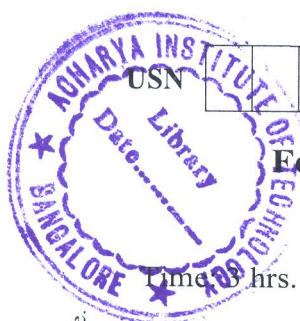


CBCS SCHEME

15EC46



Fourth Semester B.E. Degree Examination, Jan./Feb. 2021

Linear Integrated Circuits

Time: 3 hrs.

Max. Marks: 80

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. State the assumptions made.*

Module-1

- 1 a. Define the following parameters with respect to op-amp.
 - i) Input offset current
 - ii) Input offset voltage
 - iii) CMRR
 - iv) PSRR

(08 Marks)
- b. Sketch an illustration to show the effect of op-amp slew rate and explain.

(04 Marks)
- c. If a Non-inverting amplifier is designed for a gain of 50, using op-amp with 90dB CMRR, calculate common mode output (V_{ocm}) for a common mode input (V_{icm}) of 100mV.

(04 Marks)

OR

- 2 a. Design a direct-coupled non-inverting amplifier and explain its design steps.

(08 Marks)
- b. Two signals each ranging from 0.1V to 1V are to be summed. Using 741 op-amp design a suitable inverting summing circuit.

(04 Marks)
- c. Design a inverting amplifier using 741 op-amp with voltage gain of 50. The output voltage amplitude is 2.5V.

(04 Marks)

Module-2

- 3 a. Draw the circuit to set the upper cut-off frequency using inverting amplifier and explain.

(08 Marks)
- b. A capacitor coupled non-inverting op-amp is to have gain of $A_v = 66$ and $V_i = 15mV$ with $R_L = 2.2K\Omega$ and $f_1 = 120Hz$. Design the circuit.

(08 Marks)

OR

- 4 a. Explain with a neat circuit design, precision full wave rectifier and also its design steps.

(08 Marks)
- b. Design a precision voltage source, with $V_o = 9V$ and supply voltage is $\pm 12V$. Allow 10% tolerance in zener diode [Assume 1N749 with $V_z = 4.3V$].

(08 Marks)

Module-3

- 5 a. Design a precision clipper to clip both ends, using dead zone circuit with relevant waveforms, explain the same.

(08 Marks)
- b. Design capacitor coupled zero-crossing detector with $f_1 = 1kHz$ square wave input and $V_{o(p-p)} = 6V$. Use 741 op-amp with $\pm 12V$ supply [Assume $\Delta V = 1V$, $V_B = 0.1V$]

(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.

OR

- 6 a. Define Barhausen's criteria. Explain with design, phase shift oscillator and with relevant waveforms. (08 Marks)
- b. Show the realization of logarithmic amplifier using an op-amp. Obtain the expression for the output voltage. (08 Marks)

Module-4

- 7 a. Write a brief note on the following op-amp applications:
i) First order low pass filter
ii) Second order high pass filter. (08 Marks)
- b. Design a single stage bandpass filter with frequency of $f_1 = 300\text{Hz}$ and $f_2 = 30\text{kHz}$. Also state whether the design is narrow band or wide band. Use 741 op-amp for designing. [Assume $c_2 = 1000\text{pF}$]. (08 Marks)

OR

- 8 a. Explain the working of a series regulator using op-amp. (06 Marks)
- b. With a neat internal diagram of IC723. Explain the functions of each block. Mention the advantages. (10 Marks)

Module-5

- 9 a. Explain D to A converter using R-2R network. (08 Marks)
- b. With a neat block diagram, explain the blocks of PLL. (08 Marks)

OR

- 10 a. Explain 555 timer as Monostable multivibrator with waveforms. (08 Marks)
- b. Explain the working of A to D converter using successive approximation method. (08 Marks)

* * * * *