Code No: 45012 **R07** **Set No - 1**

III B.Tech I Semester Regular Examinations,Nov/Dec 2009
Linear IC Applications
Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Why should cascading of differential amplifiers be done? Draw the circuit and explain the operation of cascaded differential amplifier stages.
   (b) When a differential input of 1mV sin wt is applied to a differential amplifier the differential output is 0.5V sin wt. When both inputs are joined together and 1V sin wt is applied to the output is 200mV sin wt. Determine the CMRR. [8+8]

2. (a) With the help of circuit diagram and wave forms explain how IC 555 can be operated as monostable multi-vibrator.
   (b) What is the importance of Pin5 of IC 555? Explain. [10+6]

3. (a) Find the resolution of 12-bit D/A converter.
   (b) List the draw backs of binary weighted resistor technique D/A conversion.
   (c) Explain the working of inverted R-2R ladder D/A converter. [6+4+6]

4. (a) With the help of circuit diagram explain staircase and pulse generator.
   (b) Use ±15V power supply and IC741 design wien bridge oscillator for 1 KHz frequency. [8+8]

5. (a) Discuss the stability of an op-amp by considering non-inverting amplifier with resistive feed back.
   (b) For an op-amp PSRR = 70db (min) CMRR = 10^5 and differential mode gain Ad = 10^5. The output voltage changes by 20V in 4μSec calculate:
      i. PSRR
      ii. Common mode gain
      iii. Slew Rate. [8+8]

6. (a) Draw the circuit diagram of a triangular wave generator using a comparator and integrator. Explain its operation by referring to the output waveform.
   (b) What is window detector? Explain its operation. [8+8]

7. (a) What is an instrumentation amplifier? What are the basic requirements of a good instrumentation amplifier.
   (b) Design an instrumentation amplifier whose gain can be varied continuously over the range $1 \leq A \leq 1000$ use 100 kΩ potentiometer. [8+8]

8. (a) Draw the basic logarithmic multiplier circuit and explain how it multiplies two voltages

   (b) With the neat circuit diagram explain the operation of an op-amp based sample & hold circuit. [8+8]

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Code No: 45012 **R07** **Set No - 2**

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Answer any FIVE Questions
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1. Obtain the expressions for A_d, A_c, R_i and R_0 for dual input unbalanced output differential amplifier configuration. [16]

2. (a) What is the name of the circuit that is used to detect the peak value of non-sinusoidal input wave forms? Explain its operation?
   (b) Distinguish between positive and -ve chipper circuits. Explain the operation of +ve and -ve chippers with the help of circuit and wave form. [8+8]

3. (a) Define a filter? How filters are classified?
   (b) Explain various types of filters alongwith their frequency response.
   (c) Define the conditions on the feedback circuit of an amplifier to convert it into an oscillator. [6+6+4]

4. (a) Explain the operation of balanced modulator using diodes.
   (b) Briefly explain the following.
      i. Square circuit.
      ii. Square rooting circuit. 8+8]

5. (a) Write a short notes on
      i. Limitations of weighted resistor type D/A converters.
      ii. Resolution of a converter circuit.
   (b) Calculate the number of bits required to represent a full scale voltage of 10V with a resolution of 5 mV approximately. [8+8]

6. (a) An IC555 timer used as a monostable has R=20 KΩ and C = 0.01uf. What is the duration of output pulse?
   (b) Explain how IC555 can be used as missing pulse detector. [8+8]

7. (a) Explain how the averaging circuit can be derived from the summer.
   (b) Show that the output of the subtractor is proportional to the difference between the two input voltages.
   (c) Design the op-amp circuit which can give the output as $V_0 = 2\ V_1 - 3\ V_2 + 4V_3 - 5V_4$ [6+6+4]

8. (a) Explain the following parameters of an op-amp:
      i. Input bias current

ii. Input offset current

iii. Input offset voltage.

(b) An op-amp is given 7 KHz sine warye input signal. Find the largest amplitude of undistored output of the amplifier with I_{CQ} of 8μA and C_C of 27pF. [16]

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Code No: 45012 **R07** **Set No - 3**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) Using analog voltage multiplier circuit show that the output voltage is proportional to two analog input voltages V1 and V2.
   (b) Explain analog voltage divider circuit. [8+8]
2. (a) Compare monostable and astable multi-vibrators.
   (b) What are the features of IC 555 timer.
   (c) Design a timer, which should turn ON heater immediately after pressing a push button and should hold heater ON state for 5 seconds. [6+6+4]
3. (a) Explain the operation of a practical integrator with suitable mathematical expressions.
   (b) Obtain the frequency response of a practical integrator. What are its applications? [8+8]
4. (a) Draw the circuit diagram of a symmetrical emitter coupled differential amplifier and show that a very high CMRR will result if the differential amplifier is supplied by a constant current bias.
   (b) That parameters for the differential amplifier are given as R_C = 1kΩ R_S = 1kΩ h_{fe} = 1 KΩ and R_E = 2 MΩ neglecting h_{oe}, calculate differential mode gain, common mode gain and CMRR. The amplifier is dual input, balanced output configuration. [8+8]
5. (a) Explain the following parameters of an op-amp.
      i. CMRR
      ii. PSRR
      iii. Slew rate.
   (b) For an op-amp having a slew rate of 3V/μsec. What is the maximum closed loop voltage gain that can be used when the input signal varies by 0.4 in 12 μsec. [8+8]
6. (a) Write a note on multiplying DACs.
   (b) List important specifications of a standard ADC IC.
   (c) An 8 bit successive approximation Register type ADC is driven by a 1 MHz clock. Find its conversion time. [6+6+4]
7. (a) What is absolute value output circuit? How can it be used as a full ware rectification. [10]

b) For an op-amp Comparator assume ± V_{CC} = ± 12V, V_{sat} = 0.9V_{CC} If a sine wave of 10V is applied, calculate threshold level and plot input output waveforms [6]

8. (a) What is VCVS configuration. Explain.

   (b) Design a VCVS low pass butter worth second order filter with a cut off frequency of 4KHz assume necessary data. [8+8]

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Code No: 45012 **R07** **Set No - 4**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) Explain the performance parameters of a multiplier.
   (b) List the applications of multiplier. [8+8]
2. (a) Describe any two application of 555 timer in
      i. Astable multivibrator configuration.
      ii. Monostable multivibrator configuration. [8+8]
3. (a) Explain successive approximation ADC with the help of block diagram. Also illustrate conversion process.
   (b) An 8-bit successive approximation ADC is driven by a 1 MHz clock. Find its conversion time. [8+8]
4. (a) What are the limitations of comparator.
   (b) In the square wave oscillator as shown in figure 1 , calculate the frequency of oscillations. If R_2= 10KΩ R_1= 8.6KΩ R_f= 100KΩ and C = 0.01uf. [8+8]
5. (a) Draw the circuit diagram of emitter coupled differential amplifier and perform D.C. analysis.
   (b) Determine the output-voltage of a differential amplifier for the input voltage of 300μV and 240μV. the differential gain of the amplifier is 5000 and the value of CMRR is 100. [8+8]
6. (a) Explain the operation of voltage to current converter.
      i. With floating load
      ii. Grounded load.
   (b) An inverting amplifier using op-amp has R_1 = 10 kΩ and R_f = 47 KΩ. It is applied with 2V peak to peak sine wave. An AC voltmeter is used between the output terminal and ground to measure the output voltage calculate the reading on the voltmeter. Assume supply voltage to be ± 12V. [8+8]
7. (a) Derive the expression for voltage to frequency conversion factor.
   (b) Draw the pin diagram of 566 VCO IC and list important specifications of 566 VCO IC. [8+8]
8. Discuss Dominant pole, pole zero and Feed Forward compensation technique. What are its merits and demerits. [16]

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Code No: 45012 **R07** **Set No - 4**

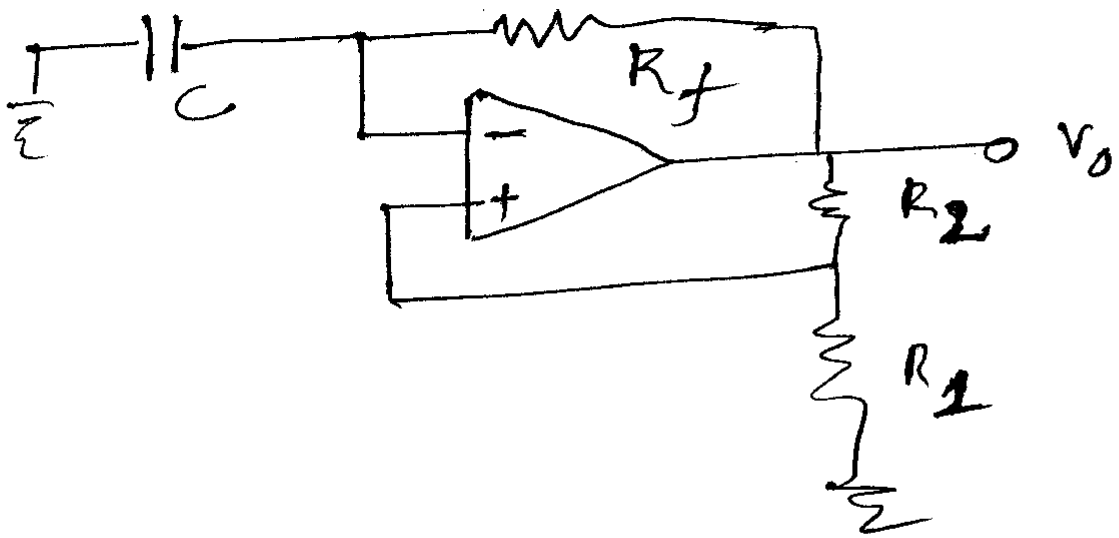

Figure 1: