

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

**Term-End Examination**

00383

**December, 2018**

**BIEL-011 : LINEAR INTEGRATED CIRCUITS**

*Time : 3 hours*

*Maximum Marks : 70*

---

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

---

---

1. (a) What is a differential amplifier ? Why are differential amplifiers preferred over single-ended amplifiers ? 5
- (b) Explain the concept of current mirror with suitable diagram. 5
2. (a) Draw the circuit diagram of a cascade differential amplifier configuration. Explain its operation. 5
- (b) Enlist the characteristics of an ideal operational amplifier (op-amp). 5

3. Explain the following terms used regarding an op-amp :  $4 \times 2 \frac{1}{2} = 10$
- Supply Voltage Rejection Ratio (SVRR)
  - Input Offset Current
  - Virtual Ground
  - Thermal Drift
4. (a) Discuss about the error voltage. How can it be reduced ? 5
- (b) The two input terminals of an op-amp are connected to voltage signals of strength  $745 \mu\text{V}$  and  $740 \mu\text{V}$  respectively. The gain of the op-amp in differential mode is  $5 \times 10^5$  and its CMRR is 80 dB. Calculate the output voltage and percentage error due to common mode. 5
5. Draw the circuit diagram of a non-inverting amplifier. Explain its working and derive the expression for voltage gain.  $3+3+4=10$
6. (a) Draw the circuit diagram of a differentiator using op-amp and explain its working. 5
- (b) Calculate the value of output voltage at which op-amp will get saturated shown in Figure 1. 5

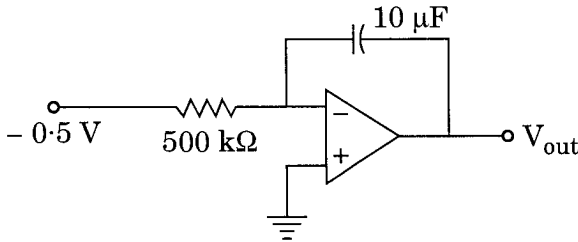


Figure 1

7. (a) Draw and explain the working of logarithmic amplifier using op-amp. 5
- (b) Describe the application of op-amp as current to voltage converter. 5
8. (a) Explain the frequency response of an internally compensated op-amp. 5
- (b) Draw the equivalent circuit diagram of an op-amp for high frequency and explain the the major sources that are responsible for capacitive effects. 5
9. Draw the circuit of a second-order low pass filter. Derive an expression for its transfer function for a Butterworth filter. 10
10. What is meant by a clamping circuit ? Give different types of clamping circuits along with their output waveforms and explain operation of any one circuit.  $3+4+3=10$
-