



Reg. No. :



Name :

**Fourth Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)**

**Branch : ELECTRONICS AND COMMUNICATION ENGINEERING
08.405 : Analog Integrated Circuits (T)**

Time : 3 Hours

Max. Marks : 100

Instructions : 1) Answer **all** questions in Part A. **Each** question carries 4 marks.
2) Answer **any two** questions from **each** Module in Part B. **Each** question carries 10 marks.

PART – A

1. Explain the need of frequency compensation in op-amp.
2. For an op-amp having slew rate of $2V/\mu\text{sec}$, what is the maximum closed-loop voltage gain that can be used when the input signal varies by 0.5 V in $10\mu\text{sec}$?
3. The bandwidth of audio amplifier using 741 is to be 20 KHz. Determine the maximum closed-loop gain for the audio amplifier.
4. What is the input impedance of an inverting amplifier with $R_1 = R_F = 10\text{K}$ if the input impedance of the op.amp. is $100\text{K}\Omega$?
5. Show how a capacitor in conjunction with two switching transistors can be act as resistor.
6. Explain resolution and offset error in ADC.
7. Give a one-pole low-pass switched capacitor filter circuit.
8. What is the role of lowpass filter in PLL ?
9. How to configure PLL as frequency multiplier ?
10. How to incorporate foldback protection in 723 ?



PART – B
Module – I

11. Draw the circuit diagram of folded cascade MOS op.amp. and what are its advantages ?
12. a) For an inverting amplifier with $R_1 = 20\text{K}\Omega$ and $R_F = 100\text{K}\Omega$ used an op.amp. having open-loop gain of 10^3 . Determine overall closed loop gain.
b) Explain the instrumentation amplifier circuit using three op.amp and derive the expression for its difference mode gain.
13. a) Explain the working of non-inverting Schmitt trigger using op.amp.
b) Design a linear sweep voltage generator using op.amp. using only one capacitor to have $\pm 5\text{V}$ sweep at 1KHz .

Module – II

14. a) Derive the transfer function of second order Butterworth low pass filter.
b) Design a unit gain Sallen-key low pass filter with $f_o = 5\text{KHz}$ and $Q = 2$.
15. a) Explain the principle of dual slope ADC with circuit diagram.
b) What is the maximum resistance ratio required by a 12 bit DAC utilizing a binary-weighted ladder ?
16. a) Explain the gyrator circuit using op.amp. and how it can be configured as BPF.
b) What is the principle of operation of Tow-Thomas biquad filter ?

Module – III

17. a) Explain the working principle of Gilbert multiplier cell.
b) How to configure multiplier as balanced modulator ?
18. a) What is the role of a low pass filter and VCO in PLL ?
b) A first order PLL with $K_V = 10^4\text{s}^{-1}$ used a VCO with free running frequency of 10KHz and a sensitivity of 5Hz/V . What is the control voltage needed to lock the PLL on a 20KHz input signal ?
19. a) What are the major differences between digital and analog PLLs ?
b) Design an astable multivibrator using 555 timer which will turn on a LED for 4 seconds and turn off for 2 seconds alternatively.