

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
M.SC INTEGRATED - SEMESTER - III EXAMINATION - SUMMER 2025

Subject Code: 1330504

Date: 16-05-2025

Subject Name: 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. Use of simple calculators and non-programmable scientific calculators are permitted.**

	Marks
Q.1 (a) Convert the decimal number 225.225 to binary number and octal number.	03
(b) Do as directed. 1. Convert the decimal number 43 to hexadecimal number. 2. Find 1's complement of 000. 3. Find 2's complement of 000. 4. Convert Gray code 11011 in to binary number.	04
(c) Draw the symbol of all the logic gates and write their truth tables only.	07
Q.2 (a) Prove following Boolean functions using Boolean theorems. 1. $x(x'+y)=xy$ 2. $xy+xy'=x$ 3. $(A'+B')'=AB$	03
(b) Simplify the Boolean function $F(x, y, z)=\sum(0, 2, 4, 5, 6)$. Also draw the AOI logic diagram.	04
(c) Explain 3 to 8 line decoder with truth table and logic diagram	07

OR

(c) Design binary to Gray code converter.	07
Q.3 (a) Design half subtractor.	03
(b) Explain 4 to 1 multiplexer with truth table and logic diagram.	04
(c) Explain JK flip-flop. Also write characteristic table and derive characteristic equation of it.	07

OR

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| (a) Design 1-bit magnitude comparator. | 03 |
| (b) Implement the Boolean function $F=AB'CD'+A'BCD'+AB'C'D+A'BC'D$ using EX-OR and AND gates. | 04 |

- (c) Explain SR latch using NOR gates and SR latch using NAND gates with truth table and logic diagram. **07**
- Q.4** (a) Write the comparison between combinational and sequential circuits. **03**
- (b) Convert JK flip-flop to D flip-flop. **04**
- (c) Design a Mod-10 asynchronous counter using T flip-flops. **07**
- OR**
- (a) Fill in the blanks using bracket. **03**
1. When two inputs of JK flip-flop tied together, the resulting flip-flop is _____ flip-flop. (*SR, D, T*)
 2. One flip-flop can store _____ bit/s. (*1, 2, 4*)
 3. When an inverter placed between two inputs of SR flip-flop, the resulting flip-flop is _____ flip-flop. (*JK, D, T*)
- (b) Convert JK flip-flop to T flip-flop. **04**
- (c) Explain 4-bit universal shift register. **07**
- Q.5** (a) Draw and explain SISO shift register using D flip-flops. **03**
- (b) Write comparison between synchronous and asynchronous counter. **04**
- (c) Explain the types of ROM. **07**
- OR**
- (a) Explain buffer register. **03**
- (b) Design 4-bit ring counter using D flip-flops. **04**
- (c) Explain SRAMs and DRAMs. **07**
