# Digital Logic Design

# Experiment 1: Study of basic Gates

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**Name: ……………………………. Registration No: ……………………**

**Date: …………………………… Grade and Signature: ………………………**

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**Objectives:** To get understanding of basic logic gates and to analyze their inputs and outputs.

**THEORY:** Logic gates are the digital circuits with one output and one or more inputs. They are the basic building blocks of any logic ckt. Different logic gates are:

**AND, OR, NOT, NAND, NOR, EXOR.**

**AND:** Logic eqn. Y = A.B. The output of AND gate is true when the inputs A and B are true.

**OR:** Logic eqn. Y = A+B. The output of OR gate is true when one of the inputs A and B or both the inputs are true.

**NOT:** Logic eqn. Y = A’. The output of NOT gate is complement of the input.

**NAND:** Logic eqn. Y = A.B. The output of NAND gate is true when one of the inputs or both the inputs are low level.

**NOR:** Logical eqn. Y = A+B. The output of NOR gate is true when both the inputs are low.

**EX-OR:** Logic eqn. Y=A`. B + A.B`. The output of EX-OR gate is true when both the inputs are not similar.

**Equipment required:**

Power Supply, Breadboard, Connecting wires, ICs 7400, 7402, 7404, 7408, 7432, 7486, LED.

1. **Gate No 1**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Gate No 2**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
|  |  |  |
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|  |  |  |
|  |  |  |

1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Gate No 3**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
|  |  |  |
|  |  |  |

1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Gate No 4**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
|  |  |  |
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1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Gate No 5**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
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1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Gate No 6**

**IC PINOUTS**



**TRUTH-TABLE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Connect the ICs according to its pin diagram.
2. Fill the table and write any property and observation in comment column.
3. **Truth Table is given below. Identify the gate, its symbol and its formula? Draw the Pin diagram of associated IC with this gate?**

**Truth Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **Gate =** | | **Formula =** | **Comments** |
| **Input A** | **Input B** | **Output Y** |  |
| **0** | **0** | **1** |
| **0** | **1** | **0** |
| **1** | **0** | **0** |
| **1** | **1** | **1** |

1. **Conclusion: Write what you learnt in your own words.**