Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences, Manipal
Second Semester Master of Engineering - ME (VLSI Design Degree Examination - June 2022

Advanced VLSI Design [VLS 5201]

Marks: 100   **Duration: 180 mins.**

Monday, June 27, 2022

Answer all the questions.

1)	What are the different ways of fabricating capacitors in CMOS VLSI process? Compare each of them. (TLO 1.1)	(10)
2)	With diagram, explain a basic current mirror using MOSFETs, taking into account the channel length modulation. (TLO 2.1)	(10)
3)	Design a current sink to sink a current of 10µA. Estimate the minimum voltage across the current sink and the output resistance. [Data: V_{DD} = +5V, V_{SS} = 0V, L = 5µm, V_{GS} = 1.2V, V_{th} = 0.83V, lambda = 0.06/V, K_n = 50µA/V^2] (TLO 2.1)	(10)
4)	With the help of a schematic diagram and a small-signal equivalent circuit, obtain the expression for the small-signal incremental voltage gain, A_v of a CMOS Common-Source amplifier with passive resistor load. (TLO 3.1)	(10)
5)	With the help of a small-signal equivalent circuit, obtain the expression for A_v of a CMOS Common-Gate amplifier with passive resistor load. Assume finite output impedance r_0 and signal source impedance R_s. (TLO 3.1)	(10)
6)	Draw a neat schematic and explain the Thermal Voltage Referenced Self-Biasing circuit. (TLO 2.2)	(10)
7)	What is Common Mode Range (CMR) of a differential amplifier? Explain, with diagram, how do you measure it? (TLO 4.1)	(10)
8)	What are the advantages of *switched-capacitor* circuits? With the help of a simple diagram, explain a switched-capacitor resistor circuit. (TLO 5.2)	(10)
9)	With neat diagrams, explain Analog Multiplying Circuit using Squaring Circuit. (TLO 5.1)	(10)
10)	With the help of neat diagrams, explain the working of Cyclic DAC and Pipeline DAC. (TLO 6.2)	(10)

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