

00617

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

Term-End Examination

June, 2013

BIEL-011 : LINEAR INTEGRATED CIRCUITS

Time : 3 Hours

Maximum Marks : 70

Note : (1) Attempt any seven questions.

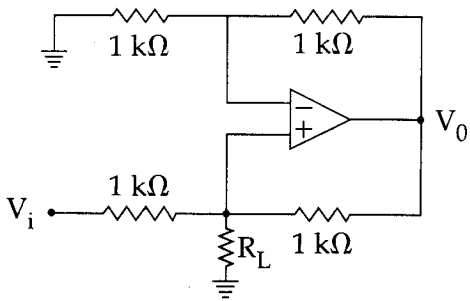
(2) Use of scientific calculator is allowed.

1. Explain principle of current mirror. Derive relationship between output and input current of current mirror. 10

2. Define the following terms of OP-AMP. 10
 - (a) CMRR
 - (b) Input offset current
 - (c) Input offset voltage
 - (d) Output offset voltage
 - (e) Power supply rejection ratio

3. (a) How can an OP-AMP be used as a differentiator and an integrator ? 6
(b) Draw the circuit of voltage to current converter using OP-AMP. 4

4. (a) Discuss the effect of slew rate on band width 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 5 V. 5
5. (a) What is virtual grounding in OP-AMP ? 3
- (b) Calculate the current through the resistance R_L of following circuit. What is the maximum value of the load resistance R_L for successful operation ? 7



6. (a) Show that the normalized gain of an n^{th} order low pass Butter worth filter rolls off at a rate of $20 n$ dB/decade far away beyond Cut off. 6
- (b) What are the advantages of active filter over passive filter ? 4
7. Design a second order band pass filter with center frequency gain $A_0=50$, $f_0=160$ Hz and $Q=10$. 10

8. (a) Draw the circuit diagram of Wein bridge oscillator. Derive the necessary conditions of Oscillation. 5
- (b) Explain how square and triangular wave forms can be produced using OP-AMP ? 5
9. Design a notch filter with center frequency $f_0=400$ Hz, center frequency gain $A_0=2$ and $Q=10$. 10
10. Attempt *any two* of followings : 5+5=10
- (a) Working of zero - crossing detector
- (b) Working of absolute value detector
- (c) Voltage transfer curve for OP-AMP under open loop and closed loop.
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