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10EC46

**Fourth Semester B.E. Degree Examination, Aug./Sept.2020**  
**Linear ICs and Applications**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1 a. With a neat circuit diagram, explain the basic opamp circuit. (06 Marks)  
b. Define the following parameters and mention its practical values for op-amp 741. (06 Marks)  
i) CMRR ii) input offset voltage iii) PSRR.  
c. Using a 741 op-amp, design an non – inverting amplifier to have a voltage gain of approximately 66. The Signal amplitude is to be 15mV. (08 Marks)
- 2 a. Sketch the circuit of capacitor coupled voltage follower and design its steps. (06 Marks)  
b. Design a high input impedance voltage follower. Calculate the minimum theoretical input impedance of the circuit. (10 Marks)  
c. What is meant by setting upper cut off in a capacitor coupled Amplifier? Explain how it can be achieved in an inverting op-amp? (04 Marks)
- 3 a. Define Gain margin and Phase margin and explain how they help for stability check. (08 Marks)  
b. Explain Miller effect compensation. (06 Marks)  
c. Calculate the slew rate limited cur – off frequency for a voltage follower circuit using a 741 op-amp if the peak of sine wave output is to be 5V. Also determine the maximum value of the sinusoidal output voltage that will allow the circuit to operate at the 800KHz, unity gain cutoff the frequency. Given typical slew rate for the 741 op-amp is 0.5V/rs. (06 Marks)
- 4 a. Draw the circuit of instrumentation amplifier, discuss the characteristics of the circuit and show how voltage gain can be varied. Also show the method of mulling common mode inputs and how dc output voltage can be level shifted. (12 Marks)  
b. A voltage source is to be designed to provide a constant output voltage of approximately 6V. The load resistance has a minimum value of 150Ω and the available supply is ± 12V. Design a suitable circuit. (08 Marks)

**PART - B**

- 5 a. Explain the operation of op-amp sample and hold circuit with signal, control and output waveforms. (08 Marks)  
b. Explain op – amp square wave/triangular wave generator with neat circuit diagram, waveform expressions. (06 Marks)  
c. Using a BIFET Op-amp with a supply of ±12V, design a wein bridge oscillator to have an output frequency of 15 KHz. (06 Marks)
- 6 a. With a neat circuit diagram, waveform and expressions , explain the capacitor coupled non – inverting cross detector. (10 Marks)  
b. Design a non inverting Schmitt Trigger circuit to have UTP = +3V and LTP = -5. Use a 741 op-amp with  $V_{CC} = \pm 15V$ . (10 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.

- 7 a. Mention the advantages of IC voltage regulator. Draw the internal schematic for IC regulator and briefly explain the working. (10 Marks)
- b. Explain briefly about 78XX and 79XX series voltage regulator. (10 Marks)
- 8 a. Draw the block diagram of PLL and explain it. (08 Marks)
- b. Explain OP – amp D/A converter with R and 2R resistor. (06 Marks)
- c. Explain 555 timer as monostable multivibrator with relevant circuit diagram, waveforms and expressions. (06 Marks)

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