

BT-5/D07

## LINEAR IC APPLICATIONS

Paper-ECE-307E

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt *five* questions, selecting at least *one* from each unit.

## UNIT-I

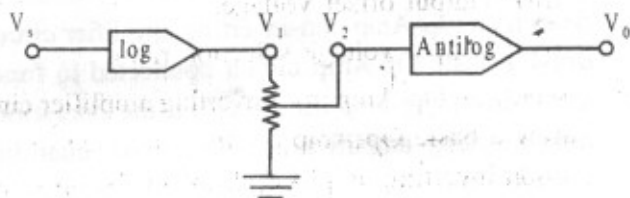
1. (a) Define the common mode voltage, common mode voltage gain and common mode rejection ratio for Op-Amp. 5
- (b) Draw and discuss the circuit of a Sample and Hold circuit. 5
- (c) Explain the following parameters : 10
  - (i) Slew rate.
  - (ii) Input bias current.
  - (iii) Output offset voltage.
  - (iv) Supply voltage selection ratio.
2. (a) Sketch an Op-Amp non-inverting amplifier circuit. Also draw a basic Op-Amp circuit connected to function as a non-inverting amplifier. Explain the operation of the non-inverting amplifier and derive an equation for its voltage gain. 15
- (b) What is Cascade amplifier? List its characteristics. 5

## UNIT-II

3. (a) What is the difference between compensated and non-compensated Op-Amp. ? Draw the circuit of lag and lead compensation networks. Discuss this operation and show how they affect the frequency response of an Op-Amp. 15
- (b) Draw the frequency response of operational amplifier. Why its gain roll-off often certain frequency ? 5
4. (a) Describe the circuit of voltage to current converter, if the load is (i) floating, and (ii) grounded. Is there any information on the size of the load when grounded ? 10
- (b) A non-inverting amplifier is to amplify 10 mV signal to a level of 1 V using 741 Op-Amp. Design a suitable circuit and calculate its input and output impedances. 10

## UNIT-III

5. (a) Show that the following circuit can be used to raise the input  $V_s$  of an arbitrary power. Assume  $V_1 = K_1 \ln K_2 V_s$ ,  $V_0 = K_3 \ln^{-1} K_4 V_2$ ,  $V_2 = \alpha V_1$ . 15



- (b) Name the circuit which can be used to detect the peak value of non-sinusoidal waveforms. Explain its operation. 5

- (a) Sketch the circuit of a single stage band-pass filter. Discuss the low-pass and high-pass operation of the circuit. Show how band stop filter can be constructed by the use of band-pass filter and a summing circuit.

15

- (b) Design a band-pass RC active filter with mid-band voltage gain of 30, centre frequency of 200 Hz, and  $Q = 5$ . Choose  $C_1 = C_2 = 0.15 \mu\text{F}$ .

5

#### UNIT-IV

7. (a) Draw the block diagram of 555 timer IC. List its important features. 10
- (b) What is the difference between digital and analog PLLs? 10
8. Write short notes on the following :

(i) 8038.

(ii) PLL.

(iii) Level translator circuit.

6,7,7