EEE119 Digital System Engineering – Problem Sheet 1

1. Explain the difference between digital and analog quantities and give an example of each.

2. Write down the truth tables for AND, OR, NAND, NOR, XOR, XNOR.

3. Draw the logic gate network for the following function. $F = X.\overline{Y}.Z + \overline{X.Y.Z} + X.Y$

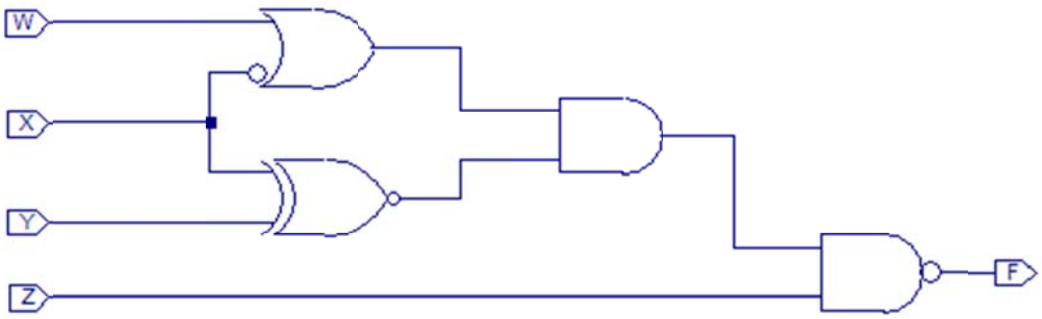
4. Obtain a logic expression for the function F in terms of the input variables R, S, T using the truth table opposite.

R	S	T	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

5. Find the value of ABCD that makes $\overline{A.\overline{B}.C.\overline{D}}$ equal to logic '0'.

6. Draw the logic gate network for $F = A.B + \overline{A.\overline{B}.C + \overline{A.C}}$ and use this to produce a truth table for the function by propagating the literal values '0' and '1' through the network.

7. Find a logic equation to describe the circuit shown below.



8. The burglar alarm at a bank must be activated, subject to the following conditions:

The alarm must be operative only if a master switch at the police station has been turned on. Subject to this condition, the alarm will sound if (1) the vault is disturbed in any way (2) the door to the bank is opened unless a special switch is first operated by the security guard's key

(i) assign variables (ii) deduce Boolean expression (iii) draw the logic circuit for the alarm.