**Seat No.: _____** **Enrolment No._____**

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–IV (NEW) - EXAMINATION – SUMMER 2017**

**Subject Code: 2140910** **Date: 01/06/2017**

**Subject Name: Digital 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.**

| | | | MARKS |
|---|---|---|---|
| **Q.1** | | **Short Questions** | **14** |
| | **1** | Each 4 bit binary is called a _____.<br>(i) bit (ii)nibble (iii) byte (iv) word | |
| | **2** | The complement of a complement gives the _____.<br>(i)number itself (ii)1's complement (iii)2's complement (iv)zero | |
| | **3** | _____ code is a reflective code.<br>(i) Binary (ii)BCD (iii)Gray (iv)XS-3 | |
| | **4** | A sequential logic circuit consists of _____.<br>(i)only flip flops (ii)only gates<br>(iii)only combinational circuits<br>(iv)flip flops and combinational circuits | |
| | **5** | The two popular alphanumeric codes are ____ and ____.<br>(i)ASCII & EBCIDIC (ii) GRAY & XS-3<br>(iii)XS-3 & BCD (iv) BCD & ASCII | |
| | **6** | _____ gate is called an all or nothing gate.<br>(i) AND (ii)OR (iii)NOT (iv)Ex-OR | |
| | **7** | _____ gate is called an inequality detector.<br>(i) AND (ii)OR (iii)NOT (iv)Ex-OR | |
| | **8** | A+B = B+A: AB = BA represents which law?<br>(i)Associative (ii)Commutative<br>(iii)Distributive (iv)Idempotence | |
| | **9** | The number of cells in a 3 variable K-map is ___.<br>(i)4 (ii)8 (iii)15 (iv)12 | |
| | **10** | _____ code is used for labelling the cells of K-map.<br>(i) Binary (ii)BCD (iii)Gray (iv)XS-3 | |
| | **11** | The _____ adder speeds up process by eliminating the ripple carry.<br>(i)Half (ii)Full (iii)Look ahead (iv)Ripple carry | |
| | **12** | The ____ gate is a basic comparator.<br>(i) AND (ii)OR (iii)Ex-OR (iv)Ex-NOR | |
| | **13** | The toggle mode for JK flip flop is<br>(i)J=0,K=0 (ii)J=1,K=0 (iii)J=0,K=1 (iv)J=1,K=1 | |
| | **14** | The number of flip flops required for a decade counter is<br>(i)3 (ii)4 (iii)5 (iv)10 | |
| **Q.2** | **(a)** | Explain minterm and maxterm | **03** |
| | **(b)** | Reduce using K-map (i)Σm(5,6,7,9,10,11,13,14,15)<br>(ii)ΠM(1,5,6,7,11,12,13,15). | **04** |
| | **(c)** | State and prove De Morgan's theorems | **07** |

**OR**

| | | | |
|---|---|---|---|
| | **(c)** | Explain a 4 input multiplexer. | **07** |
| **Q.3** | **(a)** | Convert $(2598.675)_{10}$ to hex | **03** |
| | **(b)** | Add 27.125 to -79.625 using 12-bit 2's complement arithmetic. | **04** |
| | **(c)** | Write a short note on XS-3 code. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Convert $3A7_{16}$ into a Gray code | **03** |
| | **(b)** | Perform the decimal subtraction 206.7-147.8 in 8421 BCD code. | **04** |
| | **(c)** | Write a short note on gray code | **07** |
| **Q.4** | **(a)** | Draw and explain with truth table Ex-OR and Ex-NOR gates | **03** |
| | **(b)** | Why NAND and NOR are known as universal gates? | **04** |
| | **(c)** | Discuss JK master slave flipflop. Explain race around condition. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain a full adder circuit | **03** |
| | **(b)** | Explain a parity generator and checker. | **04** |
| | **(c)** | Describe a 3-to-8 line decoder with logic diagram and truth table. | **07** |
| **Q.5** | **(a)** | Distinguish between combinational and sequential logic circuits. | **03** |
| | **(b)** | Discuss application of flip flops. | **04** |
| | **(c)** | Discuss applications of shift registers. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | State the basic difference between synchronous and asynchronous counters. | **03** |
| | **(b)** | Explain in brief modulus of counters. | **04** |
| | **(c)** | Explain the Digital to Analog converter with binary weighted resistors. | **07** |

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