Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– IV EXAMINATION – SUMMER 2026

Subject Code:3142408 Date:28-05-2026

Subject Name:Analog & Digital Circuits

Time:10:30 AM TO 01:00 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 the following **a)** Input Offset Current **b)** Slew Rate **c)** Input Bias Current	**03**
	(b)	Compare inverting and non-inverting op-amps.	**04**
	(c)	Draw the block schematic of a typical operational amplifier Op-Amp and briefly explain the function of each block.	**07**
Q.2	**(a)**	Draw and explain working of zero crossing detector	**03**
	(b)	Explain voltage follower with it's application.	**04**
	(c)	With neat circuit diagram explain the working of an Integrator with relevant waveforms.	**07**
		OR	
	(c)	Draw the circuit op-amp as differentiator and explain with necessary waveforms.	**07**
Q.3	**(a)**	Compare SOP and POS	**03**
	(b)	Compare combinational logic circuit with sequential logic circuit	**04**
	(c)	Minimize following Boolean function using K-map: $F(A,B,C,D) = \Pi\, M(1, 2, 3, 8, 9, 11, 14) \bullet d(7, 15$	**07**
		OR	
Q.3	**(a)**	Compare Multiplexer and Demultiplexer.	**03**
	(b)	Explain Full adder logic circuit.	**04**
	(c)	Minimize following Boolean function using K-map: $Y(A,B,C,D) = \Sigma\, m(0, 3, 5, 6, 9, 10, 12, 15)$	**07**
Q.4	**(a)**	Explain Master-Slave J-K flip-flop configuration	**03**
	(b)	Write a short notes on Parallel in serial out shift register	**04**
	(c)	Draw 4-bit down counter; explain its working with timing diagram and truth table.	**07**
		OR	
Q.4	**(a)**	Classify the various modes of operation of shift register.	**03**
	(b)	Draw & explain in detail the logic diagram & the truth table of clocked SR flip-flop	**04**
	(c)	Design 4-bit up/down ripple counter	**07**
Q.5	**(a)**	Sketch sample and hold circuit and explain its working.	**03**
	(b)	Define following specification of ADC 1)Conversion Time 2)Resolution 3)Quantization	**04**

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

OR

Q.5	**(a)**	Compare various D/A converters	**03**
	(b)	Write a brief note on quantization and encoding.	**04**
	(c)	Explain working of Successive approximation type ADC	**07**

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