

Assignment-1

Digital Logic Design (Sec-M)

1. Write down the truth table, logic, logic expression and draw the logic symbol for each of the following gates with 2 inputs.

a. NOT (1 input)	b. OR	c. AND	d. NAND
e. NOR	f. XOR	g. XNOR	

Logic Simplification with Boolean algebra:

- Using **Boolean algebra** and **De Morgan's Rule** where applicable, **simplify** the following expressions
 - $AB + A(B+C) + B(B+C)$
 - $A\bar{B} + A(\bar{B} + \bar{C}) + B(\bar{B} + \bar{C})$
 - $[AB(C + \bar{B}D) + \bar{A}\bar{B}]CD$
 - $\bar{A}\bar{B} + \bar{A}\bar{C} + \bar{A}\bar{B}\bar{C}$
- Convert** each of the following Boolean expressions to **SOP** form:
 - $(A+B)(B+C+D)$
 - $\overline{(A+B)} + C(A+D)$
- Convert** the following to **Standard SOP** expressions:
 - $\bar{A}BC + A\bar{D} + \bar{B}\bar{C}D$
 - $(A + \bar{B} + C)(A + B + \bar{C})$
- Convert** each of the following to **POS** expressions:
 - $AB + CD(\bar{A}\bar{B} + CD)$
 - $AB(\bar{B}\bar{C} + BD)$
- Convert** the following to **Standard POS** expressions:
 - $A+B(AC+(B+\bar{C})D)$
 - $\bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C} + AB\bar{C}D$
- Develop a truth table** from each of the following expressions. (Hint: Convert them to their standard forms before you create any truth table)
 - $\bar{A}\bar{B} + AB\bar{C} + \bar{A}\bar{C} + A\bar{B}\bar{C}$
 - $(A+B)(A+C)(A+B+\bar{C})$

Building Combinational Logic Circuit and Universal Gates

7. For the following output expressions, **design the combinational logic circuits with basic logic gates (use Boolean algebra to reduce the expressions where possible).**
- For the designed logic circuits, **redraw** each of them with only **Universal NAND gates only**.
 - $ABC + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{C}$
 - $AC + AB + B\bar{C}$
 - For the designed logic circuits, **redraw** each of them with only **Universal NOR gates only**.
 - $\bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C} + \bar{A}\bar{C}$
 - $AC + \bar{A}\bar{B} + B\bar{C}$

Do not copy from your peers. If you do not understand anything, consult with them or me. Assignments copied will be considered obsolete. Assignment is due on the day you sit for your 1st quiz. Deadline - 6th June, 2016, 2:00pm. Keep a copy of your assignment with you for further consultation for your term exam.