

**CMOS MIXED SIGNAL CIRCUIT DESIGN**

(Common to VLSI&ES, ES&VLSI, VLSID&ES, ES& VLSID, VLSI, VLSID, VLSID and VLSI&ME)

**Time: 3 Hours**

**Max. Marks: 60**

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*Answer any FIVE Questions  
All Questions Carry Equal Marks*

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| 1. | a | What is switched capacitor? What is its significance in the CMOS technology?   | 5  |
|    | b | If $C_1 = C_2 = C$ , find the value of C that will emulate a $1M\Omega$ resistor if the clock frequency is 200 KHz.  | 7  |
| 2. | a | Explain about the basic charge pump PLL with a neat figure.  | 5  |
|    | b | With the help of necessary waveforms, explain about the non-ideal effects in PLLs.   | 7  |
| 3. | a | What are the dynamic characteristics that influence the performance of DACs?   | 5  |
|    | b | Design a decoder based DAC with a detailed explanation.  | 7  |
| 4. | a | Give the classification of ADC architectures based on the conversion rate.   | 5  |
|    | b | Explain the static and dynamic characteristics of ADCs.  | 7  |
| 5. | a | What is a flash converter? Explain the function of a 3 bit flash ADC.  | 5  |
|    | b | What is time interleaving? Explain the operation of a time interleaved ADC.  | 7  |
| 6. | a | Discuss about Delta-Sigma ADC.   | 5  |
|    | b | Explain the block diagram of second order Delta-Sigma modulator.   | 7  |
| 7. |   | Distinguish between oversampling without noise shaping and with noise shaping.   | 12 |
| 8. | a | What are biquad filters? Explain about the two switched capacitor biquad realizations.   | 5  |
|    | b | Design a switched capacitor realization for a first order, high pass circuit with a high frequency gain of -10 and a -3dB frequency of 1 kHz using a clock of 100kHz | 7  |

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