R10

Code No: R31043

Set No: 1

III B.Tech. I Semester Supplementary Examinations, June/July - 2014
LINEAR IC APPLICATIONS
(Common to Electronics and Communications Engineering & Electronics and Instrumentation
Engineering & Bio-Medical Engineering & Electronics and Computer Engineering)

Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Draw the equivalent circuits of emitter coupled differential amplifier from which calculate Ad.
   (b) Draw the block diagram of four stage cascaded amplifier. Explain the function of each block.

2. (a) Discuss the electrical characteristics of an OP-AMP in detail.
   (b) Discuss the three basic types of linear IC packages and briefly explain the characteristics of each.

3. For the inverting amplifier with a single supply shown below determine:
    (a) Band width. (b) Maximum ideal voltage swing.. (c) Sketch output waveforms VO and VO if Vin = 200 mV peak sine wave at 1 KHz.
   If R1 = 10 KΩ, R2 = R3 = Rf = 100 KΩ, Ci = CO = 0.1 μF.
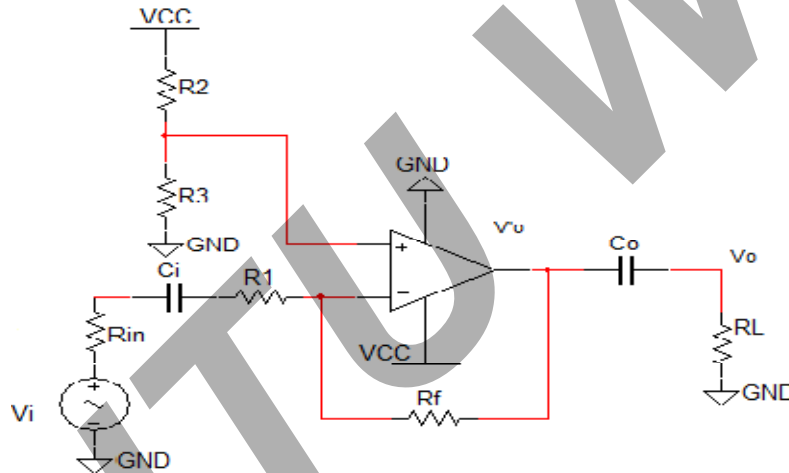
4. (a) Explain characteristics and limitations of op-amp comparators.
   (b) Explain operation of free running Multivibrator using op-amp.

5. (a) Calculate values of resistance required in a second order low pass Butterworth filter having cutoff frequency of 15Krad/s with a capacitor selected as 0.02μF.
   (b) Design a third order Butterworth low pass with upper cutoff frequency 1 KHz.

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6. (a) Configure a 555 timer as a Schmitt trigger and explain.
   (b) Explain frequency translation and FSK demodulation using 565 PLL.

7. (a) Draw the schematic circuit diagram of a Servo A/D converter and explain the operations of   this system.
   (b) Compare Servo A/D with other types of A/D converters

8. Derive the output voltage expression for: (i) Analog voltage multiplier circuit. (ii) Analog voltage divider circuit
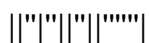
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1. (a) Explain the basic multiplier and its characteristics.
   (b) Explain the performance parameters of multiplier

2. (a) Explain the operation of antilog amplifier using Op-Amp
   (b) What is the main advantage of comparator based triangular wave generator over free running Astable multivibrator based circuit?

3. (a) Explain about any two nonlinear applications of OP-AMP.
   (b) Explain the principle of operation of Asymmetric square wave generator with suitable circuit.

4. (a) Draw the circuit diagram of an FET differential amplifier with active load and determine its voltage gain.
   (b) Compute the output signal and noise on the output of a differential amplifier from the following data. A_d = 100, CMRR = 100dB. V_{in1} = 50mV, V_{in2} = 100mV, with 1mV of nois input.

5. (a) explain and draw the frequency response characteristics of HPF filters. Band pass, Band reject and All pass filters
   (b) Design a notch filter, for f_0 = 50 Hz and draw the circuit

6. (a) Design a notch filter, for f_0 = 50 Hz and draw the circuit
   (b) Design a free running Multivibrator using 555 timer that generates a square wave o/p with 50% duty cycle of 1 KHz frequency. Assume timing capacitor as 0.01 μF.

7. (a) Classify commonly available analog to digital converters.
   (b) Describe the operation of successive approximation type analog to digital converter.

8. Explain
   (a) IC1496   (b)balanced modulator,

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Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
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*****

1. (a) explain Dual input Balanced output differential amplifier Configuration, and its Properties
   (b) Explain how CMRR of a differential amplifier can be improved.

2. (a) Draw pin diagram of IC 741 op-amp and explain it features.
   (b) Explain open loop configurations of op-amp
   (c) For a typical IC 741 op-amp, the parameters are given as I_{cq} =10 μA and C_c =33 pF.
   If peak value of input voltage is 12 V, find the maximum possible frequency of i/p voltage that can be applied to get undistorted output.

3. (a) Explain Inverting and Non-inverting amplifier with suitable circuits
   (b) Explain Integrator and differentiator amplifier with suitable circuits

4. (a) Draw the square wave generator circuit using op-amp and derive expression for frequency of oscillations.
   (b) Draw the precision half-wave rectifier and explain its operation

5. (a) Design a third order Butterworth low pass with upper cutoff frequency 1 KHz
   (b) Explain frequency translation and FSK demodulation using 565 PLL

6. (a) Give the circuit of monostable multivibrator with`555' timer, explain its operation by deriving expression for pulse width.
   (b) List the applications of PLL.

7. (a) Define the terms 'Accuracy' and 'settling time' of an Analog to Digital converter.
   (b) Explain in detail with a neat circuit diagram the operation of a parallel Comparator type Analog to Digital converter

8. Write short notes on: (a) Applications of analog switches.(b) Comparators.(c) All pass filter (d)V to I converter
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Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) explain Dual input Balanced output differential amplifier Configuration, and its Properties
   (b) Explain how CMRR of a differential amplifier can be improved.

2. (a) Explain the operation of antilog amplifier using Op-Amp.
   (b) What is the main advantage of comparator based triangular wave generator over free running Astable multivibrator based circuit?

3. Explain in detail about the following
   (a) Instrumentation amplifier,
   (b) AC amplifier,

4. (a) Explain characteristics and limitations of op-amp comparators
   (b) Explain operation of free running multivibrator using op-amp.

5. (a) Design a wide band reject filter $fh = 400Hz$ and $fl = 2KHz$ having the passband gainas`2'.
   (b) With the help of block diagram, explain the operation of 566.

6. (a) Explain Astable multivibrator circuit using 555.Also derive expression for time period.
   (b) Derive lock-range of PLL.

7. (a) Explain working principle of dual slope ADC
   (b) An 8 bit ADC outputs all is when V_i =5.1 V. Find resolution and digital o/p when $V_i = 1.28$ V

8. (a) Explain application of Gilbert cell multiplier as balanced modulator
   (b) Explain sample and hold amplifier

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