

**III B.Tech I Semester Supplementary Examinations, May 2005**  
**LINEAR & DIGITAL IC APPLICATIONS**  
( Common to Electronics & Communication Engineering, Electronics &  
Instrumentation Engineering, Electronics & Control Engineering,  
Mechatronics and Electronics & Telematics)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions**  
**All Questions carry equal marks**

\*\*\*\*\*

1. Explain in detail all the dc and ac characteristics of an ideal OP-AMP with relevant expressions
2. (a) Draw the circuit diagram of a two input non inverting type summing amplifier and derive the expression for output voltage.  
(b) Briefly explain why negative feedback is desirable in amplifier applications  
(c) How does negative feedback affect the performance of an inverting amplifier?
3. (a) Derive the frequency of oscillation of a RC phase shift oscillator and explain the operation of the circuit.  
(b) Define supply voltage sensitivity. What is meant by poorly regulated power supply?
4. Explain the use of 555 timer as free running ramp generator and draw the output waveforms.
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 =  $4.5\text{ KHz}$
  - ii. Lock range of  $2\text{ KHz}$  and
  - iii. Capture range =  $100\text{ Hz}$ .Assume a supply voltage of + or - 10V. Show the circuit diagram with all component values.
6. (a) Explain the term "Frequency Sealing" with suitable example.  
(b) Design a wide band-pass filter with  $f_L=200\text{Hz}$ .  $F_H=1\text{KHz}$  and a pass-band gain=4. Draw the frequency response and calculate 'Q' factor for the filter.
7. (a) When do we prefer H.T.L. (High-Threshold Logic) gate? And explain why ?  
(b) Draw the Integrated circuit of H.T.L. 3-input NAND gate, and explain its operation with the help of Truth Table.  
(c) Find out the average power dissipation of the gate.
8. (a) List out different types of A/D converters.

- (b) Draw the schematic circuit diagram of dual-slope A/D converter and explain its operation. Derive expression for output voltage.
- (c) Compare dual-slope A/D converter with successive approximation A/D converter.

\*\*\*\*\*