OR

- 4) a) Compare telescopic and folded cascode configurations in terms of input and output common mode ranges and output impedances. (10 Marks)
b) What is the need for 'gain boosting' in operational amplifiers? Justify the answer with proper proof. (8 Marks)

- 5) a) Draw and explain the high frequency small signal model of MOSFET with the help of the constructional diagram. (6 Marks)
- b) What is reason for 'poles & zeros' in a circuit? What is the physical significance of 'zeros' in a circuit? (6 Marks)
- c) How thermal noise in MOSFET is represented? (6 Marks)

OR

- 6) a) Derive the expression for high frequency gain of common source amplifier. (14 Marks)
- b) Prove that noise source can be transformed from a drain source current to a gate series voltage. (4 Marks)