**COURSE:** IV B.Tech I SEM **REGULATION:** R-16

**BRANCH:** ECE **SUBJECT:** System Design through Verilog

Tutorial Questions

# Unit-1

1. a) Explain in detail the Levels of Design Description.

b) Explain the concept of numbers in Language constructs.

1. a) Explain the Simulation and Synthesis in Verilog HDL.

b) Explain the components of a Verilog module with block diagram

1. Write a short note on (i) parameters (ii) memory (iii) operators.
2. Write a short notes on (i) system tasks (ii) PLI (iii) lexical tokens (iv) concurrency
3. Using example, explain about concurrent and procedural statement with syntaxes.
4. a) Write a short notes on (i) logic values (ii) strings (iii) strengths (iv) Data types

b) Write a short notes on (i) Identifiers (ii) white space characters (iii) comments

# Unit-2

1. a) Describe the model structures with an example.
   1. Design a 3 to8 decoder and write a verilog code.
2. a) Write a verilog code and test bench for a 4 bit ALU
   1. Write about array of instances of primitives
3. a) Write short notes on tri state gates. Give the relevant syntax, logic diagrams and excitation tables

b) Write a typical instantiation of an array and write a byte comparator using that array instantiation using verilog

1. a) Explain continuous assignment structures with examples
   1. Write a verilog code and test bench for a net delay of 2 time steps
2. a) Design module and a test bench for a half-adder
   1. Write a verilog code and test bench for a 4 x 1 mux.
3. a) Write a verilog code and test bench for an AOI gate
   1. Write a verilog code and test bench for an 4 to 16 decoder.

# Unit-3:

1. a) Explain with an example how ‘while’ construct issued.

b) Write briefly about functional bifurcation

1. a) Explain blocking and Non-blocking statements with an examples
   1. Explain disable construct with an example
2. a)Write a verilog code and test bench for a D latch
   1. Write a verilog code and test bench for an addition of two BCD nibbles
3. a) Write a verilog code and test bench for an up down counter
   1. Write a verilog code and test bench to generate a clock waveform using forever construct
4. a) Write the differences between begin-end and fork-join blocks
   1. Explain about multiple always blocks
5. a) Write short notes on the following with examples (i) Intra assignment delay (ii) Inter assignment delay (iii) Delay assignments (iv) Zero delay
   1. Write a verilog code and test bench for 2 to 4 demux using an **if-else construct**

# Unit-4:

1. a) Discuss Basic Transistor Switches.
   1. Explain File Based Tasks and Functions
2. a) Explain the Strength Contention with Trireg Nets
   1. Implement NAND, AND, OR gates using MOS switches, test with a suitable test bench
3. a)What do you mean by user defined primitive? Explain the types with examples
   1. Implement a 4X1 mux using CMOS transmission gate and write a verilog code.
4. a) Discuss the basic transistor switches
   1. Design half-adder using CMOS switches and write a verilog code.
5. a) Write about basics with primitives
   1. Write a verilog code using data flow and test bench for 8 bit adder
6. Write a verilog switch level code for a two input CMOS NAND, CMOS NOR gate.

# Unit-5:

1. a) Explain the Sequential Model-Feedback Model.

b)Write about Assertion Verification

1. a) Explain the Static Machine Coding
   1. Explain the Sequential Circuit Testing
2. a) Write and explain the Verilog module for positive edge trigger flip-flop
   1. Discuss setup hold, width and period checks used in Verilog
3. a) Explain in detail about formal verification of a system
   1. Describe the synthesis of a 4 bit ripple counter
4. a)Describe the synthesis of of BCD to XS-3 code converter
   1. How the memory initialization carried out in Verilog? Explain with the help of an example
5. Write a short notes on synthesis of latch and flip flop

# Unit-6

1. a) Explain about serial data transmission in UART design?

b) Explain read and write operations in SRAM with relevant timing diagrams.

1. a) Explain the interfacing with microprocessor
   1. What is meant by memory interfacing? With suitable diagram explain interfacing memory to a microprocessor
2. a) Write and explain the operation of a BUS
   1. Write a Verilog module for PLA
3. a) Write the Verilog code for basic functional unit of a dynamic shift register.
4. Explain about the resetting of sequence of a controller
5. a) Write a short note on Design verification.
6. What are the various sequential memory storage models? Explain in detail.
7. Write a verilog code for modelling of microcontroller

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