Sub Code: VDT-307 **ROLL NO.**

Model Question Paper

COURSE: M.TECH **BRANCH**: VLSI DESIGN
SEMESTER: 1 . **SUBJECT**: Mixed Signal IC Design
Duration: 3:00 hrs **Max marks: 100**

Note: - Attempt all questions: All Questions carry equal marks

Q 1.Attempt any four parts of the following (5x4=20)

(a) Why CMOS Technologies is preferred over other fabrication technologies for Analog-Mix-Signal Integrated Circuits?
(b) Justify the need of analog circuit components in the era of Digital Transformation.
(c) Give a comparative analysis of analog continuous time filters and digital filters.
(d) Explain how a MOSFET can be used as a Current Controlled Current Source.
(e) Discuss analog design octagon and its significance in analog mixed signal integrated circuits.
(f) How Z-transform is related to the Laplace transform?

Q 2.Attempt any four parts of the following (10x4=20)

(a) What is switched capacitor? Design a switched capacitor realization for a first order, high pass circuit with a high frequency gain of -10 and a -3dB frequency of 1 kHz using a clock of 100kHz
(b) Draw the circuit diagram and explain the working of a Switched Capacitor (SC) integrator.
(c) Discuss key technical challenges and market challenges before mixed signal IC design engineers and also discus some important manufacturers leading the market in the field of Mixed signal ICs.

Q 3.Attempt any two parts of the following (10x2=20)

(a) With neat diagram, explain the working of a sample and hold circuit.
(b) Give the classification of ADC architectures based on the conversion rate. Also explain the static and dynamic characteristics of ADCs.
(c) What is time interleaving? Explain the operation of a time interleaved ADC.

Q4.Attempt any two parts of the following: (10x2=20)

(a) What are the dynamic characteristics that influence the performance of DACs?
(b) What is a flash converter? Discuss the working of a 3-bit flash A/D Converter.
(c) Write short critical note on hybrid data converters.

Q5.Attempt any two parts of the following: (10x2=20)

(a) Explain the dynamics of a simple PLL Circuit. Also explain the Jitter in PLLs and delay locked loops.
(b) Draw the block diagram of a charge pump PLL and explain the functions of each block.
(c) Differentiate the working of analog PLL circuits from digital PLL Circuits. With the help of necessary waveforms, explain about the non-ideal effects in PLLs.