

Code No: 55009

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year I Semester Examinations, February/March - 2016****IC APPLICATIONS****(Common to EEE, ECE, ETM)****Time: 3 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

- 1.a) Derive the expressions to show that an op-amp can be used as (i) scale changer (ii) voltage follower.
- b) With a neat circuit diagram explain differential mode of op-amp. [8+7]
- 2.a) What are the limitations of an ordinary op-amp integrator? Draw the circuit of a practical integrator and explain how it will eliminate these limitations.
- b) Design an op-amp differentiator that will differentiate an input signal with $f_{\max} = 100\text{Hz}$. Draw the output waveform for a sine wave of 1V peak at 100Hz applied to the differentiator. Repeat the same for square wave input. [7+8]
- 3.a) Explain Quadrature type oscillator using op-amp.
- b) With a neat circuit diagram and necessary waveforms explain triangular wave generator using op-amp. [7+8]
- 4.a) Draw and explain the internal schematic of a 555 timer IC.
- b) What is the principle of PLL? Draw the block schematic and explain the same. [8+7]
- 5.a) Explain R-2R ladder type DAC with the help of a circuit.
- b) Compare direct conversion and indirect conversion techniques of ADCs. [8+7]
- 6.a) Explain in detail about comparison of different logic families.
- b) Explain IC interfacing for TTL driving CMOS. [8+7]
- 7.a) Explain the differences between a MUX and a DEMUX. Realize 16-input multiplexer by cascading of two 8-input multiplexers 74151.
- b) Realize the function $f(A,B,C,D) = \sum m(1,2,5,8,10,14) + d(6,7,15)$ using (i) 16:1 MUX (ii) 8:1 MUX (iii) 4:1 MUX. [7+8]
- 8.a) Explain the differences between asynchronous and synchronous counters. Design a MOD-10 ripple counter.
- b) Design and construct MOD-5 synchronous counter using JK flip flops. [8+7]