CBCS SCHEME

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15EE46

Fourth Semester B.E. Degree Examination, June/July 2018
Operational Amplifiers and Linear Integrated Circuits

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Discuss the Ideal characteristics of an OPAMP. **(04 Marks)**

b. Show that the output of subtractor is proportional to the different between the two input voltages. **(06 Marks)**

c. Draw and explain the operation of peaking amplifier. **(06 Marks)**

OR

2 a. For a non inverting amplifier, the values of R_1 and R_f are 1KΩ and 10KΩ respectively. The various op-amp parameters are, open loop gain is 2×10^5, input resistance is 2MΩ, output resistance is 75Ω, single break frequency is 5Hz, supply voltage are ±12V. Calculate the closed loop gain, Input Resistance, output Resistance and Bandwidth with feedback. **(08 Marks)**

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

Module-2

3 a. Derive the expression for the phase shift produced by an All pass Filter. **(08 Marks)**

b. With a neat diagram, explain the operation of a voltage follower regulator using OPAMP. **(08 Marks)**

OR

4 a. Explain the following performance parameters of voltage Regulator.
(i) Line Regulation (ii) Load Regulation (iii) Ripple Rejection. **(05 Marks)**

b. Design second order Low pass Filter for a cut-off frequency of 100Hz with capacitor selected as 0.1μF and draw the circuit diagram. **(05 Marks)**

c. Briefly explain with the help of schematic Diagram, the working of LM317 IC Regulator. **(06 Marks)**

Module-3

5 a. Draw and explain triangular wave generator using square wave generator and integrator method. Draw the required waveforms. **(10 Marks)**

b. With a neat circuit diagram and waveforms, explain the operation of inverting Schmitt trigger circuit with different LTP and UTP. **(06 Marks)**

OR

6 a. Using 741 OPAMP with a supply voltage of ±12V, design a RC phase shift oscillator to have an output frequency of 3.5 KHz. Draw the circuit diagram. **(06 Marks)**

b. Draw and explain the operation of voltage to frequency converter using OPAMP. **(05 Marks)**

c. Design the wein bridge oscillator circuit to have output frequency of 10KHz. Use C = 0.01μF. **(05 Marks)**

Module-4

7 a. Design the precision full wave rectifier circuit to produce a 2V peak output from a sine wave input with a 0.5V peak value and 1MHz frequency. Use Bipolar OPAMPS with a supply voltage of ± 15V. Choose adequate diode current as 500μA. Draw the circuit diagram. **(06 Marks)**

b. Explain the successive approximation A/D converter technique with the help of block diagram. **(05 Marks)**

c. Sketch and explain the working of sample and Hold circuit. **(05 Marks)**

OR

8 a. With a neat circuit diagram, explain the operation of a high input impedance full wave precision rectifier. Draw the voltage waveforms at various points in the circuit and write the appropriate equations to show that full wave ratification is performed. **(08 Marks)**

b. Explain the working of Dual slope ADC with the help of neat diagram. **(08 Marks)**

Module-5

9 a. Draw and explain the functional block diagram of IC 555. **(08 Marks)**

b. Explain PLL IC 565 application as frequency multiplier and frequency synthesizer. **(08 Marks)**

OR

10 a. Design an Astable multivibrator having an output frequency of 10KHz with a duty cycle of 25%, using IC 555. Use C = 0.01μF. **(08 Marks)**

b. What is phase locked loop? Explain the working of the building blocks of PLL. **(08 Marks)**

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