CBCS SCHEME

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18EE46

Fourth Semester B.E. Degree Examination, June/July 2024
Operational Amplifiers and Linear ICS

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Explain the general stages of op-amps with a neat block diagram. **(08 Marks)**

b. Design AC inverting amplifier, given following values $R_{in} = 50\Omega$, $C_i = 0.1\mu F$, $R_l = 100\Omega$, $R_F = 1K\Omega$, RL = $10K\Omega$, Supply voltages = ± 15V. Determine Bandwidth of the amplifier. **(06 Marks)**

c. List the advantages of negative feedback. **(06 Marks)**

OR

2 a. Sketch the 3-input inverting summing amplifier circuit. Explain the operation of the circuit and derive an equation for the output voltage. **(06 Marks)**

b. List the ideal characteristics of an op-amp. **(06 Marks)**

c. What is an instrumentation amplifier? For instrumentation amplifier using transducer bridge, obtain the expression for output voltage V_0 interms of change in resistance ΔR of the transducer. Draw the circuit diagram. **(08 Marks)**

Module-2

3 a. With a neat circuit diagram, explain the working of first order high pass filter and draw its typical frequency response curve. **(08 Marks)**

b. With a neat circuit diagram and frequency response, explain the working of low pass filter. **(08 Marks)**

c. List the advantages of active filters over passive-filters. **(04 Marks)**

OR

4 a. Explain the following performance parameters of DC voltage regulators:
i) Line regulation
ii) Load regulation
iii) Temperatures stability
iv) Ripple rejection. **(08 Marks)**

b. With a neat circuit diagram, explain the working of voltage follower regulator. **(06 Marks)**

c. Draw the circuit of a LM317 adjustable positive voltage regulator and explain its operation and design. **(06 Marks)**

Module-3

5 a. With a neat block diagram, explain the working principle of oscillator. **(06 Marks)**

b. With a neat circuit diagram, explain the operation of triangular/rectangular wave generator. **(08 Marks)**

c. Design the RC-phase oscillator to generate frequency of 200Hz, given C = 0.1μF. **(06 Marks)**

OR

6 a. With a neat circuit diagram and waveform, explain the working of non-inverting zero cross over detector. **(10 Marks)**

b. With a neat circuit diagram, explain the operation of inverting Schmitt trigger with waveforms. **(10 Marks)**

Module-4

7 a. With a neat circuit diagram and waveform, explain the working of precision full wave rectifier. **(10 Marks)**

b. With a neat diagram, explain the working of successive approximation type ADC. **(10 Marks)**

OR

8 a. With a neat circuit diagram, explain the working of 4-bit R-2R ladder digital to analog converter circuit and obtain an expression for output voltage. **(10 Marks)**

b. With a neat circuit diagram, explain the operation of Linear Ramp ADC. **(10 Marks)**

Module-5

9 a. With a neat block diagram, explain the operating principle of PLL. **(10 Marks)**

b. With a neat diagram and waveforms, explain the edge triggered phase detector. **(10 Marks)**

OR

10 a. Draw the neat diagram and explain the internal architecture of IC555 timer. **(10 Marks)**

b. With a neat circuit diagram and relevant waveforms, explain the working of Monostable Multivibrator using 555 timer. **(10 Marks)**

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