Total No. of Questions : 8]

SEAT No. :

P3763

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[4960] - 1256

M.E. (E & TC) (VLSI & Embedded Systems)

Analog CMOS DESIGN

(2013Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Answer any five questions.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Explain with suitable diagrams N-channel transistor as a switch. **[5]**

b) With the help of suitable schematic & necessary expressions, explain current source inverter. **[5]**

Q2) a) Explain current & voltage references with neat circuit diagram. Derive the expression for reference voltage. **[5]**

b) What are the different types of inverting CMOS amplifier. Explain Push-Pull inverter with neat circuit diagram. **[5]**

Q3) a) What are the advantages of cascode amplifier over the inverting amplifier. Explain simple cascode amplifier with neat circuit diagram. **[4]**

b) Carry out small signal analysis of CMOS differential amplifier & find out r_{out}, A_v, CMRR and V_{out}. **[4]**

c) What is the role of slew rate and noise in CMOS differential amplifier. **[2]**

Q4) a) Explain Class A Amplifier with suitable circuit diagram & waveforms. Derive the equations of r_{out}, I^-_{out} & I^+_{out}. **[4]**

P.T.O.

b) Explain push-pull common source amplifier with neat circuit diagram. **[4]**

c) What are the main objectives of output Amplifier? **[2]**

Q5) a) Explain DAC with suitable diagram & input - output characteristics. Derive the equation of ENOB. **[4]**

b) Explain analysis method for switched capacitors circuits using two phase nonoverlapping clocks. **[4]**

c) What is tuned amplifiers? Explain. **[2]**

Q6) a) Explain zero as bandwidth enhancer. Give the expression for bandwidth. **[4]**

b) Explain the neutralization & unilalateralization with suitable circuit diagrams. **[4]**

c) Differentiate the method of open-circuit time constant and the method of short circuit time constants. **[2]**

Q7) a) Explain LNA topologies power match versus noise match with suitable circuit diagrams & necessary equations. **[4]**

b) Explain differential LNA with neat circuit diagram. **[4]**

c) What is role of single balanced mixer in LNA? **[2]**

Q8) a) Explain active double balanced mixer with neat circuits. **[4]**

b) How nonlinear systems works as linear mixers? Explain square-law MOSFET mixer with neat circuits. **[4]**

c) Define linearity & isolation w.r.t. mixer. **[2]**