Title: **NEMA Symbols and Boolean Logic** Test: 2

Course: Intro to Automation Unit: Manual Motor Control CLO: 1

Name ANSWER KEY Grade 39pts Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall identify the National Electrical Manufactures Association (NEMA) symbols and the components that they represent.
2. Student shall list each component as either an input or an output device.
3. Student shall recall the components of a ladder diagram.

**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**

Label each NEMA symbol with the appropriate description and identify whether the symbol is an input or an output.

|  | Symbol | Description | Input/Output |
| --- | --- | --- | --- |
|  |  | Pilot Light | Output |
|  |  | Normally Open Float Switch | Input |
|  |  | Normally Closed Flow Switch | Input |
|  |  | Two Position Selector Switch, Dual Action | Input |
|  |  | Normally Closed Contacts | Input |
|  |  | Normally Closed Held Open Pressure Switch | Input |
|  |  | Mushroom Head Pushbutton | Input |

|  | Symbol | Description | Input/Output |
| --- | --- | --- | --- |
|  |  | Coil | Output |
|  |  | Normally Open Contacts | Input |
|  |  | Normally Open Held Closed Temperature Switch | Input |

**Instructions**

Answer each of the individual questions below.

1. When building a control circuit, there is not an industry standard on the order (inputs and outputs) of the components.
   1. True
   2. False
2. An input device such as a pushbutton or limit switch that is normally closed would have terminal numbers (or the numbers would end in) \_\_1\_\_ and \_\_2\_\_.
3. If a circuit has three inputs, how many possible states can that circuit be placed? \_\_8\_\_
4. When hand drawing a control schematic, wire numbers are denoted by using?
5. Boxes
6. Triangles
7. Circles
8. Underline
9. When hand drawing a control schematic, cross-reference numbers are placed?
10. In boxes
11. To the left of the ladder rail
12. In the middle of the line
13. To the right of the ladder rail



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Draw a truth table for the above circuit. | |  |  |  | | --- | --- | --- | | START1 | START2 | G | | 0 | 0 | 0 | | 0 | 1 | 1 | | 1 | 0 | 1 | | 1 | 1 | 1 | |

1. How would you describe this circuit?
2. EQUAL Logic
3. NOT Logic
4. AND Logic
5. OR Logic