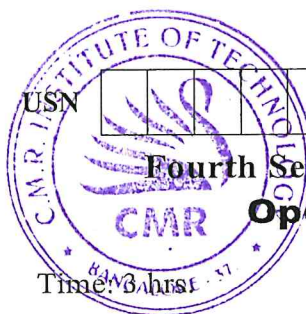


CBCS SCHEME



18EE46

Fourth Semester B.E. Degree Examination, July/August 2022 Operational Amplifiers and Linear IC's

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Draw the block diagram of an Op – Amp and write the function of each block. (08 Marks)
- b. Explain the working of Op – Amp as non – inverting amplifier. Derive the expression for its voltage gain. (08 Marks)
- c. An Input of 3V is Fed to the non inverting terminal of an Op – Amp. The amplifier has $R_i = 10\text{ k}\Omega$ and $R_f = 10\text{ k}\Omega$. Find the output voltage. (04 Marks)

OR

- 2 a. What is an Instrumentation Amplifier? Also obtain the expression for output voltage in terms of change in Resistance ΔR using transducer bridge. (08 Marks)
- b. Draw and explain the 2 input inverting summing amplifier and derive its output voltage equation V_o . Also explain how to convert it to an averaging amplifier. (08 Marks)
- c. Explain the Virtual ground concept of an Op - Amp. (04 Marks)

Module-2

- 3 a. Draw the First Order Low Pass Butterworth filter and obtain its Frequency Response. (10 Marks)
- b. Explain Working and design of voltage follower Regulator. (06 Marks)
- c. Design a First Order Low Pass filter with a cut off frequency of 1KHz and Pass band gain of 2. Assume $C = 0.001\ \mu\text{F}$. (04 Marks)

OR

- 4 a. Draw the First Order High Pass Butterworth filter and obtain its Frequency Response. (10 Marks)
- b. With a neat circuit diagram, explain the Adjustable Voltage Regulator and its Operation. (06 Marks)
- c. Find the Range in which output voltage can be varied with the help of 317 IC Regulator using $R_1 = 820\Omega$ and $R_2 = 10\text{K}\Omega$ potentiometer. (04 Marks)

Module-3

- 5 a. Sketch the circuit of triangular waveform generator and explain its operation. (08 Marks)
- b. Draw and explain the Operation of Non Inverting Zero Crossing detectors. (04 Marks)
- c. Explain the working of voltage to current converter with grounded load. (08 Marks)

OR

- 6 a. With a neat circuit diagram and waveforms, explain the Operation of inverting Schmitt trigger circuit. (08 Marks)
- b. Give comparison between Schmitt trigger and Comparator. (04 Marks)
- c. Explain the working of R – C phase shift oscillator using Op - Amp. (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.

Module-4

- 7 a. With a neat circuit diagram, explain the Operation of Non Saturating precision half Wave Rectifier. (10 Marks)
b. Explain the working of Successive Approximation Type ADC with neat sketch. (10 Marks)

OR

- 8 a. Explain the Operation of R – 2R ladder digital to Analog Converter Circuit. (10 Marks)
b. With a neat circuit diagram, explain the working of Precision full wave Rectifier. (10 Marks)

Module-5

- 9 a. Draw the basic block diagram of Phase Locked Loop (PLL) and explain its each component. (10 Marks)
b. With a neat diagram, explain the Internal Architecture of IC 555 Timer. (10 Marks)

OR

- 10 a. Draw and explain working of Monostable Multivibrator using 555 Timer and draw its Input – Output wave forms. (12 Marks)
b. Define the following terms related to PLL : (08 Marks)
i) Lock range ii) Capture range iii) Pull in Time iv) Tracking range.

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