Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III EXAMINATION – SUMMER 2025

Subject Code:3130907 Date:31-05-2025

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)**	State all ideal characteristics of an opamp	**03**
	(b)	Describe Input Offset Voltage and Input Bias Current	**04**
	(c)	Describe the working of JK master slave FF with necessary truth tables and waveforms	**07**
Q.2	**(a)**	Discuss the working of Zero Crossing Detector with necessary diagram and waveforms	**03**
	(b)	Sketch the block diagram of an opamp and briefly explain the function of each block	**04**
	(c)	Discuss (i) CMRR (ii) Slew Rate	**07**
		OR	
	(c)	Explain the working of an Integrator with necessary diagrams	**07**
Q.3	**(a)**	Compare RC phase shift and Wien bridge oscillator	**03**
	(b)	A noninverting opamp with R_1 = 1kΩ and R_F = 10kΩ has following parameters: A = 200,000, R_i = 2MΩ, R_o = 75Ω, f_o = 5Hz, Supply voltages = ±15V, Output Voltage Swing = ±13V. Solve and find the values of A_F, R_{iF}, R_{oF}	**04**
	(c)	Describe the working of Instrumentation Amplifier using opamp. List it's advantages and applications	**07**
		OR	
Q.3	**(a)**	Write a brief note on Voltage Follower circuit	**03**
	(b)	Compare a Comparator and Schmitt Trigger circuit	**04**
	(c)	Explain the working of closed loop opamp in non-inverting mode and derive the voltage gain formula	**07**
Q.4	**(a)**	Compare Combinational and Sequential Digital circuits	**03**
	(b)	Discuss the applications of shift registers	**04**
	(c)	Minimize the following expressions using K maps: (i) $F = \Sigma m\ (4,5,7,12,14,15) + \Sigma d\ (3,8,10)$ (ii) $F = \Pi M\ (0,3,7,8,9,10,11,15) \bullet \Pi d\ (2,4)$	**07**
		OR	
Q.4	**(a)**	List the steps to be followed in Quine Mckluskey method	**03**
	(b)	Describe the working of a decimal to binary encoder with the help of logic diagram and truth table	**04**
	(c)	Write a note on Ring Counter	**07**
Q.5	**(a)**	Explain the following terms of DAC: a) Accuracy b) Resolution c) Setting time	**03**
	(b)	Explain resolution and quantization error about ADC	**04**

	(c)	Draw & explain R-2R ladder D/A converter with necessary equations	**07**

OR

Q.5	**(a)**	List Analog to Digital Converter ICs	**03**
	(b)	Illustrate different methods for analog to digital conversion	**04**
	(c)	Draw the block diagram and explain about a 3 terminal voltage regulator	**07**

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