328511(28)

B. E. (Fifth Semester) Examination, 2020

(Old Scheme)

(EEE, Et&T Engg. Branch)

LINEAR INTEGRATED CIRCUITS & APPLICATIONS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory. Attempt any *two* parts (b), (c) and (d). Assume suitable data if necessary.

Unit-I

1. (a) Define "input offset voltage" and "input offset current". 2

   (b) Discuss the DC and AC characteristics of an OP-AMP. 7

(c) Derive the expression for the impedance and output impedance of an operational amplifier in inverting amplifier configuration. Compare them with those of non-inverting configuration.   7

(d) Explain the input offset voltage compensation techniques used in OP-Amp.   7

Unit-II

2. (a) What are the advantages of using a voltage follower amplifier?   2

(b) Define CMRR. Mention the limitations of a differential amplifier. Draw and deduce the expression for the output voltage of a differential amplifier using OP-AMP.   7

(c) Draw and explain the operation of a current-to-voltage convertor with grounded load. What are the applications of V-to-I convertors?   7

(d) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz – 1 kHz. The input is a sine wave peak to peak amplitude 3 V at 200 Hz. Sketch the output voltage waveform.   7

Unit-III

3. (a) Define "Sweep time" and "Fly back time".   2

(b) Draw the circuit of square wave generator using OP-AMP and explain its operation.   7

(c) Draw and explain current sweep generator in detail. Also explain how the linearity of current sweep generators can be improved, explain linearization technique using constant current source.   7

(d) State and prove that clamping circuit theorem.   7

Unit-IV

4. (a) What do you mean by transition time and settling time?   2

(b) With the help of neat circuit diagram and waveform explain the working of a collector-coupled monostable multivibrator. Also derive the expression for gate width of monostable multivibrator.   7

(c) With the help of a schematic diagram explain how the commutating capacitors reduce the transition time?   7

(d) Draw and explain Schmitt trigger circuit.   7

Unit-V

5. (a) List the performance parameters of voltage regulator. 2

   (b) Explain in detail along with neat circuit diagram of transistorized series regulator. 7

   (c) Explain how adjustable regulator IC works. Derive the expression for the output voltage for LM317 adjustable voltage regulator. 7

   (d) Design an adjustable voltage regulator to satisfy the following specifications : 7

      (i) Output voltage $V_0 = 5$ to 12 V

      (ii) Output current $I_0 = 1\cdot0$ A

      (iii) Voltage regulator is LM317