

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

**Term-End Examination**

00043

**December, 2018**

**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 is the difference between Analog and Digital signal ?  $4 \times 2 \frac{1}{2} = 10$
- (b) How is analog signal converted to digital signal ?
- (c) Define Signal to Noise Ratio (SNR).
- (d) What do you mean by submicron CMOS technology ?
  
2. (a) Explain the principle of working of D/A converter using binary-weighted resistors. 5

- (b) What is the maximum resistor ratio required by a 12-bit D/A converter utilizing a binary-weighted resistor network ? 5
3. (a) Explain the operation of a dual-slope A/D converter with suitable diagram. 5
- (b) Express the maximum quantization error of an N-bit A/D converter in terms of its Least-Significant Bit (LSB) and in terms of its full-scale analog input  $V_{FS}$ . 5
4. (a) Explain the principle of operation of a cyclic DAC and pipeline DAC. Also differentiate between them. 5
- (b) Explain the operation principle of successive approximation ADC with its block diagram. Write down its advantages and disadvantages. 5
5. (a) Explain the working principle of a basic CMOS comparator circuit. 5
- (b) Design a CMOS analog multiplier and explain its working principle. 5
6. (a) What is CMOS technology ? Explain the categories of CMOS technology. 5
- (b) How does IC technology influence analog IC design ? 5

7. Draw and explain the process flow of submicron CMOS technology. 10
8. Explain the operation of a MOSFET. Show that MOSFET can be used as bidirectional switch. Derive the expression of drain current in all modes of operation and draw its I-V characteristics. 10
9. (a) What is the role of SNR in analog circuit design? How can it be improved? 5
- (b) What is the role of decimating filters for ADCs and interpolating filters for DACs? 5
10. Write short notes on any *two* of the following:  $2 \times 5 = 10$
- (a) Sample and Hold Circuit
- (b) High Pass Synchronous Filter
- (c) Operational Amplifier Design
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