May - June 2012

Total No. of Questions—**12**] [Total No. of Printed Pages—**4+1**

Seat No.	

[4162]-203

S.E. (Computer Engineering) (First Semeste

EXAMINATION, 2012

(Common to I.T.)

DIGITAL ELECTRONICS AND LOGIC DESIGN

(2008 PATTERN)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answers to the two Sections should be written in separate answer-books.

(*ii*) In **Section I** attempt : Q. No. **1** *or* Q. No. **2**, Q. No. **3** *or* Q. No. **4**, Q. No. **5** *or* Q. No. **6**.
In **Section II** attempt : Q. No. **7** *or* Q. No. **8**, Q. No. **9** *or* Q. No. **10**, Q. No. **11** *or* Q. No. **12**.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data, if necessary.

SECTION I

1. (*a*) Do the required conversions for the following numbers : [6]

(*i*) $(1FFF)_{16} = (\_\_\_\_\_)_{10}$

(*ii*) $(1024)_{10} = (\_\_\_\_\_)_{16}$

(*iii*) $(36)_8 = (\_\_\_\_\_)_{16}$.

(*b*) Which gates are known as Universal Gates ? Justify using examples. [6]

(*c*) Solve the following equation using K map minimization technique. Draw the MSI design for the minimized output : [6]

$$Z = f(A, B, C, D) = \Sigma m(1, 3, 6, 7, 12, 13) + d(0, 2, 8, 9).$$

P.T.O.

Or

2. (*a*) Perform the following operations : [8]

(*i*) $(8085)_{16} - (1000)_{10} = (\_\_\_\_\_)_{10}$

(*ii*) $(777)_8 + (77)_8 = (\_\_\_\_\_)_{16}$

(*iii*) $(888)_{16} + (999)_{16} = (\_\_\_\_\_)_{16}$

(*iv*) $(1001.10)_2 = (\_\_\_\_\_)_{10}$.

(*b*) Solve the following equation using corresponding minimization technique. Draw the MSI design for the minimized output : [6]

$$Z = f(A, B, C, D) = \pi M(1, 3, 5, 6, 7, 10, 11) + d(2, 4).$$

(*c*) State and prove any *two* theorems of Boolean Algebra. [4]

3. (*a*) Define the following terms related to logic families. Mention typical values for standard TTL family : [8]

(*i*) Power dissipation

(*ii*) Fan-in

(*iii*) V_{IL}, V_{OH}

(*iv*) Noise margin.

(*b*) Draw the structure of CMOS inverter gate. Explain its working. [4]

(*c*) List differences between open drain and wired logic CMOS. [4]

Or

4. (*a*) Explain the working of two input TTL NAND gate with active pull up. Consider various input, output states for explanation. [8]

(*b*) Which parameters are significant while interfacing TTL and CMOS ? Draw and explain TTL driving CMOS gate. [8]

5. (*a*) Design 4-bit binary to Gray code converter. State the applications of Gray code. [8]

(*b*) Explain the working of magnitude comparator 7485. Discuss the truth table for the same. [8]

Or

6. (*a*) Design an 8 : 1 multiplexer using two 4 : 1 multiplexers. Explain with the help of the truth table. Implement the function $f(A, B, C) = \Sigma m(1, 3, 7)$ using the same. [8]

(*b*) Describe the working of BCD adder using 7483 with the help of diagram. [8]

SECTION II

7. (*a*) What is SR-flip-flop ? Convert the basic SR-flip-flop (SR-FF) into : [10]

(*i*) JK-FF

(*ii*) T-FF

(*iii*) D-FF.

(*b*) Explain the internal diagram of IC 7490. Design MOD 7 and MOD 98 counter using 7490. [8]

Or

8. (*a*) What is the difference between synchronous counter and asynchronous counter ? Design 3-bit synchronous up-counter using MS JK-flip-flop. [10]

(*b*) Design a sequence detector using D-FFs to detect the following sequence based on Mealy machine : [8]

1101.

9. (*a*) Explain ASM technique of designing the sequential circuits in detail. How does it differ from conventional flow chart ? [8]

(*b*) Describe the different modeling styles of VHDL with suitable example. [8]

Or

10. (*a*) Give the features of ASM. Draw the ASM chart for 2-bit binary up-counter with an enable signal e such that : [8]

for $e = 0$ disable counting

$e = 1$ enable counting.

(*b*) With the help of suitable example, explain the data objects : [8]

Constant, variable, signal and file.

11. (*a*) Define PLD and mention different types of PLD. Implement the following function using PAL : [8]

$F(A, B, C, D) = \Sigma m(0, 1, 3, 15)$.

(*b*) Draw and explain the architectural diagram of 8085 microprocessor. [8]

Or

12. (*a*) What do you mean by FPGA ? Explain the details of internal architecture of FPGA. [8]

(*b*) Draw the block diagram of simple microprocessor based system and explain the function of each block. [8]