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[3962]-203

S.E. (Comp. Engg.) (I Sem.) EXAMINATION, 2011

(Common to I.T.)

DIGITAL ELECTRONICS AND LOGIC DESIGN

(2008 PATTERN)

Time : Three Hours

Maximum Marks : 100

- N.B. :—**
- (i) Answer Questions 1 or 2, 3 or 4, 5 or 6 from Section I and Questions 7 or 8, 9 or 10, 11 or 12 from Section II.
 - (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) Assume suitable data, if necessary.

SECTION I

1. (a) For a maximum 3-digit octal number obtain equivalent hex, binary, decimal number. [3]
- (b) Perform the following operation and show your answer in hexadecimal, decimal and octal format : [15]
- (i) $(7FF)_{\text{Hex}} - (777)_{\text{Octal}}$
 - (ii) $(2078)_{\text{Decimal}} - (3FF)_{\text{Hex}}$

P.T.O.

(iii) $(1111)_{\text{Decimal}} - (1111)_{\text{Binary}}$

(iv) $(3258)_{\text{Octal}} + (FFF)_{\text{Hex}}$

(v) $(1110)_{\text{Binary}} + (1110)_{\text{Decimal}}$

Or

2. (a) Design and explain in detail 4-bit grey code to 5-bit BCD code conversion. For this design use K-map reduction and MSI circuit using basic gates. [16]

- (b) Explain rule for any sequence binary to grey code conversion. [2]

3. (a) Draw and explain 3-i/p TTL NAND gate circuit, also write various i/p, o/p states with transistor ON/OFF condition. [10]

- (b) Explain OR Gate using CMOS logic. [6]

Or

4. (a) Solve the following reduction using K-map, also draw MSI circuit for the output : [12]

(i) $Z = f(A, B, C, D) = \Sigma(1, 2, 7, 8, 10, 12, 15)$
 $+ d(0, 5, 6)$

(ii) $Z = f(A, B, C, D) = \Sigma(1, 3, 4, 6, 8, 11, 15)$
 $+ d(0, 5, 7)$

- (b) Explain various characteristics for TTL logic families. [4]

5. (a) Explain 16 : 1 mux using 4 : 1 mux in detail with necessary diagram. [8]
- (b) Explain decoder (1 : 8) as a binary to grey code converter. Show your design. [8]

Or

6. (a) Draw and explain 4-bit BCD adder using IC 7483. Also explain with example addition of numbers with carry. [8]
- (b) Explain working of cascaded mode IC 7485 magnitude comparator. [8]

SECTION II

7. (a) Draw 4-bit Asynchronous Counter. Also explain timing diagram for the same. [8]
- (b) What is advantage of MOD counter ? Explain working of MOD-27 and MOD-13 counter with detail diagram. [10]

Or

8. (a) What is S-R flip-flop ? Explain working of clocked SR flip-flop. What is edge triggering ? [10]
- (b) Explain ring counter design for the initial condition '10110', also explain twisted ring counter in brief. [8]
9. (a) What is VHDL ? Explain entity-architecture declaration for universal gates. [8]
- (b) What is ASM chart ? Design ASM chart for 3-bit octal number sequence with up-down conditions. [8]

Or

10. (a) What is ASM chart ? Explain the MUX controller method with suitable example. [8]
- (b) Draw an ASM chart and state table for a sequential ring counter with suitable present state and conditional input. [8]
11. (a) Explain execution sequence of a sample program.
[Hint : Assume basic microprocessor instructions]. [8]
- (b) Explain the design model of PAL. [8]

Or

12. (a) Explain in brief, for performing the various operations, a basic microprocessor must consist of what various blocks ? [8]
- (b) Explain in brief interfacing of memory with microprocessor.
[Hint : Assume 16-bit address bus and 8-bit data bus] [8]