Title: **Number Conversion and Logic Diagrams** Test: 5

Course: Introduction to Automation Unit: Introduction to PLC CLO: 4

Name ANSWER KEY Grade 40pts. Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall calculate the correct number conversion base on a number from a different number base system.
2. Student shall draw the output of an instruction given its input(s).

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Test. Grading shall be based on the answer key.

**Instructions**

Calculate the following number to the new number base system given the value from another number base system.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. A16 1010 | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Hexadecimal Truth Table | | | | | | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |  |  |  |  |  |  | |
| 1. 1C16 2810 |
| 1. 8F16 14310 |
| 1. 2210 1616 |
| 1. 3110 1F16 |
| 1. 4210 2A16 |
| 1. 0101 1001 0011 11012 593D16 |
| 1. 1011 0100 1100 01112 B4C716 |
| 1. 1111 1010 1111 01102 FAF616 |
| 1. 543216 0101 0100 0011 00102 | |
| 1. 2FA316 0010 1111 1010 00112 | |
| 1. BC4D16 1011 1100 0100 11012 | |

**Instructions**

Convert the following numbers to their designated equivalents.

1. 348 2810
2. 118 910
3. 238 1910
4. 558 4510
5. 810 108
6. 11110 1578
7. 9910 1438
8. 8810 1308
9. 0101 1001 0011 11012 544758
10. 1011 0100 1100 01112 1323078
11. 1111 1010 1111 01102 1753668
12. 7328 111 011 0102
13. 2568 010 101 1102
14. 528 000 101 0102

Select the best answer to each multiple-choice question below.

1. An CTU would be used to?
   1. Timing a specific set of contacts
   2. Be a Clock timer unit
   3. Counting up to a certain Preset
   4. Counting down to a certain Preset
2. A CTD would be used to?
   1. Each logical continuity true transition, decrements an integer by one
   2. Subtract two numbers until they equal each other
   3. Counting up to a certain Preset then setting the done bit
   4. Is used to test for a 0 and sets the Accum value
3. If you wanted a button *press* on a normally open pushbutton to activate an action only once during that button press you would use the following instruction.
   1. XIC
   2. XIO
   3. OSR
   4. OSF
4. If you wanted a button *release* on a normally open pushbutton to activate an action only once during that button press you would use the following instruction.
   1. XIC
   2. XIO
   3. OSR
   4. OSF
5. Fill in the state of each timer bit (0 or 1).

|  |  |
| --- | --- |
|  | EN 1  TT 0  DN 1 |

1. Fill in the state of each timer bit (0 or 1).

|  |  |
| --- | --- |
|  | EN 1  TT 0  DN 1 |

1. What describes an Integer?
   1. Any number that doesn’t have a fraction.
   2. Is negative or positive
   3. Any number on the number line.
   4. Both A and B
2. How does a number become negative inside the PLC?
   1. The first bit indicates the sign
   2. The MSB equaling 1
   3. All the bits are 1
   4. None of the above

Draw the output to the following logic diagrams.

1. 
2. 

This page intentionally almost blank