Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(NEW) EXAMINATION – SUMMER 2023

Subject Code:3130907 Date:28-07-2023

Subject Name:Analog & Digital Electronics

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define Slew Rate, CMRR, & Input Offset Voltage.	**03**
	(b)	What is cross over distortion in power amplifier?	**04**
	(c)	Sketch the block schematic of a typical operational amplifier and briefly explain the function of each block.	**07**
Q.2	**(a)**	List applications of instrumentation amplifier.	**03**
	(b)	Design an R-C phase shift oscillator to produce a sinusoidal output at 1KHz, using capacitor value 0.1 μF.	**04**
	(c)	Draw integrator circuit with example of input and output Waveforms. Derive expression for output voltage.	**07**
		OR	
	(c)	Draw & explain in detail the logic diagram & the truth table of clocked SR flip-flop.	**07**
Q.3	**(a)**	For an inverting amplifier, V1 = 1V, V2 = 3V, V3 = 2V with R1 = R2 = R3 = 2KΩ and RF = 3KΩ. Determine the output voltage.	**03**
	(b)	Implement the following function using 8:1 Multiplexer. $F(A,B,C,D) = \bar{A}B\bar{D} + ACD + \bar{B}CD + \bar{A}\bar{C}D$	**04**
	(c)	Explain the circuit diagram of op-amp as a Peak detector.	**07**
		OR	
Q.3	**(a)**	Simplify $\bar{A}BC\bar{D} + BC\bar{D} + B\bar{C}\bar{D} + B\bar{C}D$.	**03**
	(b)	Classify digital logic gates. Draw truth table and symbols of basic logic gates.	**04**
	(c)	Prove that NAND and NOR gates are universal gates.	**07**
Q.4	**(a)**	Design D FF using SR FF. Write truth table of D FF.	**03**
	(b)	Explain Master-Slave J-K flip-flop configuration.	**04**
	(c)	Simplify the Boolean function F(A,B,C,D) = Σm (1,5,6,12,13,14), Σd=(2,4) using K-map method. Implement using basic logic gates.	**07**
		OR	
Q.4	**(a)**	Design half subtractor logic circuit.	**03**
	(b)	Write short note on Gray code.	**04**
	(c)	Explain Half Adder circuit .Explain Full adder circuit with the help of two Half adder.	**07**
Q.5	**(a)**	Compare RC phase shift and Wien bridge oscillator.	**03**
	(b)	Explain R-2R ladder DAC with necessary diagram.	**04**
	(c)	Explain the working of Zero crossing Detector.	**07**

OR

Q.5	**(a)**	Define following a) Attenuation b) Pass Band c) Cut of frequency	**03**
	(b)	Draw Schmitt trigger circuit. Plot input and output waveforms.	**04**
	(c)	List out various commonly used A/D converters. Draw & explain Flash A/D converter with necessary decoding table. Also mention pros & cons of the same.	**07**

****