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10EC46

Fourth Semester B.E. Degree Examination, June 2012
Linear IC's and Applications

Time: 3 hrs. Max. Marks:100

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

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.

PART – A

1 a. Explain common mode input, common mode voltage gain and common mode rejection ratio for operational amplifiers. **(06 Marks)**

b. Sketch an op-amp difference amplifier circuit. Explain the operation of the circuit and derive an equation for the output voltage. **(08 Marks)**

c. Design an inverting amplifier using a 741 op-amp. The voltage gain is to be 50 and the output voltage amplitude is to be 2.5V. **(06 Marks)**

2 a. Sketch the circuit of a capacitor-coupled voltage follower and explain its operation. **(08 Marks)**

b. Sketch the circuit of a capacitor coupled voltage follower using a single polarity supply and explain its operation. **(06 Marks)**

c. Using a LF 353 BIFET op-amp, design a high z_{in} capacitor coupled non-inverting amplifier to have a low cut-off frequency of 200Hz. The input and output voltages are to be 15mV and 3V respectively, and minimum load resistance is 12 K Ω. **(06 Marks)**

3 a. Explain miller effect compensation. **(08 Marks)**

b. Discuss the effects of stray capacitance on op-amp circuit stability. **(08 Marks)**

c. Calculate the slew rate limited cut-off frequency for a voltage follower circuit using a 741 op-amp. If the peak of sine wave output is to be 5V. Also determine the maximum peak value of the sinusoidal output voltage that will allow the circuit to operate at the 800 kHz, unity gain cut off frequency. Given typical slew rate for the 741 op-amp is 0.5 V/rs. **(04 Marks)**

4 a. Draw the circuit of a precision voltage source using an op-amp and a zener diode. Explain the circuit operation. **(06 Marks)**

b. Draw the circuit of a simple current-to-voltage converter, then show how it should be modified to function as a current amplifier/attenuator with a grounded load. **(06 Marks)**

c. Sketch the complete circuit of an instrumentation amplifier and explain its operation. **(08 Marks)**

PART – B

5 a. Draw the circuit of an op-amp precision clamping circuit and explain its operation. **(06 Marks)**

b. Draw the circuit of an precision peak detector and explain its operation. **(06 Marks)**

c. Draw the op-amp sample-and-hold circuit and explain its operation. **(08 Marks)**

6 a. Draw the circuit of a capacitor coupled crossing detector and explain its operation. **(06 Marks)**
b. With a neat circuit diagram, explain the operation of inverting Schmitt trigger circuit. **(06 Marks)**
c. Draw the circuit of an op-amp monostable multivibrator, show the voltage wave forms and explain the operation of the circuit. **(08 Marks)**

7 a. What is an voltage regulator? With neat figure explain the working of series op-amp regulator. **(07 Marks)**
b. Explain the current limiting feature of 723 regulator. **(07 Marks)**
c. Explain the principles of switching regulator. Mentions its advantages. **(06 Marks)**

8 a. Draw the block schematic of the PLL and explain its operation. **(06 Marks)**
b. With a neat block diagram, explain the operation of a astable multivibrator using 555 timer. **(08 Marks)**
c. With a neat figure explain the working of weighted resistor DAC. **(06 Marks)**

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