Boolean Logic

Q1. Prove the following-

1) (X+Y)' = X'.Y'

Ans1: (X+Y)' = X'.Y'

According to de-morgans low.

Lets take LHS: (X+Y)'=

X	Y	X+Y	(X+Y)'
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

Lets take RHS:X'.Y'=

X	Y	X'	Y'	X'.Y'
0	0	1	1	1
0	1	1	0	0
1	0	0	1	0
1	1	0	0	0

Here we can see the final value of LHS=RHS.

Q2. Briefly explain the combinational circuits?

Ans2: combinational circuit- collection of logical circuits which does'nt generates the memory. Following are some combinational circuits.

1.Half subtractor- subtract two bits and produced their difference and borrow.

2.Full subtractor- subtraction involves three bits their difference and borrow.

3.Multiplexers- It has many inputs and a single output.It has two selection line to decides which input is connected to the output.

4.Demultiplexers- It has one input and multiple output lines.It is single source multiple destination. It has serial to parallel convertor.

5.Decoders- It takes multiple input from input lines and convert them into coded form. If ‘n’ input are there than output is 2’power n .

6.Encoder- It perform exactly reverse operation than decoder. An encoder has M input and N output lines. Out of M input lines only one is activated at a time.

Q3. Explain flip flop.

Ans3: Flip Flop- this is Smallest storge device, which is used to store one bit at a time. Also called a One bit storage device and used to data transfer, data storage, count pulses. Followings are four type of flip-flop.

- **R-S flip flop**
- **J-k flip flop**
- **T flip flop**
- **D flip flop**