

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
LINEAR & DIGITAL IC APPLICATIONS  
( Common to Electrical & Electronic Engineering and Electronics &  
Computer Engineering)**

Time: 3 hours

Max Marks: 80

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

\*\*\*\*\*

1. (a) Discuss the electrical characteristics of an OP-AMP in detail. [10]  
 (b) Draw an ideal voltage transfer curve of an OP-AMP. [3]  
 (c) What are the features of IC 741? [3]
2. (a) Explain the differences between ac and dc amplifiers [6]  
 (b) What is instrumentation amplifier? What are its features? List any three applications of instrumentation amplifier. [10]
3. (a) Derive the frequency of oscillation of a RC phase shift oscillator and explain the operation of the circuit. [12]  
 (b) Define supply voltage sensitivity. What is meant by poorly regulated power supply? [4]
4. (a) Draw the circuit of Schmitt trigger using 555 timer and explain its operation. [8]  
 (b) How is an Astable multivibrator using 555 timer connected in to a pulse position modulator? [8]
5. (a) Draw the schematic circuit diagram of the following and explain their working. [12]
  - i. Analog phase detector
  - ii. VCO
 Derive necessary expressions.  
 (b) What is their role is in PLL? Explain. [4]
6. (a) Derive the transfer function for a general second order sallen-key filter with suitable circuit diagram. [8]  
 (b) Design a Butterworth filter for a given normalized polynomial of  $S^2+1.414S+1$ . Assume necessary data. [8]
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. [10]  
 (c) Find out the average power dissipation of the gate. [2]

8. (a) Compare different A/D converters for their merits and demerits. [8]
- (b) Give the schematic circuit diagram of a successive approximation type A/D converter and explain the operations of this system. [8]

★ ★ ★ ★ ★