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10EE56

Fifth Semester B.E. Degree Examination, June/July 2019
Linear ICs and Applications

Time: 3 hrs.

Max. Marks: 100

- Note:** 1. Answer any FIVE full questions, selecting at least TWO full questions from each part.
2. Standard resistance and capacitance data table may be used.

PART – A

- 1 a. Give the circuit and design steps for
i) Capacitor coupled voltage follower. (08 Marks)
ii) High zin capacitor coupled voltage follower. (08 Marks)
b. Design the following circuits with $f_1 = 100\text{Hz}$, $R_L = 3.8\text{K}\Omega$, gain = 10 and output = 5V p-p.
i) Capacitor coupled inverting amplifier
ii) Capacitor coupled non-inverting amplifier. (12 Marks)
- 2 a. Give the need for frequency compensation. (04 Marks)
b. Define phase-margin and explain how phase-lead compensation circuit helps to improve the same. (06 Marks)
c. i) Draw the graph of open-loop frequency response of Op-Amp and mark A_{OL} , UGB and open-loop bandwidth (Typical values of 741).
ii) Derive equation to calculate maximum peak output and maximum frequency of operation for a given slew-rate.
iii) Find the max frequency for 741-op-amp with 5V output [Assume $SR = 0.5\text{V}/\mu\text{sec}$]. (10 Marks)
- 3 a. With the help of a neat circuit diagram and waveforms, explain the working of peak clipper. (06 Marks)
b. Explain the working of a sample-and-hold circuit. (06 Marks)
c. Describe the operation of R-2R DAC. (08 Marks)
- 4 a. Give the design steps for inverting Schmitt trigger circuit with variable UTP and LTP. (08 Marks)
b. Design an astable multivibrator using op-amp to produce $\pm 1\text{kHz}$ and $\pm 9\text{V}$ output. (06 Marks)
c. Draw the circuit of monostable circuit using op-amp with relevant waveforms, briefly give the working. (06 Marks)

PART – B

- 5 a. Explain the working of op-amp RC phase-shift oscillator. (06 Marks)
b. Design a Weinbridge oscillator using BIFET op-amp for output frequency of 10Hz with $\pm 12\text{V}$. (06 Marks)
c. Give the working of a triangular/square wave generator. (08 Marks)

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.

- 6 a. Write the circuit and design procedure for second order lowpass and highpass active filters. Draw the expected frequency-response. (10 Marks)
- b. Design single stage band pass-filter with cutoff frequencies 300Hz and 3kHz. (05 Marks)
- c. Explain how a bandstop filter is designed using a lowpass filter and a highpass filter. (05 Marks)
- 7 a. Define the terms line regulation and load regulation. (04 Marks)
- b. With the help of block diagram, explain the PLL operation. (08 Marks)
- c. Briefly explain the operation of op-amp series voltage regulator. (08 Marks)
- 8 a. Explain how a 723 IC can be used as low voltage regulator and high voltage regulator. (12 Marks)
- b. A LM 317 regulator is to provide a 6V output from a 15V supply. The load current is 200mA. Determine suitable resistance values for R_1 and R_2 and calculate regulator power dissipation. (08 Marks)

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