Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE/ETE) (2011 Onwards) (Sem.–6)

VLSI DESIGN

Subject Code : BTEC-604

Paper ID : [A2318]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) Explain VHDL design flow with an example.

b) What do you mean by package and library?

c) Differentiate between decoder and demultiplexer.

d) Explain different types of delays in VHDL.

e) With examples explain how different architectures can be declared under a single entity.

f) What is the difference between synthesis and simulation?

g) What are test benches?

h) What are various sources of power dissipation in CMOS circuits?

i) Explain basic difference between function and procedure.

j) Give an example of concurrent and sequential signal assignment.

SECTION-B

2. Design an 8 : 3 Priority Encoder. Implement the priority encoder using VHDL code.

3. Write VHDL code for a full subtractor using logic equations.

4. Write a VHDL Code to implement the function

   $F(x_1 \ldots\ldots x_4) = \Sigma m\ (1, 4, 7, 14, 15) + D(0, 5, 9)$.

5. Design a string detector circuit that takes as input a serial bit stream and outputs a '1' whenever the sequence "111" occurs. Overlap must also be considered, that is, if 0111110... occurs, then the output should remain active for three consecutive clock cycles. Also write VHDL code for the same.

   Input string is : "011101100"

6. Design a shifter circuit which can shift a four bit input vector, $W = w_3w_2w_1w_0$, one bit position to the right when the control signal Right is equal to 1, one bit position to the left when the control signal Left is equal to 1. When Right = Left = 0, the output of the circuit should be the same as the input vector. Assume that the condition Right = Left = 1 will never occur. Write VHDL code for the shifter.

SECTION-C

7. Draw the CMOS inverter and discuss its DC characteristics. Write the conditions for different regions of operation.

8. a) Implement the CPU of a basic computer using VHDL. This CPU is to perform atleast arithmetic and logical functions on an 8-bit data.

   b) What are programmable logic devices? Explain architecture of a general FPGA.

9. a) Write short note on :

      i) Constant Field Scaling

      ii) Constant Voltage Scaling

   b) Design a 3 bit twisted ring Counter. Write its VHDL Code