328511(28)

B. E. (Fifth Semester) Examination, April-May 2021

(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).

Unit-I

1. (a) Draw equivalent circuit of an OP-AMP.   2

   (b) Derive the expression for output resistance of a non inverting configuration of OP-AMP.   7

(c) What is slew rate? List causes of the slew rate and explain its significance in application. 7

(d) The following specifications are given for the dual input, balanced output bipolar differential amplifier : 7

$$R_e = 2 \cdot 2 \, K\Omega, \quad V_{EE} = -10 \, V$$

$$R_E = 4 \cdot 7 \, K\Omega, \quad \beta_F = \beta_0 = 100$$

$$R_s = 50 \, \Omega$$

$$V_{cc} = 10 \, V$$

Assume $V_{BE} = 0 \cdot 7 \, V$. Determine the following :

(i) I_{CQ} and V_{CEQ}

(ii) Differential made voltage gain

(iii) Input and output resistance

Unit-II

2. (a) Draw circuit diagram for the given equation. 2

$$V_0 = V_A - V_B$$

(b) Explain logarithmic amplifier and also show that out put voltage V_0 of logarithmic amplifier is : 7
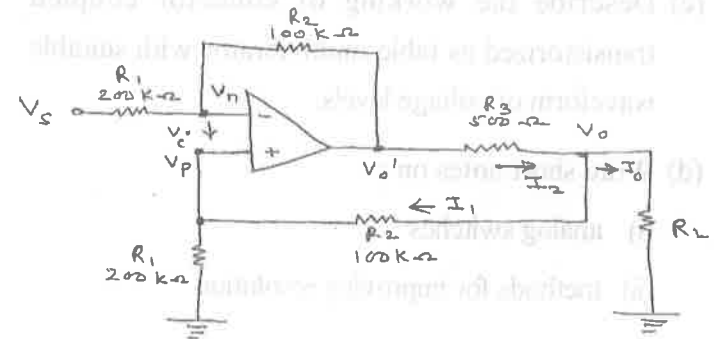
$$V_0 = \frac{-KT}{q} \ln\left(\frac{V_1}{R_1 I_0}\right)$$

(c) Design an OP-AMP schmitt trigger for the following specifications : 7

$$V_0 = \pm 10 \text{ volts, tripping voltages 4 V and } -2V$$

(d) In the voltage controlled current source shown in the below figure an output current, $I_0 = 10$ mA is desired. Calculate V_0. 7

Unit-III

3. (a) Write different types of clamping circuits. 2

(b) Explain how high pass filter act as differentiator. 7

[4]

(c) Draw and explain low pass RC circuit as integrator, also explain what are the advantages of low pass RC integrator over basic integrator. 7

(d) Draw the circuit for voltage sweep generator and explain. 7

Unit-IV

4. (a) Write the need of commutating capacitors. 2

(b) Explain different types of multivibrators with their applications. 7

(c) Describe the working of collector coupled transistorized as table multivibrator with suitable waveform of voltage levels. 7

(d) Write short notes on : 7

(i) analog switches

(ii) methods for improving resolution

Unit-V

5. (a) Calculate the output pulse width if $R = 10\ k\Omega$, $C = 0 \cdot 1\ \mu F$ are connected in monostable circuits. 2

[5]

(b) Draw and explain functional block diagram of LM 723 high precision voltage regulator. 7

(c) Design an astable multivibrator using 555 timer with 50% duty cycle. 7

(d) Draw and explain block diagram and pin functions of IC 555. 7