

Code: EE5T5

III B.Tech - I Semester – Regular Examinations – November 2015

**LINEAR & DIGITAL INTEGRATED CIRCUIT
APPLICATIONS
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Answer any FIVE questions. All questions carry equal marks

1. a) Compare and contrast an ideal op - amp and practical op - amp. 6 M
b) List out the AC characteristics of an op-amp and discuss about them. 8 M
2. a) Design a differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 KHz. If a sine wave of 1 Volt peak at 1000 Hz is applied to this differentiator draw the output waveforms. 10 M
b) Draw the circuit diagram of a two input non-inverting type summing amplifier and derive the expression for the output voltage. 4 M
3. a) List the conditions for oscillation in all the three types of oscillators, namely, RC phase shift, Wien - bridge and quadrature oscillators. 8 M

- b) Explain, How to obtain triangular wave using a square wave generator? 6 M
4. a) Explain an application in which the 555 timer can be used as Astable multivibrator. 8 M
- b) Give the functional block diagram of VCO NE 566 and explain its working and necessary expression for free running or center frequency. 6 M
5. a) Derive the expression for the transfer function of 2nd order High pass filter. 8 M
- b) Compare merits and demerits of A/D converters. 6 M
6. a) Design a full-adder with two half-adders and basic gates. 6 M
- b) Draw the logic diagram of a single bit comparator. 8 M
7. a) Realize D-latch using R-S latch. How it is different from D-flip flop? Draw the circuit using NAND gates and explain. 8 M
- b) Draw the circuit diagram of 4-bit Johnson counter using D-flip flop and explain its operation with the help of bit pattern. 6 M

8. a) Design a PLA to realize the following three logic functions and show the internal connections. 8 M

$$F_1(a, b, c, d, e) = a^1 b^1 d^1 + b^1 c d^1 + a^1 b c d e^1$$

$$F_2(a, b, c, d, e) = a^1 b e + b^1 c d e^1$$

$$F_3(a, b, c, d, e) = a^1 b^1 d^1 + b^1 c d^1 e + a^1 b c d$$

- b) With the help of internal structure of a small SRAM and its timing diagram, describe read and write operations performed in the SRAM. 6 M