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10EC46

**Fourth Semester B.E. Degree Examination, Dec.2017/Jan.2018**

**Linear Integrated Circuits and Applications**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.**

**PART – A**

- 1 a. Explain the basic circuit of operational amplifier. (08 Marks)
- b. Draw neat circuit diagram of a direct coupled non-inverting op-Amp and explain the design steps. (06 Marks)
- c. Design an inverting amplifier using 741 op-Amp for the voltage gain to be 50 and the output voltage amplitude to be 2.5 volts. (06 Marks)
- 2 a. Draw neat circuit diagram of a capacitor coupled voltage follower and give its design steps. (07 Marks)
- b. With neat circuit diagram, explain the high input impedance capacitor coupled non-inverting amplifier. (07 Marks)
- c. Using a LF353BIFET op-Amp design a high  $Z_{in}$  capacitor coupled non-inverting amplifier to have a low cut off frequency of 200 Hz. The input and output voltages are to be 15 mV and 3V respectively and the minimum load resistance is 12 K $\Omega$ . (06 Marks)
- 3 a. Sketch the circuit of a lag and lead compensation network. Explain its operation and show how it affects the frequency response of op-Amp. (08 Marks)
- b. Write a note on  $Z_{in}$  mod compensation. (06 Marks)
- c. Determine the upper cutoff frequency for a: (i) voltage follower (ii) unity gain inverting amplifier, using a 741 op-Amp, given that UGB of 741 is 800 kHz. (06 Marks)
- 4 a. What are the advantages of Precision Rectifier over Ordinary Rectifier? Explain the working of a precision half wave rectifier. (06 Marks)
- b. Draw the circuit diagram of instrumentation amplifier using op-Amp. Explain its working and derive the expression of output. (08 Marks)
- c. With neat circuit diagram explain the working of op-Amp Limiting Circuit. (06 Marks)

**PART – B**

- 5 a. Draw the op-Amp sample and hold circuit and explain its operation. (08 Marks)
- b. Explain the working of phase shift oscillator using op-Amp. (06 Marks)
- c. With a neat circuit diagram, explain the Wein-Bridge oscillator using op-amp. (06 Marks)
- 6 a. Explain the working of inverting Schmitt trigger with the help of circuit diagram and waveform. (07 Marks)
- b. Draw the circuit and explain op-Amp astable multivibrator. (06 Marks)
- c. With the help of circuit diagram and frequency response, explain the working of second order lowpass filter. (07 Marks)
- 7 a. Mention the advantages of IC voltage regulator. Draw the series op-Amp regulator and explain its working. (10 Marks)
- b. Draw the internal schematic diagram of IC 723 regulator and explain its working. (10 Marks)
- 8 a. Draw the internal schematic diagram of 555 IC configuring it for monostable operation. Explain its working. (08 Marks)
- b. With the help of basic block diagram, explain PLL. (06 Marks)
- c. Explain the working of D to A converter using R-2R network. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.