

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER- III EXAMINATION – SUMMER 2020****Subject Code: 3131704****Date:02/11/2020****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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Design a logic circuits for AND,OR and NOT gate using only NAND gates.	<b>03</b>
	(b) What is the difference between demultiplexer and multiplexer ? Explain with necessary diagram and truth table.	<b>04</b>
	(c) Explain D flip flop in detail with circuit diagram and truth table	<b>07</b>
<b>Q.2</b>	(a) Derive the SOP expression for following term $AB'C' + ABC' + AB'CD + A'BC' + AB$	<b>03</b>
	(b) Explain binary to gray and gray to binary conversion with circuit diagram and truth table.	<b>04</b>
	(c) Minimize the following function using tabulation method: $F(w, x, y, z) = \sum (0,1,2,8,10,14,15)$	<b>07</b>
<b>OR</b>		
	(c) Design a logic circuit for half and full subtraction circuits with K-map equations and truth table.	<b>07</b>
<b>Q.3</b>	(a) Convert the following numbers to decimal: $(10101.101)_2$ , $(330.4)_8$ , $(A325)_{16}$	<b>03</b>
	(b) Construct 3x8 decoders with diagram and necessary truth table.	<b>04</b>
	(c) Explain following terms with example 1) Inter register-transfer operation 2) Arithmetic micro operation 3) Shift micro operation 4) Logic micro operation	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Draw the circuit of 3 input TTL(Transistor Transistor Logic) NAND gate and explain its operation.	<b>03</b>
	(b) Explain working of 4-bit binary ripple counter.	<b>04</b>
	(c) Simplify the following equation using K-map and implement using logic gates: $F(A,B,C,D) = \sum(0,1,2,3,5,7,8,9,10,12,13)$	<b>07</b>
<b>Q.4</b>	(a) Explain BCD adder with diagram and truth table	<b>03</b>
	(b) Explain 1's and 2's complement with example	<b>04</b>
	(c) Explain 2-bit UP synchronous counter with K-map equations and circuit diagram	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Write short note on PLA.	<b>03</b>
	(b) Reduce the expression $A+B[AC+(B+C')D]=A+BD$	<b>04</b>
	(c) With neat sketch explain the operation of clocked RS flip flop with NAND and NOR gates.	<b>07</b>

- Q.5** (a) Represent the decimal number 8620 in BCD, Excess-3, and Gray code. **03**
- (b) Explain 2 bit magnitude comparator with necessary diagram and equation. **04**
- (c) List out different types of memories used in digital logic circuits and define them. **07**

**OR**

- Q.5** (a) Explain meaning of following micro operations **03**
- 1)  $T_1 : A+B'+1$
- 2)  $T_2 : A \wedge B$
- 3)  $T_3 : \text{shr } A$
- (b) Explain BUS transfer logic for two registers **04**
- (c) Design a logic circuit with JK flip-flop for the given state sequence with necessary K-map equation **07**

Present state	Next state
000	001
001	010
010	011
011	100
100	101
101	000

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