Questions for self assessment

Module 10--Lecture 1

1. What is the basic philosophical difference between testing a sequential circuit compared to combinational circuit?

2. Why is testing a sequential circuit considered more complex compared to combinational circuit?

3. Why is Routh's five algebra not powerful to handle sequential circuit ATPG? Explain the algebra that is suitable for sequential circuit ATPG.

4. What is a cyclic circuit? What is the sequential depth of a flip-flop?

5. Prove that "The secondary inputs of a cycle free sequential circuit of depth d_{seq} can be brought to controllable value in at most d_{seq} number of primary input patterns and clock pulses"

6. Illustrate the steps of time frame expansion method based testing using an example.

Module 10--Lecture 2,3

1. What is the difficulty in controlling and observing flip-flops in a sequential circuit? Suggest schemes that can achieve controllability and observability of flip-flops.

2. How can set-reset lines of flip-flops help is testing a cyclic circuit?

3. What are the drawbacks of testing a sequential circuit using set-reset lines of flip-flops? How can they be addressed?

4. What is scan chain? Why scan chain based technique is claimed to be the best in controlling and observing flip-fops?

5. What is the extra circuitry required in scan chain enabled flip-flops compared to simple ones?

6. Illustrate the reduction in testing complexity (of sequential circuits) using scan chains compared to time frame expansion method.

7. What are the drawbacks of scan chains? How can partial scan chain based design solve the problems?