

(3 Hours)

Total Marks: 80

- N.B: (1) Question No.1 is compulsory and solves ant three questions from remaining questions.
 (2) Assume suitable data if necessary.
 (3) Draw neat and clean figures.

1. Answer any four:
 - (a) Explain trade off in Analog design with the help of analog design octagon 5
 - (b) For N channel MOSFET draw i) small signal model ii)small signal model with channel length modulation iii)small signal model with body effect 5
 - (c) Explain importance of Miller theorem 5
 - (d) Explain input output characteristic of Phase detector circuit 5
 - (e) Compared performance of op-amp topologies 5
2.
 - (a) Derive voltage gain of diode connected load CS amplifier 10
 - (b) Derive equation of differential gain, common mode gain, CMRR of differential amplifier 10
3.
 - (a) Explain in detail how to generate temperature independent reference 10
 - (b) Explain concept of switched capacitor circuit and explain switched capacitor amplifier in detail. 10
4.
 - (a) Design an amplifier that meet the following specification with a phase margin of 60.assume the channel length is to be $1\mu\text{m}$
 $A_v > 5000\text{v/v}$, $V_{dd} = 2.5$, $V_{ss} = -2.5\text{v}$, $GB = 5\text{MHz}$, $CL = 10\text{pf}$,
 $SR > 10\text{v}/\mu\text{sec}$, V_{out} range = $\pm 2\text{V}$, $ICMR = -1$ to 2V , $P_{diss} \leq 2\text{mw}$. 20
5.
 - (a) List down the performance parameter of VCO and explain trade off between them 10
 - (b) Give comparison of full custom design and semi custom design 10
6. Write short notes(any three) 20
 - (a) White and flicker noise in MOSFET
 - (b) AMS design flow
 - (c) Clock feed through in MOSFET
 - (d) Band gap reference
