Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III EXAMINATION – WINTER 2025

Subject Code:3132003 Date:15-12-2025

Subject Name: Design Concepts in Basic Electronics

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)**	Explain the Positive Biased Clipper circuit with figure.	**03**
	(b)	Differentiate between analog system and digital system.	**04**
	(c)	Explain 8×1 Multiplexer with circuit diagram.	**07**
Q.2	**(a)**	Convert : (1). $(0.6875)_{10}=(\_\_\_\_\_)_2$ (2). $(673.124)_8 = (\_\_\_\_\_)_2$ (3). $(10110001101011.111100000110)_2 = (\_\_)_8$	**03**
	(b)	Draw the logic diagram and state truth table for J-K -flip flop.	**04**
	(c)	Simplify the Boolean function F(A,B,C,D) = Σ(0,1,2,5,8,9,10) in sum of products using k-map with GATE implementation and truth table.	**07**
		OR	
	(c)	Explain significance of digital system with block diagram.	**07**
Q.3	**(a)**	Design and explain half adder combinational logic circuit.	**03**
	(b)	Explain forward bias V-I characteristics of PN junction diode.	**04**
	(c)	Explain with neat diagram working of 4-bit bidirectional shift register with parallel load.	**07**
		OR	
Q.3	**(a)**	Briefly explain intrinsic material and extrinsic material.	**03**
	(b)	Construct and explain working of 3-bit decoder.	**04**
	(c)	Explain input and output characteristics of CB configuration of transistor.	**07**
Q.4	**(a)**	Explain Voltage Tripler circuits with circuit diagram.	**03**
	(b)	Design 1-Bit magnitude comparator.	**04**
	(c)	Design 3bit up-down synchronous counters with help of T-flip flop.	**07**
		OR	
Q.4	**(a)**	Explain Capacitor Filter for bridge rectifier with circuit diagram and waveforms.	**03**
	(b)	Explain the input output characteristics of N-P-N transistor in CE configuration.	**04**
	(c)	Derive the following parameter for full wave bridge rectifier. 1) RMS load current, 2) RMS load Voltage, 3) Average load Current, 4) PIV 5) Average load Voltage, 6) Ripple Factor.	**07**
Q.5	**(a)**	What are the applications of Transistor-Transistor Logic (TTL) circuits?	**03**
	(b)	Explain 3-bit Asynchronous Counter in detail.	**04**
	(c)	Explain emitter feedback bias for transistor.	**07**
		OR	
Q.5	**(a)**	Prove (A + B)(A + C) = A + BC using Boolean Algebra.	**03**
	(b)	Briefly explain min-terms and max-terms with suitable example.	**04**
	(c)	Explain error detection using parity bit.	**07**

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