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[4957]-203

S.E. (Computer/IT) (I Sem.) EXAMINATION, 2016
DIGITAL ELECTRONICS AND LOGIC DESIGN
(2008 PATTERN)

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

- N.B. :—**
- (i) Answer any *three* questions from each Section.
 - (ii) Answers to the two Sections should be written in separate answer-books.
 - (iii) Neat diagrams must be drawn wherever necessary.
 - (iv) Figures to the right indicate full marks.
 - (v) Use of calculator is allowed.
 - (vi) Assume suitable data, if necessary.

SECTION I

1. (a) Convert the following octal numbers into their equivalent binary, hexadecimal and decimal numbers : [12]
 - (i) 87
 - (ii) 0.3467
 - (iii) 1234
 - (iv) 87.02
- (b) Express the following number in decimal. Show your step by step equation and calculations. [6]
 - (i) $(10110.0101)_2$
 - (ii) $(16.5)_{16}$

P.T.O.

Or

- 2.** (a) Express the following number in binary. Show your step by step equation and calculations. [6]
- (i) $(1010.11)_{10}$
- (ii) $(428.10)_{10}$
- (b) Solve the following equations using corresponding minimization techniques. [12]
- (i) $Z = f(A,B,C,D) = \pi M(4, 5, 6, 7, 14, 15)$
- (ii) $Z = f(A,B,C,D) = \Sigma M(0, 2, 5, 6, 8, 10, 13, 15)$
- 3.** (a) Solve by Quine-McClusky technique : [10]
- $Z = f(A,B,C,D) = \Sigma(0, 3, 8, 9, 10, 12, 15)$
- (b) Explain standard TTL characteristics in brief. [6]

Or

- 4.** (a) Draw 2-i/p standard TTL NAND gate with Totem Pole. Explain operation of transistor (ON/OFF) with suitable input conditions and truth table. [8]
- (b) Compare TTL and CMOS logic family (Any 4 points). Also draw CMOS-NOR gate. [8]
- 5.** (a) Design and implement 4-bit Gray to Binary code converter using basic gates. [8]

- (b) Draw 4-Bit BCD Adder by using IC 7483 and logic gates. [8]

Or

6. (a) Design 16:1 mux using 4:1 multiplexers (with enable inputs). Explain the truth table of your circuit in short. [8]
- (b) What do you mean by half-adder and full adder ? How will you implement full adder using half-adder. Explain with circuit diagram. [8]

SECTION II

7. (a) What is MOD counter ? Explain MOD-15 counter using IC 7490. Draw design for the same. [8]
- (b) What is the difference between Asynchronous and Synchronous Counter ? Draw a 3-bit Synchronous counter. Explain timing diagram for the same. [10]

Or

8. (a) Explain the difference between combinational and sequential circuit. Also convert D Flip-Flop into JK-F/F and T-F/F. Show the Truth Table. [10]
- (b) Give any four applications of Shift Registers. Also explain 4-Bit Ring Counter. [8]

- 9.** (a) What is ASM chart ? Design ASM chart for 3-Bit Up-Down counter. [8]
- (b) What is VHDL ? Explain entity architecture declaration for 2-Bit AND gate. [8]

Or

- 10.** (a) What is ASM chart ? Give its application and explain the MUX controller method with the suitable example. [8]
- (b) List any four sequential statements used in VHDL ? [8]
- 11.** (a) Explain basic characteristics of FPGA. [8]
- (b) Explain basic microprocessor architecture. [8]

Or

- 12.** (a) Explain in brief, the working of Address bus, Data Bus and Control bus by assuming a basic operation. [8]
- (b) What is the difference between CPLD and FPGA ? [8]