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**[5057]-2053**

**S.E. (Computer Engineering) (First Semester)**

**EXAMINATION, 2016**

**DIGITAL ELECTRONICS AND LOGIC DESIGN**

**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and  
Q. 7 or Q. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Assume suitable data, if necessary.

1. (a) Minimize the following logic function and realize using NAND  
gates : [4]

$$F(A, B, C, D) = \sum m (1, 3, 5, 8, 9, 11, 15) + d(2, 13).$$

(b) Write the rules for BCD addition and give example. [2]

(c) Draw and explain 3 bit Asynchronous UP counter using  
MS-JK flip-flop, also draw timing diagram for the  
same. [6]

P.T.O.

*Or*

- 2.** (a) Design 16 : 1 Multiplexer using 4 : 1 MUX. Explain the truth table of your design. [6]
- (b) Compare Moore and Mealy model. [2]
- (c) Convert the following flip-flop : [4]
- (i) JK to T
- (ii) SR to D.

- 3.** (a) What is an ASM chart ? Draw an ASM chart and state table for 2 bit UP-down counter having mode control input M :  
When M = 1 : UP counting and  
When M = 0 : Down counting. [6]
- (b) Implement the following Boolean function using PAL : [6]
- $$F1 = \Sigma m(0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15)$$
- $$F2 = \Sigma(1, 2, 8, 12, 13)$$

*Or*

- 4.** (a) Write VHDL code for full adder using : [4]
- (i) Data Flow modeling
- (ii) Structural modeling.

- (b) Explain entity declaration for IC7432 (OR gate). [2]
- (c) Implement 3 bit binary to gray code converter using PLA. [6]
5. (a) Compare TTL and CMOS logic family and also draw CMOS-NOR gate. [7]
- (b) Draw three input standard TTL NAND gate circuit and explain its operation. [6]
- Or*
6. (a) State the following characteristics of digital TTL and CMOS ICs : [6]
- (i) Figure of merit
- (ii) Noise immunity
- (iii) Speed of operation.
- (b) What is logic family ? Give the classification of logic family in detail. [7]
7. (a) Draw and explain architecture of microcontroller 8051. [7]
- (b) Explain any *three* addressing modes of 8051 with example. [6]

*Or*

- 8.** (a) Discuss the function of PSW register in 8051 and also explain different flags available in PSW of 8051. [7]
- (b) Explain the following instructions with respect to 8051 and also give example of each : [6]
- (i) MOV A, Rn
  - (ii) SWAP A
  - (iii) SET B.