

(3 Hours)

Total Marks: 80

N.B: (1) Question No.1 is compulsory and solve any three questions from remaining questions.

(2) Assume suitable data if necessary.

1. Answer any four:

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| (a) Explain current source and current sink circuit | 5 |
| (b) Draw and explain CYCLIC ADC circuit? | 5 |
| (c) Explain Miller theorem? | 5 |
| (d) Explain advantages of diode connected load CS amplifier? | 5 |
| (e) Explain bandgap reference in detail? | 5 |
| 2. (a) Derive voltage gain of source degenerated CS amplifier? | 10 |
| (b) Draw and explain noise in a single stage CD amplifier. | 10 |
| 3. (a) Draw small signal model of CS amplifier with constant current source as a load and derive its small signal voltage gain. | 10 |
| (b) Explain thermal noise and flicker noise sources in CMOS circuit | 10 |
| 4 (a) Design two stage amplifier that meet the following specification with a phase Margin of 60. assume the channel length is to be $1\mu\text{m}$, $A_v > 5000\text{v/v}$, $V_{dd} = 2.5\text{V}$, $V_{ss} = -2.5\text{V}$, $GB = 5\text{MHz}$, $CL = 10\text{pf}$, $SR > 10\text{v}/\mu\text{sec}$, V_{out} range = $\pm 2\text{V}$, $ICMR = -1$ to 2V , $P_{diss} \leq 2\text{mw}$. | 20 |
| 5 (a) Explain all different parameters of ADCs like INL, DNL, offset error and gain error with neat diagrams. | 10 |
| (b) Explain basic differential pair and its characteristics? Explain the drawback of basic differential pair with neat waveform and how to overcome it? | 10 |
| 6 Write short notes on following: | 20 |
| (a) correlated and uncorrelated noise sources in MOSFET | |
| (b) pipeline DAC | |
| (c) Cascode current mirror | |
| (d) Noise bandwidth | |