Printed Pages : 3 TEC-11

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0306 Roll No.

B. Tech.

(SEM. VII) EXAMINATION, 2008-09

DIGITAL SYSTEM DESIGN USING VHDL

Time : 3 Hours] *[Total Marks : 100*

Note : *(1) Attempt* ***all*** *questions.*

(2) ***Each*** *question carries* ***equal*** *marks.*

1 Attempt any **four** parts : 5×4=20

(a) Write a behavioural styplo of VHDL Code for 4×1 MUX.

(b) Develop a VHDL code for a JK flip flop using conditional assignment statement.

(c) What are the various VHDL operators? Explain each with examples.

(d) Write a short note on VHDL packages and libraries.

(e) Explain the various VHDL delays.

(f) Discuss the compilation, simulation and synthesis of VHDL code.

2 Attempt any **four** parts : 5×4=20

(a) Develop a VHDL module that describes one bit of a full adder with accumulator.

(b) Draw the block diagram of the faster multiplier including its state graph.

(c) Consider a 4x4 array multipler with 4 bit multiplicand and multiplier with a 8 bit result.

(i) Draw the block diagram of the multiplier.

(ii) How many AND gates, full adder and half addres did you use?

(d) Design an SM block that has 3 input variables (a,b,c) 4 outputs (w,x,y,z) and two exit paths. For this block output Z is always 1 and w is 1 if a and b both are 1. If C=1 and a=0, y=1 and exit path 1 is taken. If C=0 and a=1, x=1 and exit path 2 is taken.

(e) Explain a method used to realize SM charts with an example.

(f) Write a short note on Xilinx 3000 series FPGAs.

3 Attempt any **two** parts : **10×2=20**

(a) What are the various floating point operations? Draw and explain the flow chart for floating point multiplication.

(b) Two floating point numbers are added to form a floating point sum:

$$\left(F_1 \times 2^{E_1}\right)+\left(F_2 \times 2^{E_2}\right)=F \times 2^{E}$$

Assume that F_1 and F_2 are normalized and the result should be normalized. List the steps to carry out floating point addition including all special cases.

(c) Write a short note on one hot state assignment.

4 Attempt any **two** parts : **10×2=20**

(a) Draw and explain SM chart for simplified 486 bus interface.

(b) Write a VHDL code for simple 6116 state RAM model.

(c) Design the interfacing between memory to a microprocessor bus.

5 Attempt any **two** parts : **10×2=20**

(a) Explain the UART block diagram with SM chart for the receiver.

(b) Write various control instructions of 6805 microcontroller. Give one example of each instruction.

(c) Design the CPU of 6805 microcontroller with the suitable instructions.