



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Tech(ECE-VLSI)/SEM-2/MVLSI-203/2012
2012**

ANALOG IC DESIGN

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

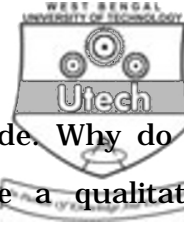
Answer the following questions :

1. Design the block diagram of an ideal operational amplifier. $2\frac{1}{2}$
2. Design a small signal equivalent circuit of a MOSFET. $2\frac{1}{2}$
3. How is the MOS diode compared with a $p-n$ diode ? 3
4. What is DNL ? What is value of DNL for ideal DAC ? 2
5. What is INL ? What is value of INL for ideal DAC ? 2
6. What is resolution value for 8-bit DAC with reference voltage of 16V ? 2

GROUP – B

Answer any *four* of the following. $4 \times 14 = 56$

7. Design and explain the MOSFET switch model. Explain ON and OFF characteristics of a MOS switch. $6 + 8$



8. Describe how a MOSFET can work as a diode. Why do we need to use MOSFET as resistor ? Give a qualitative analysis of the different types of MOS differential amplifier.

5 + 2 + 7

9. Write a short note on how MOSFET can work as current sink and source. How to improve the performance of a simple NMOS current sink by connecting a resistance between source and ground ?

6 + 8

10. Show DAC components by block diagram. Explain Binary Weighted Resistor 4-bit DAC with circuit diagram. Explain R-2R Ladder 4-bit DAC with circuit diagram.

2 + 6 + 6

11. Show ADC components by block diagram. Explain N-bit Ladder Comparison ADC using block diagram. Explain N-bit Flash ADC using block diagram. Explain pros and cons of these two ADCs.

2 + 5 + 5 + 2

12. How can you realize resistor using switched capacitor circuit ? Explain PLL operation.

6 + 8
