



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; Dec. - 2019

Op-Amp and Linear IC's

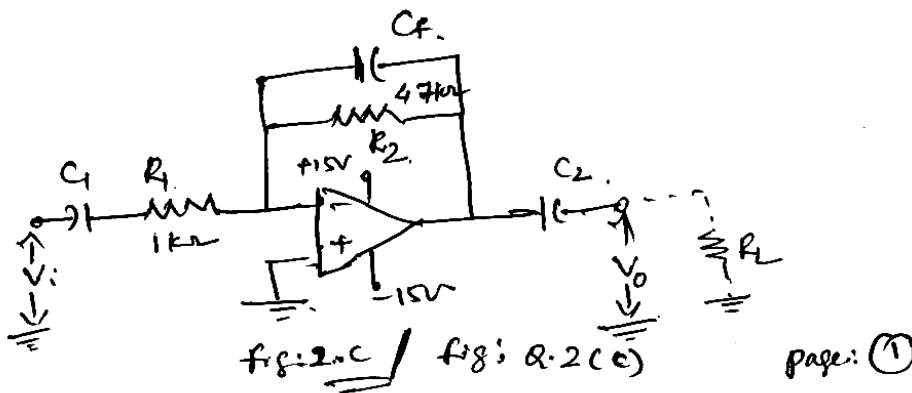
Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Sketch and explain the operation of high Zin capacitor coupled non inverting amplifier, with necessary equation. 10
- b. Design a capacitor coupled voltage follower using a 741 Op-Amp. The lower cut off frequency to be 50 Hz and the load resistance is $R_L = 3.9 \text{ k}\Omega$. 10
- 2 a. With a necessary circuit, explain the operation of capacitor coupled voltage follower. Describe the necessary equations. 10
- b. With a neat circuit diagram, explain capacitor coupled difference amplifier. 6
- c. The inverting amplifier designed to be capacitor coupled and to have a signal frequency range of 10 Hz to 1 kHz. If the load resistance is 250Ω . Calculate the required capacitor values for the following circuit: 4



UNIT - II

- 3 a. Explain in detail how stray capacitance affects the circuit instability with suitable circuit diagram? 10
- b. Describe Phase lag and Phase lead frequency compensating method with a suitable circuit diagram. 10
- 4 a. With a neat diagram, analyse the concept of Zin MOD compensation of an OP-Amp. 7
- b. Define and discuss Miller effect compensation. 8
- c. Explain the conditions need to be satisfied for an oscillations state of Op-Amp. 5

UNIT - III

- 5 a. Draw an Op-Amp Sample-and-hold circuit. Sketch the signal control and output voltage wave form. Explain the operation of the circuit. 10
- b. Design a high input impedance full wave precision rectifier circuit and explain its operation with a necessary circuit and waveform. 10
- 6 a. With necessary circuit, explain the operation of diode clamping and precision clamping circuit. 10
- b. Explain the operations of phase shift oscillator with a relevant circuit and waveforms. 10

UNIT - IV

- 7 a. Design a second order low pass filter circuit to have a cut-off frequency of 1 kHz. 8
- b. Using a 741 OP-Amp, design a band pass filter. The centre frequency is to be 1 kHz and the pass band is to be approximately ± 33 Hz on each side of 1 kHz. 6
- c. Explain with a block diagram and response curve, how band stop filter can be obtained using low pass and high pass circuit? 6
- 8 a. With relevant circuit and waveform, explain the operation of Zero crossing (inverting, non-inverting and voltage level detector). 10
- b. Explain the operation of non-inverting Schmitt trigger. With relevant circuit and waveform. 10

UNIT - V

- 9 a. What is PLL? Explain the operation of PLL with the help of block diagram. 6
- b. With a neat circuit diagram, explain the operation of an adjustable output regulator. 6
- c. Explain the theory of operation of the universal active filter. 8
- 10 a. With a neat circuit, explain the basics of voltage regulator and define line regulation, load regulation and ripple rejection. 6
- b. Sketch and explain the operation of precision voltage regulator. 7
- c. With a necessary circuit, explain the operation of voltage follower regulator using Op-Amp. 7

* * *