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10EE56

Fifth Semester B.E. Degree Examination, May 2017
Linear IC's and Applications

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Use of resistor, capacitor standard values list/data sheets are permitted.

PART – A

1 a. A capacitor coupled voltage follower is to be designed to have a lower cut-off frequency of 120 Hz. The load resistance is 8.2 kΩ and the op-amp used has a maximum input bias current of 600 nA. Design a suitable circuit. **(05 Marks)**

b. Sketch the capacitor coupled difference amplifier and derive the equation for output voltage. **(08 Marks)**

c. Show how a capacitor coupled non-inverting amplifier should be connected to use a single polarity supply. Explain. **(07 Marks)**

2 a. Discuss the operational amplifier circuit stability and show how feedback in an inverting amplifier can produce instability. **(08 Marks)**

b. Sketch and explain a circuit to show Z_{in} mod method of frequency compensation. **(07 Marks)**

c. List the precautions that should be observed for operational amplifier circuit stability. **(05 Marks)**

3 a. Design a precision full-wave rectifier consists of half wave rectifier and summer to produce 2V peak output from a sine wave input with a peak value of 0.5 volts and a frequency of 1 MHz. Use 741 op-amp with a supply of ±15V. **(06 Marks)**

b. With a neat circuit diagram and waveforms explain the working of precision peak detector. **(07 Marks)**

c. With a neat circuit diagram explain the operation of precision clamping circuit. **(07 Marks)**

4 a. With circuit diagram and waveforms, explain the operation of inverting Schmitt trigger circuit and show input/output characteristics. **(07 Marks)**

b. Design an astable multivibrator to generate a square wave signal with an amplitude of ±14V, using 741 op-amp. The signal frequency is to be 3 kHz. **(06 Marks)**

c. With neat circuit diagram and relevant waveforms explain the operation of monostable multivibrator. **(07 Marks)**

PART – B

5 a. With a neat circuit diagram and waveforms explain the operation of triangular/rectangular wave generator. Show the arrangement to adjust frequency and duty cycle of output signal. **(10 Marks)**

b. Draw the circuit of RC phase shift oscillator using op-amp. Explain how Barkhausen conditions are satisfied and output amplitude can be stabilized. **(10 Marks)**

6 a. With frequency response, explain first order high pass filter. **(06 Marks)**

b. Design a second order low pass filter to have a cutoff frequency of 1 kHz using 741 op-amp. **(04 Marks)**

c. Explain the principle of Band pass filter with its frequency response and show the design equations. **(10 Marks)**

7 a. What is phased locked loop? Explain the working of phase locked loop with neat block diagram. **(08 Marks)**

b. Write a short notes on:

(i) Universal Active Filter

(ii) Power Amplifiers. **(12 Marks)**

8 a. Define the terms line regulation and load regulation for a d.c. voltage regulator. **(04 Marks)**

b. Explain the operation of series op-amp regulator with neat circuit diagram. **(06 Marks)**

c. Show the basic circuit of a 723 I.C. Regulator and explain its operation. What are its special features? **(10 Marks)**

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