Code: R7221005

R07

B.Tech II Year II Semester (R07) Supplementary Examinations, April/May 2013
LINEAR IC APPLICATIONS
(Electronics & Instrumentation Engineering)

Time: 3 hours   Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1 (a) Explain in detail about AC and DC analysis of dual input, balanced output differential amplifier.
   (b) Why active loading of differential amplifiers is required and what are the considerations while constructing differential amplifier?

2 (a) What are the three operating temperature ranges of the IC?
   (b) Why it is required to have an external offset voltage compensating network with practical op-amp circuits?
   (c) Explain the terms:
             (i) 741 op - amp and its features
             (ii) FET input op - amps

3 (a) Explain the role of instrumentation amplifier in industrial applications using a transducer bridge.
   (b) Explain the operation of non - inverting AC amplifier with high input impedance.
   (c) Explain how V - I converter circuit can be used for diode tester.

4 (a) What is hysteresis? Explain the basic operation of a comparator with hysteresis.
   (b) Discuss about an astable multi - vibrator using an op - amp and derive an expression for frequency of oscillations.
   (c) Draw the circuit of logarithmic amplifier and mention some of its applications.

5 (a) Draw the first order low pass Butterworth filter and analyze the same by deriving the gain and phase angle equation.
   (b) Design a first order high pass filter at a cut - off frequency of $400\ Hz$ and a pass band gain of 1 and plot the frequency response.

6 (a) Draw and explain the functional diagram of a IC 555 timer and explain the function of "reset" pin.
   (b) Define the following terms with reference to PLL:
             (i)   Lock range
             (ii) Capture range
             (iii) Pull-in-time and why will capture range always be smaller than the lock range.

7 (a) Explain R - 2R type DAC.
   (b) Compare R - 2R and weighted resistor types of DAC's.
   (c) An 8 bit ADC is capable of accepting an input unipolar (positive values only) voltage 0 to 10 V.
             (i) What is the minimum value of 1 LSB?
             (ii) What is the digital output code if the applied input voltage is 5.4 V?

8 (a) Give the analysis of balanced modulation. Illustrate the frequency spectra of a balanced modulator. Assume $E_{c(max)} = 5\ V$, $f_c = 10,000\ Hz$, $E_{m(max)} = 5\ V$ and $f_m = 1000\ Hz$.
   (b) Explain about applications of analog switches.
   (c) Explain sample and hold amplifiers.

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