

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3130306****Date:01-08-2023****Subject Name: Fundamentals of 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) Subtract the following decimal numbers using 2's complement method, 52-17.	03
(b) Explain EX-OR and EX-NOR gate.	04
(c) Explain AND, OR, NOT, NAND and NOR gate with truth table, symbol. Why NAND & NOR gates called Universal gates?	07
Q.2 (a) Encode data bits 1101 into the 7-bit even parity Hamming code.	03
(b) Reduce the expression $f = A + B[AC + (B + \bar{C})D]$	04
(c) Explain Classification of Binary codes.	07
OR	
(c) Explain Full adder in detail.	07
Q.3 (a) Draw logic diagram of Boolean expression $f = A + A\bar{B} + \overline{A}BC + B\bar{C}$.	03
(b) Expand $f = A(A+B+C)$ to maxterms and minterms.	04
(c) Use a Multiplexer to implement the logic function $= A \oplus B \oplus C$.	07
OR	
Q.3 (a) Explain SOP and POS representation of Boolean Expression.	03
(b) Write Comparison of PLA, PAL and PROM.	04
(c) Find the minimal expression for $f = \sum m\{2,3,8,12,13\} + d(10,14)$ using Kmap.	07
Q.4 (a) Define Fan in, Fan out, Propagation Delay.	03
(b) Describe Octal to Binary Encoder.	04
(c) Design 4-bit Binary to Gray Code Converter.	07
OR	
Q.4 (a) Explain T Flip –flop.	03
(b) Describe Master- Slave S-R flip flop.	04
(c) Using the tabular method, obtain the minimal expression for $f = \sum m\{6,7,8,9\} + d(10,11,12,13,14,15)$.	07
Q.5 (a) Subtract the following decimal numbers using 9's complement method, 524.7-17.5	03
(b) Explain Ring counter.	04
(c) Explain negative edge triggered JK flip-flop.	07
OR	
Q.5 (a) Prove De morgan theorem by using Truth table.	03
(b) Explain Serial IN, Serial Out shift register.	04
(c) Design Synchronous 3-bit Down Counter using JK flip flop.	07
