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**Course: Digital Logic Design Lab**

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

**Ans** A universal gate is a gate which can implement all three basic gates **OR, AND, NOT** without need to use any other gate type. There are two universal gates. They are

**1.** NAND Gate

**2.** NOR Gate

**Q: 2** Verify the truth table of **AND** gate and **OR** gate.

**AND GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

**OR GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

**Q: 3** Verify the truth table of **NOR** gate and **NAND** gate.

**NAND GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

**NOR GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

**Q: 4** Verify the truth table of **XOR** gate and **XNOR** gate.

**XOR GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

**XNOR GATE:**

|  |  |  |
| --- | --- | --- |
| A | B | Y |
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

**Q: 5** Convertthefollowing logic gate into a Boolean expression, writing Boolean sub-expression next to each gate output in the diagram.

**Ans:** (A+B)\*C

**Q: 6** Draw the following function in circuit maker.

1. **F = X’YZ + X’YZ’ + XZ**

**2. F = X’Z + XY’Z + YZ’**

**THE END**