Code: R7220203

R07

B.Tech II Year II Semester (R07) Supplementary Examinations, April/May 2013

LINEAR DIGITAL IC APPLICATIONS

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

*****

1 (a) What are the three operating temperature ranges of an IC?

(b) Explain the parameters that should be considered for DC and AC applications of an op-amp.

(c) Design a non-inverting amplifier with a gain of 10. How non-inverting amplifier can act as voltage follower.

2 (a) What is an instrumentation amplifier? Explain and derive for output voltage of an instrumentation amplifier. Mention any three applications of it.

(b) Briefly mention the disadvantages of using zero crossing detectors and how it is overcome in Schmitt trigger.

(c) Explain briefly about 723 voltage regulator.

3 (a) Design a second order high pass filter at a cut-off frequency of 1 KHz and plot the frequency response.

(b) What is meant by all-pass filter? Draw the circuit of it.

(c) Explain the operation of square wave generator with neat sketches.

4 (a) Explain the operation of monostable multi-vibrator using 555 timer. Derive the expression of time delay of a monostable multi-vibrator using 555 timer.

(b) What is the phase-locked loop? Briefly explain the roles of low-pass filter and VCO in PLL. Define the terms:

(i) Lock range

(ii) Capture range

(iii) Pull-in-time

5 (a) Explain the operation of weighted resistor DAC with neat circuit diagram and obtain the expression for output voltage.

(b) A 12 - bit D to A converter has a full scale range of 15 volts. Its maximum differential linearity error is $\pm 1/2$ LSB.

(i) What is the percentage resolution?

(ii) What are the minimum and maximum possible values of the increment in its output voltage?

(c) Explain in detail about the dual - slope A/D converter.

Contd. in Page 2

Code: R7220203

R07

6 (a) Compare different logic families and mention their advantages and disadvantages.
(b) Design a TTL three state NAND gate and explain the operation.
(c) Explain about the CMOS logic. Sketch CMOS NAND gate and CMOS NOR gate. Explain their operation.

7 (a) Design a 3-input 5-output multiplexes. Write the truth table and draw the logic diagram.
(b) What is a parity checker? Explain the 4-bit even parity checker circuit with truth table.

8 (a) Explain the working of 4-bit up down synchronous counter.
(b) What is a shift register? With the help of block diagram and timing diagram, explain the operation of shift register how the serial transfer of information from register A to register B, occurs.

*****