Code: EC5T1

**III B.Tech - I Semester – Regular/Supplementary Examinations
October 2017**

LINEAR INTEGRATED CIRCUITS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer **all** the questions.   All questions carry equal marks

$$11x\ 2 = 22\ M$$

1.
   a) Draw the block diagram of an ideal op-amp.
   b) Define CMRR for a differential amplifier.
   c) With the help of circuit diagram find the gain of an inverting amplifier.
   d) Draw the circuit diagram of log amplifier.
   e) Mention any two advantages of active filters.
   f) Mention any two applications of All-pass filter.
   g) Mention any two applications of 555 timer in Astable-mode of operation.
   h) Draw the pin diagram of 555 timer.
   i) Mention any two applications of 565 PLL.
   j) Mention any two advantages of R-2R ladder DAC over weighted resistor DAC over.
   k) What is the principle of D/A converter?

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2.a) With the help of circuit diagram derive the expression for differential voltage gain for a differential amplifier.   8 M

b) Explain the following with respect to the operational amplifier: 8 M
i) Slew rate
ii) Input Offset current
iii) Input Offset Voltage
iv) Common mode rejection ratio

3.a) i) Design an Inverting operation amplifier which has the closed loop voltage gain of $A_F = -80$. The input voltage is $V_S = 200 \ mV$ with a source resistance of $R_S = 500 \ \Omega$. Find the value of output voltage V_O. The DC supply voltages are $V_{CC} = V_{EE} = 12 \ V$.   4 M

ii) List any 4 characteristics of an Ideal operational amplifier.   4 M

b) i) With the help of a circuit diagram explain the functioning of anti-log amplifiers.   4 M

ii) With the help of a circuit diagram explain the functioning of square wave generator.   4 M

4.a) Design a first order high-pass filter to give a high cutoff frequency of $f_o = 5\ KHz$ with a pass band gain of 10.

8 M

b) With the help of a neat circuit diagram explain the working of Band-pass filters.

8 M

5.a) With the help of neat sketches explain the functioning of Astable multi-vibrator using 555 timer.

8 M

b) With the help of neat circuit diagram explain the functioning of 565 PLL in detail.

8 M

6.a) Explain briefly about the Counter type ADC.

8 M

b) With the help of neat circuit diagram explain the functioning of weighted resistor DAC.

8 M