

**B.TECH. IN ELECTRONICS AND  
COMMUNICATION ENGINEERING  
(BTECVI)**

**Term-End Examination**

**June, 2012**

**BIEL-002 : ANALOG INTEGRATED CIRCUITS  
DESIGN**

*Time : 3 hours*

*Maximum Marks : 70*

- Note :** (i) *Attempt any seven questions.*  
(ii) *All questions have equal marks.*  
(iii) *All the questions are to be answered in English language only.*  
(iv) *Use of scientific calculator is allowed.*

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1. (a) Draw the circuit diagram of Wilson current source and show that biasing current is equal to reference current. Use  $\beta = 100$ . 5
- (b) A differential Amplifier has inputs  $V_1 = 7\text{mV}$  and  $V_2 = 9\text{mV}$ . It has a differential mode gain of 80 dB and a CMRR of 90dB. Find the output voltage. 5
2. (a) Derive the expression for output voltage of inverting Amplifier for both ideal and practical cases. 5
- (b) What is a integrator? Draw the circuit diagram of basic integrator and derive the expression for its output. 5

3. (a) Describe the operation and characteristics of an instrumentation amplifier with a neat sketch. Why do we call this as instrumentation amplifier. 5
- (b) Draw the circuit diagram of V to I converter with floating load and explain how voltage is converted into current. 5
4. (a) Find the output voltage for the circuit shown in figure 1. 5

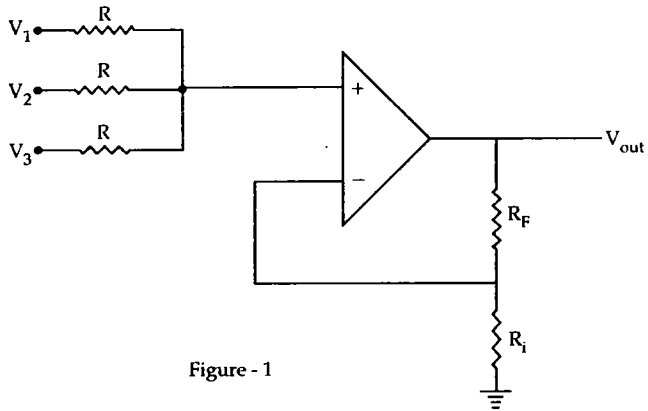


Figure - 1

- (b) Derive the expression for output voltage of the difference amplifier shown in figure 2. If  $R_1=R_3$  and  $R_2=R_4$ . 5

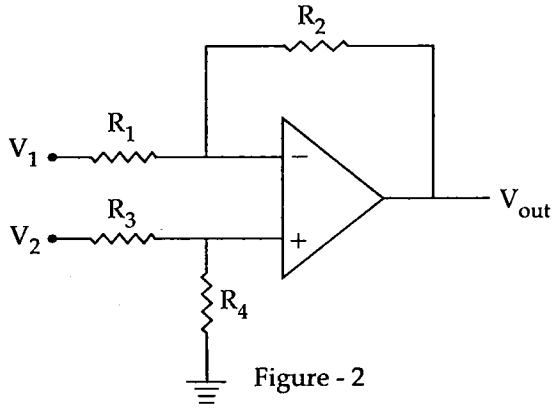


Figure - 2

5. (a) Draw the circuit diagram of peak detector and explain its operation with a neat sketch. 5
- (b) Draw the circuit diagram of Schmitt trigger and derive the expression for upper threshold voltage, Lower threshold voltage and Hysteresis Voltage. 5
6. (a) Explain the operation of precision Half wave rectifier with a neat sketch. 5
- (b) Draw the characteristics of a voltage comparator circuit and explain how the circuit is used as zero crossing detector. 5
7. (a) What is Astable Multivibrator ? Draw the circuit diagram and explain its operation with the help of wave forms. 5
- (b) What are the necessary conditions for sustained oscillation ? Draw the circuit diagram of Wein Bridge oscillator using op-Amp and derive the expression of frequency for oscillation. 5
8. (a) Draw the circuit diagram of Log-Amplifier and show how the circuit compensates the effect of temperature. 5
- (b) Draw the circuit diagram of PLL AM demodulator and explain its operation. 5

9. (a) Design a First Order Low Pass Filter for the following specifications : Cut-off frequency 2 kHz Pass band gain = 2. 5
- (b) Draw the circuit diagram for generating saw tooth waveform and explain its operation with a neat sketch. 5
10. Write short notes. (*Any two*) 5+5
- (a) PLL Frequency Synthesizer
- (b) Analog Multipliers
- (c) Sample and Hold circuit
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