

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

**Term-End Examination**

**December, 2012**

**BIEL-011 : LINEAR INTEGRATED CIRCUITS**

*Time : 3 Hours*

*Maximum Marks : 70*

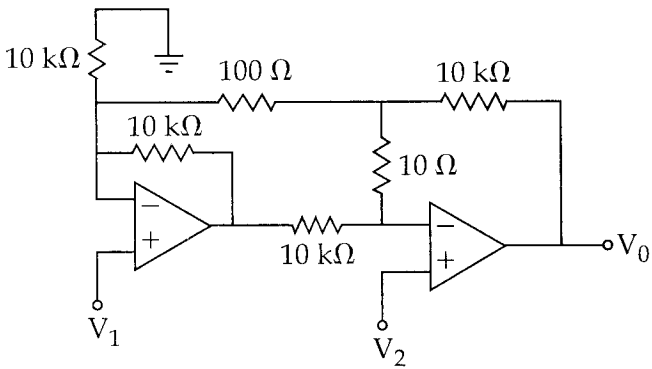
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**Note :** 1. Attempt *any seven* questions.  
2. Use of scientific calculator is *allowed*.

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|----|-----|--|---|
| 1. | (a) | With a neat circuit diagram, explain the operation of emitter coupled differential amplifier.  | 5 |
|    | (b) | Explain the concept of current mirror with suitable circuits.  | 5 |
| 2. | (a) | Differentiate between open loop and closed loop configurations of OP-AMP.  | 5 |
|    | (b) | Draw the diagram of log amplifier using OP-AMP and derive the expression for its output voltage.   | 5 |
| 3. | (a) | Discuss the effect of slew rate on bandwidth and output impedance of an OP-AMP.  | 5 |
|    | (b) | Calculate the slew rate limited cut-off frequency for a voltage follower circuit using a 741-OP-AMP if the peak of sine wave output is to be 10 V. | 5 |

4. (a) Explain the phase lag and phase lead frequency compensation methods, along with the circuit and frequency response curves. 5
- (b) Find the differential mode gain of following circuit. 5



5. (a) Design a Butterworth low pass filter which has a cut off frequency of 1 kHz. The gain is required to drop at least  $-56\text{ dB}$  at 10 kHz. 6
- (b) What are switched - capacitor filters ? Mention their advantages. 4
6. Show how a band pass filter can be constructed by the use of a low pass filter and a high pass filter. Sketch the frequency response and explain the band pass filter operation. 10
7. Draw the circuit diagram of sample and hold circuit using OP-AMP IC 741. Explain its operation. 10

8. With a neat circuit diagram and relevant waveforms, explain the operation of a triangular waveform generator which has frequency and duty cycle controls. **10**
9. Derive equations for astable oscillator mode of 555 timer. Calculate the frequency and duty cycle for  $R_A = 390 \Omega$ ,  $R_B = 180 \Omega$  and  $C = 6.8 \mu F$ . **10**
10. Attempt *any two* of followings : **2x5=10**
- (a) Phase shift oscillator
  - (b) Zero crossing detector
  - (c) Absolute value detector
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