Interview Questions for Semiconductor Roles

Section 1: CMOS

1. Draw the cross section of a full functional inverter and mark down the parts

2. Depending on the cross section you've drawn, mark the position in which paracitic diodes are formed

3. Using CMOS, design 3-input NAND gate

4. State the need for an n-well when creating an pmos

5. Write Down the steps (or masks) we use when designing any circuit using CMOS (Fabrication Steps)

Section 2: Digital Logic

1. Design Mealy and Moore sequence detector to detect this sequence 1011 (to test it use any input you want)

2. State the difference between mealy and moore state machine in your words

3. Design 8-1 Multiplexor using 2-1 Multiplexor

4. Implement and gate using NAND gates only

5. Explain setup and hold time in your words (use any example you want)

Section 3: Verilog

1. State the difference between blocking and non blocking assignment using an example
2. State the difference between Synchronas and Asynchronous reset using Verilog code
3. Explain the difference between always @(*) and always @(posedge clk).
4. What are synthesizable constructs vs non-synthesizable?
5. Write a 2:4 decoder in Verilog using case statement.

Section 4: Computer Organization and Architecture

1. What is the difference between CISC and RISC architectures?
2. Explain pipelining hazards (RAW, WAR, WAW, structural hazards).
3. What is cache memory? Explain direct-mapped, associative, and set-associative caches.
4. Difference between Harvard and Von Neumann architecture.
5. Difference between hardwired control and microprogrammed control.