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Question Paper Code : 57010

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Second Semester

Computer Science and Engineering

CS 6201 — DIGITAL PRINCIPLES AND SYSTEM DESIGN

(Common to Information Technology and Computer and Communication Engineering)

(Regulation 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Find the octal equivalent of hexadecimal numbers AB.CD.
2. State and prove the consensus theorem.
3. Implement the function $G = \Sigma m(0, 3)$ using a 2 × 4 decoder.
4. Draw the circuit for 2-to-1 line multiplexer.
5. Write the characteristic table and equation of JK flip flop.
6. Write any two applications of shift register.
7. Define Race condition.
8. What are the types of hazards?
9. What is memory decoding?
10. Define ASIC.

PART B — (5 × 16 = 80 marks)

11. (a) Simplify the following functions, using K-Map technique

(i) $G = \Pi M(0, 1, 3, 7, 9, 11)$

(ii) $f(W, X, Y, Z) = \Sigma m(0, 7, 8, 9, 10, 12) + \Sigma d(2, 5, 13)$

Or

(b) Minimize the expression using Quine McCluskey (Tabulation) method

$F = \Sigma m(0, 1, 9, 15, 24, 29, 30) + \Sigma d(8, 11, 31)$

12. (a) Design a circuit that converts 8421 BCD code to Excess-3 code.

Or

(b) Implement the following Boolean function using 8 to 1. Multiplexer $F(A, B, C, D) = A'BD' + ACD + B'CD + A'C'D$. Also implement the function using 16 to 1 multiplexer.

13. (a) Implement T flip flop using D flip flop and JK flip flop using D flip flop.

Or

(b) Design a synchronous counter which counts in the sequence 000, 001, 010, 011, 100, 101, 110, 111, 000 using D-FF.

14. (a) Explain the steps for the design of asynchronous sequential circuits.

Or

(b) Implement the switching function $F = \Sigma m(1, 3, 5, 7, 8, 9, 14, 15)$ by a static hazard free two level AND OR gate network.

15. (a) Implement the following function using PLA

$A(x, y, z) = \Sigma m(1, 2, 4, 6)$

$B(x, y, z) = \Sigma m(0\ 1, 6, 7)$

$C(x, y, z) = \Sigma m(2, 6)$.

Or

(b) The following messages have been coded in the even parity Hamming code and transmitted through a noisy channel. Decode the messages, assuming that at most a single error has occurred in each codeword.

(i) 1001001

(ii) 0111001

(iii) 1110110

(iv) 0011011.
