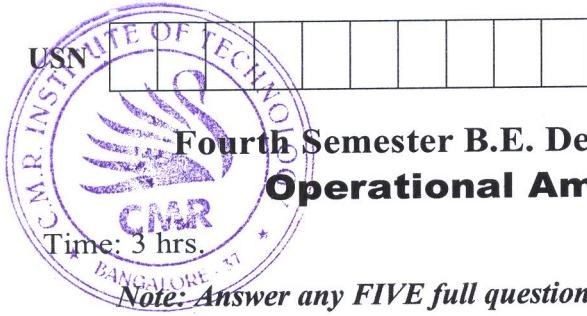


CBCS SCHEME

18EE46



Fourth Semester B.E. Degree Examination, June/July 2023 Operational Amplifiers and Linear ICs

Max. Marks: 100

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

Module-1

- 1 a. Define the following terms:
 - i) Bandwidth
 - ii) CMRR
 - iii) Slewrate
 - iv) Input offset voltage. (08 Marks)
- b. Mention the ideal characteristics of Op-Amp. (06 Marks)
- c. Draw the block diagram of Op-Amp and explain. (06 Marks)

OR

- 2 a. Derive an expression for the output of three inputs inverting amplifier and averaging amplifier. (12 Marks)
- b. Determine the value of all the components to design a peaking amplifier with a gain of 18 at a frequency of 25kHz. (06 Marks)
- c. Mention the good instrumentation amplifier requirements. (02 Marks)

Module-2

- 3 a. Compare an Active filter and Passive filter. (06 Marks)
- b. With a neat circuit diagram, explain second order low pass Butterworth filter. Derive the expression for the gain of the filter. (10 Marks)
- c. What are the advantages of active filter over the passive filter? (04 Marks)

OR

- 4 a. Define voltage regulator. With a neat block diagram, explain the regulated power supply. (12 Marks)
- b. With a neat circuit diagram, explain voltage follower regulator using Op-Amp. (08 Marks)

Module-3

- 5 a. With the neat circuit diagram, explain operation of triangular wave generator using Op-Amp. (06 Marks)
- b. Explain the operation of RC-Phase shift oscillator using Op-Amp. (08 Marks)
- c. Draw the circuit of an output stage for controlling the output amplitude and DC voltage level of a signal generator. Explain the operation. (06 Marks)

OR

- 6 a. Explain with the neat circuit diagram and waveform, the operation of inverting and non inverting zero crossing detector. (10 Marks)
- b. Comparison between Schmitt trigger and comparator. (06 Marks)
- c. For a non inverting regenerative comparator $R_1 = 100K\Omega$, $R_2 = 1K\Omega$ and $V_{sat} = \pm 13.5V$. Calculate tripping voltage. (04 Marks)

Module-4

- 7 a. What is precision rectifier? Draw and explain the operation of full wave precision rectifier using Op-Amp. (10 Marks)
b. Explain the half wave precision rectifier clipper circuit using Op-Amp. (10 Marks)

OR

- 8 a. Define the following terms of D/A converter:
i) Resolution
ii) Accuracy
iii) Monotonicity
iv) Conversion time
v) Stability. (10 Marks)
b. With a neat diagram, explain the working of R-2R ADC. (10 Marks)

Module-5

- 9 a. What is PLL? With neat diagram explain the PLL. (08 Marks)
b. Define lock range, capture range and pull in time for PLL. (06 Marks)
c. Explain how XOR gates can be used as phase detector in PLL. (06 Marks)

OR

- 10 a. Explain the basic working principle of timer circuit. (10 Marks)
b. With a neat circuit diagram, explain astable multivibrator using IC555. (10 Marks)

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