**Unit: Manual Motor Controls Job: 3**

**Title: Boolean Logic CLO# 2**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Station \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Identify EQUAL, NOT, OR, AND, NOR, NAND, XOR and XAND logic circuits.
2. Recognize symbols and operators as they relate to Boolean logic equations.
3. Translate a Boolean logic formula into a logical wired circuit.
4. Assess Boolean logic examples on a live circuit.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this shop job.

**Instructions**

Wire each example shown in the Manual Motor Controls Boolean Logic handout using PB2 (pushbutton 2) for “A” and PB3 (pushbutton 3) for “B”. Assign the output “Q” to the green pilot light. Ensure to use the proper colored wire and label all wires with the appropriate wire number. You must obtain instructor permission before energizing your circuit. Once instructor approval is obtained, test each circuit and complete the truth tables below.

|  |  |  |  |
| --- | --- | --- | --- |
| **EQUAL Logic** | **NOT Logic** | **OR Logic** | **AND Logic** |
| Q = A | Q = A | Q = A + B | Q = A x B |
| |  |  | | --- | --- | | A | Q | | 0 |  | | 1 |  | | |  |  | | --- | --- | | A | Q | | 0 |  | | 1 |  | | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | |
|  |  |  |  |
| **NOR Logic** | **NAND Logic** | **XOR Logic** | **XAND** |
| Q = A + B | Q = A x B | Q = A  B | Q = A  B |
| |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | | |  |  |  | | --- | --- | --- | | A | B | Q | | 0 | 0 |  | | 1 | 0 |  | | 0 | 1 |  | | 1 | 1 |  | |