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**BIEL-012**

# B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

## Term-End Examination

00636

**June, 2016**

## BIEL-012 : ANALOG AND MIXED MODE VLSI DESIGN

*Time : 3 hours* *Maximum Marks : 70*

***Note :*** *Attempt any* ***seven*** *questions. All questions carry equal marks. Missing data, if any, may be suitably assumed. Use of scientific calculator is permitted.*

**1.** (a) What are the typical characteristics of a sample-and-hold (S/H) circuit ? Explain in brief. *5*

(b) Explain the need for converting an analog signal to a digital-discrete signal. *5*

**2.** With the help of a neatly labelled block diagram, explain the following : *5+5=10*

(a) Pipeline DAC

(b) Pipeline ADC

3. Explain the procedure involved in improving Signal-to-Noise Ratio (SNR) using averaging techniques in data converter circuits. *10*

4. What is the need of decimating filters in ADC circuits ? How can they improve its performance ? Explain. *10*

5. List out the specifications of DAC and ADC. Find the resolution of a DAC, if the output voltage is desired to change in 1 mV increments using a reference voltage of 5 V. *10*

6. Derive an expression for transconductance ($g_m$) and output resistance ($r_0$) for a MOSFET operating in triode region. Also establish a relationship between the two parameters of the MOSFET. *3+3+4=10*

7. With the help of a neatly labelled block diagram, explain the operation of a 2-step Flash analog-to-digital converter circuit (ADC). *10*

8. What are the various design issues associated with the scaling procedure in sub-micron CMOS technology ? Explain them briefly. *10*

9. What are Bidirectional switches ? Explain with the help of a neatly labelled circuit, how MOSFETs can be used as a bidirectional switch. *3+7=10*

**10.** Write short notes on any ***two*** of the following : *2×5=10*

(a) Level Shifting

(b) Interpolating Filters for DAC

(c) Analog Multiplier

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