

II B.Tech I Semester Supplementary Examinations, May 2005
LINEAR & DIGITAL IC APPLICATIONS
(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Derive the expression for CMRR for the first stage differential amplifier
(b) Explain about any two linear and nonlinear applications of OP-AMP
2. (a) What is Gyrator circuit? Explain its operation with a neat circuit diagram
(b) What is a sample and hold circuit? Why is it needed? With neat circuit diagram, describe the operation of an OP-AMP based sample and hold circuit.
3. (a) Draw the schematic diagram of Wien Bridge Oscillator and derive the expression for frequency of oscillation
(b) What are the conditions to be satisfied by a circuit to produce oscillations?
4. (a) Explain the operation of Monostable multivibrator using 555 timer. Derive the expression of time delay of a Monostable multivibrator using 555 timer.
(b) Design a Monostable multivibrator using 555 timer to produce a pulse width of 100 m sec.
5. (a) Explain the terms Lock range, Capture range and Pull-in time a PLL. How are Lock Range and Capture range determined?
(b) Design a PLL circuit using IC 565 to get
 - i. Free-running frequency = 4.5 KHz
 - ii. Lock range of 2 KHz and
 - iii. Capture range = 100 Hz .Assume a supply voltage of + or - 10V. Show the circuit diagram with all component values.
6. (a) What are the advantages of active filters over passive ones?
(b) Design a second order low pass Butterworth filter for a cut off frequency of 2 kHz . Assume necessary data.
(c) What is an all pass filter? Draw the circuit of the filters.
7. (a) List out the advantages of CMOS logic.
(b) Draw the circuit of CMOS NOR gate and verify the Boolean function.
(c) Give the working principle of I^2L logic with neat circuit diagram.

8. (a) What is a sample-and-hold circuit? Draw the circuit diagram and explain its action?
- (b) With reference to sample and hold circuit define the following terms:
 - i. Aperture time
 - ii. Hold mode.
- (c) Draw the circuit of Weighted Resistor DAC and derive expression for output analog voltage V_o .

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