

B.Tech III Year I Semester (R13) Regular Examinations December 2015

LINEAR & DIGITAL IC APPLICATIONS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- List the characteristics of an ideal op-amp.
 - Enlist the features of an instrumentation amplifier.
 - Draw the block diagram of PLL.
 - What is meant by Regenerative comparator?
 - What are the advantages of active filters over passive filters?
 - What are the different types of oscillators?
 - Give the classification of Integrated circuits.
 - Sketch the logic levels for typical CMOS logic circuits.
 - List the applications of multiplexers.
 - What is meant by Decade counter?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) Draw and explain the operation of op-amp based sample and hold circuit. And also draw the input and output waveforms.
(b) Define the following terms: (i) Slew Rate. (ii) Thermal drift.

OR

- 3 (a) Draw and explain the operation of instrumentation amplifier using transducer bridge.
(b) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 KHz.

UNIT – II

- 4 (a) Sketch the functional schematic of 555 timer and explain how it can be used as a monostable multivibrator. And also draw the waveforms.
(b) Calculate the values of the LSB and full scale output for an 8-bit DAC for the 0 to 10 V range.

OR

- 5 (a) Draw and explain the operation of counter type ADC.
(b) Define the following terms: (i) Resolution. (ii) Capture range.

UNIT – III

- 6 (a) Draw and explain the operation of op-amp based triangular waveform generator and also determine the frequency of triangular waveform.
(b) A first order low-pass Butterworth active filter has a cut-off frequency of 10 KHz and unity gain at low frequency. Find the voltage transfer function magnitude in dB, at 12 KHz for the filter.

OR

- 7 (a) With a neat sketch, explain the operation of Quadrature oscillator.
(b) If a band-pass filter has a lower cut-off frequency $f_L = 250$ Hz and a higher cut-off frequency $f_H = 2500$ Hz, then find its bandwidth and the resonant frequency.

UNIT – IV

- 8 (a) Give the comparison of various logic families.
(b) Draw and explain the operation of CMOS three-state buffer. And also draw its functional table.

OR

- 9 (a) Draw the circuit diagram of two-input LS-TTL NAND gate and explain its operation.
(b) Write a brief note on CMOS transmission gate.

UNIT – V

- 10 (a) Draw and explain the operation of 4-bit parallel binary adder/subtractor circuit.
(b) Convert a T flip-flop to D type flip-flop.

OR

- 11 (a) Design a code converter that converts BCD to excess-3 code.
(b) List the applications of shift registers.
