Digital Logic Test

1. Subtract 9 from 13 in 8-bit wide two's complement. -- [3]
2. Explain, with the aid of a diagram, the difference between combinatorial and sequential logic circuits. [3]
3. Show the truth table for an OR gate. ---------- [3]
4. Show the truth table for an EX-OR gate ---------- [3]
5. Design a circuit that implements the function of an EX-OR gate using only NOT, AND and OR gates. --------- [6]
6. Show the truth tables for a AND gate. ---------- [2]
7. Design a circuit that implements the function of an OR gate using only NAND gates. ---------- [3]
8. Show the truth table for a 1-bit full adder. ---------- [5]
9. Design am N-bit Full Adder circuit. ---------- [5]
10. Explain how an N-bit Full Adder circuit can be modified to form an N-bit subtractor circuit. ---------- [4]
11. Design an N-bit Subtractor circuit. ---------- [5]
12. Explain the function of a decoder, giving an example of where a decoder might be used. ---------- [3]
13. Explain the function of a multiplexer, giving an example of where a multiplexer might be used. ---------- [3]
14. Explain, using an appropriate truth table or circuit diagram, the operation of a D-Type latch. ---------- [4]
15. Show how D-type latches can be arranged to form an N-bit register, explaining the function of your circuit. --- [5]

Answers: See slides during class test and lecture slides.