Code No: R05310402 **Set No. 1**

III B.Tech I Semester Regular Examinations, November 2007
DIGITAL IC APPLICATIONS
(Common to Electronics & Communication Engineering and Electronics & Instrumentation Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the parameters that are necessary to define the electrical characteristics of CMOS circuits? Mention the typical values of a CMOS NAND gate.
   (b) Design a CMOS 4-input AND-OR-INVERT gate. Draw the logic diagram and function table. [8+8]
2. (a) Mention the DC noise margin levels of ECL 10K family.
   (b) A single pull-up resistor to +5V is used to provide a constant-1 logic source to 15 different 74LS00 inputs. What is the maximum value of this resistor? How much high state DC noise margin can be provided in this case? [6+10]
3. (a) Write a VHDL Entity and Architecture for a 3-bit synchronous counter using Flip-Flops.
   (b) Explain the use of Packages. Give the syntax and structure of a package in VHDL. [8+8]
4. Design a logic circuit to detect prime number of a 5-bit input. Write the structural VHDL program for the same. [16]
5. Design a 10 to 4 encoder with inputs 1- out of ?10 code and outputs in BCD? Provide the data flow style VHDL program? [16]
6. Write VHDL program for 1-bit comparator circuit with the input bits and equal, grater than and less than inputs from the previous stage and the outputs contain equal, greater than and less than conditions. Using this entity write VHDL program for 16-bit comparator using data flow style. Do not use any additional logic for this purpose. [16]
7. (a) Differentiate between ripple counter and synchronous counter? Design a 4-bit counter in both modes and estimate the propagation delay.
   (b) Design a modulo-88 counter using 74X163 Ics. [8+8]
8. (a) Explain the necessity of two-dimensional decoding mechanism in memories. Draw MOS transistor memory cell in ROM and explain the operation.
   (b) Determine the ROM size needed to realize the logic function performed by 74×153 and 74×139. [8+8]

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