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S.E.(Electrical & Electronics) Semester- IV (Revised Course 2007-08)  
EXAMINATION MAY/JUNE 2019  
Linear Integrated Circuits

[Duration : Three Hours]

[Max.Marks : 100]

**Instructions:**

1. Attempt any five questions, Select at least one question from each Module.
2. Draw a neat circuit Diagram, Waveform wherever necessary.
3. Assume Suitable data if required.

**MODULE-I**

- Q.1
- a. Explain the working of differential amplifier using Single Input Balanced configuration. Derive the expression of Gain. **08**
  - b. Describe the block diagram representation of a typical operation Amplifier. State the linear applications of an Op-amp. **08**
  - c. Discuss the significance of slew rate in selection of an Opamp. **04**
- Q.2
- a. Derive expressions for output impedance, input impedance and gain for an inverting amplifier. Design a Gain of inverting amplifier equal to 15 and draw the nature of output waveform, if applied voltage is 1V peak to peak at frequency=2 KHz. **10**
  - b. State the need of level translator circuit. **04**
  - c. Explain A.C characteristics of Operation Amplifier State the significance of Voltage follower circuit. **06**

**MODULE-II**

- Q.3
- a. Explain the working of positive clipper circuit, assume input applied is 1.5V and  $V_{ref}$  is 500mv. Draw the output waveform. How the response of the circuit will change when  $V_{ref}$  is set to -500mv. **06**
  - b. Explain the Integrator circuit realized using op-amp. **07**
  - c. Design R-2R ladder network to convert 3 bit digital data to analog voltage assume that the full scale voltage obtained should be equal to 7V. Determine the resolution of the circuit. **07**
- Q.4
- a. Discuss the main characteristics of a comparator circuit, Design a comparator which will generate output waveform with if input voltage applied is 5V peak to peak at  $f=1\text{kHz}$  and reference voltage is 1 V calculate the duty cycle of the output waveform produced. **07**

- b. Explain Analog to Digital Converter circuit using Successive approximation method. 07
- c. Explain limitations of an ordinary op-amp as differentiator? Draw the circuit of a practical differentiator that will eliminate these limitations. 06

**MODULE-III**

- Q.5
  - a. Discuss the application of filter circuit and Design low pass filter for a cut off frequency of 2 KHZ for a pass band gain of 2. 07
  - b. Discuss the Square Wave Generator, Design a square wave generator for a frequency of 2500Hz using IC 741. 06
  - c. Describe 555 timer as a astable multivibrator. Differentiate between monostable mode and astable mode of operation. 07
- Q.6
  - a. How Saw tooth oscillator are different from Triangular wave Generator? 05
  - b. Discuss the 555 as a monostable multivibrator, Derive the charging time  $T_p$  555 in monostable mode of operation. 10
  - c. Explain the RC phase shift oscillator circuit. 05

**MODULE IV**

- Q.7
  - a. Discuss the types of various Voltage Regulator. What factors are to be considered while selecting a Voltage regulator? 10
  - b. Briefly describe the working of Phase Detector using RS Flip-flop. Assume a PLL is running at a free running frequency of 3 KHz, determine capture range and Lock range of the PLL circuit (applied voltage is  $\pm 12V$   $C_2=0.1\mu F$ ,  $R_2=10K$ ,  $C_2=(\mu f)$ . 10
- Q.8
  - a. Discuss the need of Phase Locked Loop. Explain its working principle. 08
  - b. Explain the working of fixed voltage regulator. 06
  - c. Discuss how VCO is different from relaxation oscillator? Explain its working principle. 06