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B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

ADVANCE DIGITAL DESIGN USING VERILOG

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) What are the advantages of HDLs?

(b) Differentiate between the unary and ternary operator.

(c) Differentiate between $monitor and $ display.

(d) What are the differences between assignments in always and initial constructs?

(e) Given the following Verilog code, what value of "a" is displayed?

```
always @ (clk) begin
a=0;
a<=1;
$display(a);
```

(f) What is the difference between the equality operator symbols == and ===?

(g) What are the differences between a task and a function?

(h) What are the modeling memory components in verilog?

(i) Differentiate between Feedback model & Implicit model.

(j) What are the benefits of assertion verifications.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) (i) What is verilog HDL? What are the major capabilities of verilog HDL?

(ii) Explain the components of a verilog module with block diagram.

(b) (i) What are the different data types in verilog HDL ?.Explain briefly.

(ii) Illustrate the differences between a scalar and a vector. Explain with the help of suitable example.

(c) (i) Explain NOR gate primitive with verilog module.

(ii) Write verilog HDL source code for a gate level description of 4to 1 multiplexer circuit. Draw the relevant logic diagram.

(d) (i) Explain inertial and intra-assignment delays in verilog with suitable example.

(ii) Describe a module 2 to 4 demultiplexer through procedural continuous assignments.

(e) (i) Define blocking and non blocking assignments using examples.

(ii) Write a module using the behaviour modelling style to describe the behaviour of aJ-K flip-flop using an always statement.

(f) (i) Describe a module for an NMOS inverter with an active pull up level using switch level primitives.

(ii) Describe a module for NAND gate using MOS switches & write its test bench .

(g) (i) Explain the use of path delay assignments in verilog with the help of suitable example.

(ii) Write a verilog module for half adder using file based task & function and write also its test bench.

(h) (i) What is a function of fork-join construct ? Design a verilog module for D flip flop using this construct.

(ii) Write and explain the Verilog module for edge trigger flip-flop.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 (i) Design a FSM to detect 1001 sequence using Mealy machine.

(ii) Design a module for a 2-bit priority encoder using 'casez' statement and test bench for the same.

4 (i) What do you understand from BDD and OBDD ? Explain with example.

(ii) Design a verilog module for Gray-code counter.

5 (i) Design a full adder using gate level modelling in verilog HDL.

(ii) Design a 16:1 Multiplexer using 8:1 MUX in verilog HDL.