

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

PAPER ID : 0306

Roll No.

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### B. Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION  
2010-11

### DIGITAL SYSTEM DESIGN USING VHDL

Time : 3 Hours

Total Marks : 100

Note :— (1) Attempt all questions.

(2) All questions carry equal marks.

1. Answer any **four** parts of the following : (5×4=20)
  - (a) Write VHDL description of an SR latch.
  - (b) Write the VHDL code for a full subtracter using logic equation.
  - (c) Write short notes on (a) VHDL Function (b) VHDL Procedures.
  - (d) Discuss the predefined VHDL operators.
  - (e) Write a VHDL model for the 74163 counter.
  - (f) Using waveforms explain the VHDL delays.
2. Answer any **two** parts of the following : (10×2=20)
  - (a) Enlist the IEEE standard specified a logic value for use with VHDL. Write the VHDL code for  $4 \times 1$  MUX.
  - (b) Draw a Block diagram for binary multiplier. Write a behavioural model for  $4 \times 4$  Binary multiplier, maximum number of clock cycle needed for a multiply is 10.

- (c) Explain the following term (i) GENERICS (ii) SYNTHESIS of VHDL code (iii) FILES and TEXTIO.
3. Answer any **two** parts of the following : (10×2=20)
- (a) Draw a block diagram for Dice Game. Discuss the SM chart and behavioural model for Dice Game.
  - (b) What are the various floating point operations ? Draw and explain the flow chart for floating point multiplication.
  - (c) Explain the model for 2's complement multiplier (4-bit multiplier for 2's complement numbers and implements the controller using a counter and logic equations).
4. Answer any **two** parts of the following : (10×2=20)
- (a) Using block diagram of RAM system explain the SM chart of RAM system.
  - (b) Draw and explain SM chart for simplified 486 bus interface.
  - (c) Explain the UART block diagram with SM chart for the Transmitter.
5. Answer any **two** parts of the following : (10×2=20)
- (a) Write a VHDL code for simple 6116 state RAM model.
  - (b) Draw a block diagram for M68HC05 Microcontroller. Write various addressing modes of 6805 microcontroller.
  - (c) Write short notes on the following (a) Xilinx 3000 series FPGAs (b) VHDL code for memory controller.