|      | Enrollment No: Exam Seat No:  C.U.SHAH UNIVERSITY  |   |                            |  |  |  |  |  |  |  |
|------|--|---|----------------------------|--|--|--|--|--|--|--|
|      | Winter Examination-2015  |   |                            |  |  |  |  |  |  |  |
|      | •  | Name: Digital Circuits Code: 4TE03DCI1 Branch: B.Tech (EEE,EE,IC)                     | Branch: B.Tech (EEE,EE,IC) |  |  |  |  |  |  |  |
|      | Semester   |   |                            |  |  |  |  |  |  |  |
|      | Instructions:  (1) Use of Programmable calculator & any other electronic instrument is prohibited.  (2) Instructions written on main answer book are strictly to be obeyed.  (3) Draw neat diagrams and figures (if necessary) at right places.  (4) Assume suitable data if needed. |   |                            |  |  |  |  |  |  |  |
| Q-1  |  | Attempt the following questions:  | (14)                       |  |  |  |  |  |  |  |
|      | a)   | Define Digital System.  |                            |  |  |  |  |  |  |  |
|      | <b>b</b> )   | Convert (11011.101) <sub>2</sub> to Decimal.  |                            |  |  |  |  |  |  |  |
|      | <b>c</b> )   | Convert (10101111001.0111) <sub>2</sub> to Octal.                                     |                            |  |  |  |  |  |  |  |
|      | d)   | Convert (1011011011)2 to Hexadecimal.   |                            |  |  |  |  |  |  |  |
|      | e)   | Convert (5497)10 to Binary.   |                            |  |  |  |  |  |  |  |
|      | <b>f</b> )   | Convert (378.93)10 to Octal.  |                            |  |  |  |  |  |  |  |
|      | g)   | Convert (2598.675)10 to Hexadecimal.  |                            |  |  |  |  |  |  |  |
|      | <b>h</b> )   | Convert (4057.06)8 to Decimal.  |                            |  |  |  |  |  |  |  |
|      | i)<br>.j)  | Convert (5C7)16 to Decimal.<br>Convert (367.52)8 to Binary.                           |                            |  |  |  |  |  |  |  |
|      | J)<br><b>k</b> )   | Convert (3A9E.B0D)16 to Binary.   |                            |  |  |  |  |  |  |  |
|      | l)   | State De Morgan's Theorem.  |                            |  |  |  |  |  |  |  |
|      | m)   | Define Flip Flops.  |                            |  |  |  |  |  |  |  |
|      | n)   | State the types of Shift Registers.   |                            |  |  |  |  |  |  |  |
| Atte | mpt any f  | Four questions from Q-2 to Q-8  |                            |  |  |  |  |  |  |  |
| Q-2  |  | Attempt all questions   | (14)                       |  |  |  |  |  |  |  |
| _    | $\mathbf{A}$   | Explain NAND and NOR gate as an universal gate.                                       | 8                          |  |  |  |  |  |  |  |
|      | В  | Describe S-R flip-flop and its applications.  | 6                          |  |  |  |  |  |  |  |
| Q-3  |  | Attempt all questions   | (14)                       |  |  |  |  |  |  |  |
| ~ ~  | $\mathbf{A}$   | Simplify: a) $Y = (A+C)(A+D)(B+C)(B+D)$   | 8                          |  |  |  |  |  |  |  |
|      |  | b) Y= (B+BC)(B+B'C)(B+D)  | -                          |  |  |  |  |  |  |  |
|      | В  | Explain half and full adders in detail.   | 6                          |  |  |  |  |  |  |  |
| Q-4  |  | Attempt all questions   | <b>(14)</b>                |  |  |  |  |  |  |  |
| -    | $\mathbf{A}$   | Simplify the following Boolean function using K-map and realize using basic           |                            |  |  |  |  |  |  |  |
|      |  | gates.  |                            |  |  |  |  |  |  |  |
|      |  | $F(A,B,C,D) = \Sigma m(0,1,5,9,13,14,15) + with don't care conditions d(3,4,7,10,11)$ |                            |  |  |  |  |  |  |  |



Page 1 || 2

| B | Design a 4 | bit BCD to | Gray co | ode conver | ter. |
|---|------------|------------|---------|------------|------|
|---|------------|------------|---------|------------|------|

| Q-5 |              | Attempt all questions  | (14) |
|-----|--------------|--|------|
|     | A            | What is meant by multiplexer? Explain with diagram and truth table the             | , ,  |
|     |              | Operation of 4-to-1 line multiplexer.  |      |
|     | $\mathbf{B}$ | What is meant by decoder? Explain 3-to-8 line decoder with diagram and truth       |      |
|     |              | table.   |      |
| Q-6 |              | Attempt all questions  | (14) |
|     | $\mathbf{A}$ | Explain D type positive edge triggered flip flop.                                  |      |
|     | В            | Explain the working of the Master Slave J K flip-flop with necessary logic         |      |
|     |              | diagram.   |      |
| Q-7 |              | Attempt all questions  | (14) |
|     | A            | With neat diagram explain the operation of 4- bit serial- in-serial –out register. |      |
|     |              | Draw the timing diagram and give its truth table.                                  |      |
|     | В            | With necessary sketch explain bi-directional shift register with parallel load.    |      |
| Q-8 |              | Attempt all questions  | (14) |
|     | $\mathbf{A}$ | Explain the working of 4 bit asynchronous up counter.                              | , ,  |
|     | В            | Describe the Comparison of Counters with Registers.                                |      |

