Code: 13A04508 **R13**

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)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) List the characteristics of an ideal op-amp.
(b) Enlist the features of an instrumentation amplifier.
(c) Draw the block diagram of PLL.
(d) What is meant by Regenerative comparator?
(e) What are the advantages of active filters over passive filters?
(f) What are the different types of oscillators?
(g) Give the classification of Integrated circuits.
(h) Sketch the logic levels for typical CMOS logic circuits.
(i) List the applications of multiplexers.
(j) 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.

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