Fifth Semester B.E. Degree Examination, June/July 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 and Capacitor standard values tables are permitted.

PART – A

1 a. With neat circuit diagram explain design and the operation of high input impedance non-inverting amplifier. **(10 Marks)**

   b. A capacitor coupled inverting amplifier has the following components:
   $R_1 = 2.7$ kΩ ; $R_2 = 100$ kΩ ; $R_L = 1.5$ kΩ ; $C_1 = 3.9$ μF ; $C_2 = 0.68$ μF. Determine the circuit voltage gain, input impedance, lower cutoff frequency and impedance of C_1 at f_1. **(10 Marks)**

2 a. What is frequency compensation? Explain phase lag compensation method. **(08 Marks)**

   b. Calculate the slew rate limited cutoff frequency, maximum peak value of the sinusoidal output voltage and cutoff frequency rise time, slew rate limit rise time for 741 op-amp. Given : Peak of sine wave output is to be 6V, S = 0.5 V/μS and circuit to operate at 800kHz. **(06 Marks)**

   c. Briefly explain :
   (i) Loop gain   (ii) Phase margin   (iii) Unity gain bandwidth **(06 Marks)**

3 a. With a neat circuit diagram explain design and operation of precision fullwave circuit. **(10 Marks)**

   b. With a neat circuit diagram and waveform explain the working of sample and hold circuit. **(10 Marks)**

4 a. Sketch the circuit of an op-amp astable multivibrator, show the waveforms at various points in the circuit and explain its operation. **(08 Marks)**

   b. Using a 741 op-amp with a ± 18V supply, design an inverting Schmitt trigger circuit to have UTP = 1.5 V and LTP = –3V. **(07 Marks)**

   c. With a circuit diagram, explain the working of a capacitor coupled zero crossing detector and give the design steps. **(05 Marks)**

PART – B

5 a. With neat circuit diagram and waveforms, explain the operation of triangular/rectangular generator. **(08 Marks)**

   b. Draw the circuit diagram of phase shift oscillator and explain its operation. **(06 Marks)**

   c. Using a BIFET op-amp with a supply of ± 12V, design a wein bridge oscillator to have an o/p frequency of 20 kHz. **(06 Marks)**

6 a. Sketch the circuit of a second order active highpass filter. Explain its operation and design procedure with frequency response curve. **(12 Marks)**

   b. Design a first order active high-pass filter for cut-off frequencies of 4.5 kHz use 741 op-amp. **(08 Marks)**

7   a.   Explain the operation of a switched capacitor filter. List out the advantages of switched capacitor filter. **(10 Marks)**
    b.   With a block diagram, explain the operation of a phase locked loop. **(10 Marks)**

8   a.   Define performance parameters of voltage regulators. **(04 Marks)**
    b.   With a neat circuit diagram explain the operation of a precision voltage regulator. **(08 Marks)**
    c.   Design a voltage follower type regulator circuit using 741 op-amp with following specifications;
         (i)   Output voltage 12V
         (ii) Maximum load current = 50 mA. **(08 Marks)**

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