**National University of Modern Languages,**

**Regional Campus, Hyderabad**

**Department of Computer Science**



**Name: Durr e shehwar**

**Batch: BSCS III**

**Practical no:1**

**Submitted to**

**Sir Rafay**

**Date:7-03-2023**

Q:1 Which gates are categorized as universal gates and how they are used?

A universal gate is a gate which can implement any Boolean function without need to use any other gate type. NAND and NOR gate are two universal gate through which we can make any basic logical gates.

Q:2 Verify the Truth Table for AND Gate and OR Gate.

**AND Gate:**

|  |  |  |
| --- | --- | --- |
| A | B | A\*B (output) |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

**OR Gate:**

|  |  |  |
| --- | --- | --- |
| A | B | A+B (output) |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

Q:3 Verify the Truth Table for NOR Gate and NAND Gate.

**NOR Gate:**

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A+B | A+B |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 |

**NAND Gate:**

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A\*B | A\*B |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 0 |

Q:4 Verify the Truth Table for XOR Gate and XNOR Gate.

**XOR Gate:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | A | B | AB | AB | AB +AB |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 |

**XNOR Gate:**

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | AB + AB (XOR) | (AB+ AB)’ XNOR |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |

Q:5 Convert the following logic gate circuit into a Boolean expression, writing Boolean sub-expressions next to each gate output in the diagram:

Diagram, schematic

Description automatically generated

Q:6 Draw the following function in Circuit maker.

1. F = X̅YZ + X̅YZ̅ + XZ

Diagram, schematic

Description automatically generated

ii. F=X̅Z + XY̅Z +YZ̅

Diagram, schematic

Description automatically generated