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**Question Paper Code : 21298**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Computer Science and Engineering

CS 2202/CS 34/EC 1206 A/10144 CS 303/080230012 — DIGITAL PRINCIPLES  
AND SYSTEMS DESIGN

(Common to Information Technology)

(Regulation 2008/2010)

(Common to PTCS 2202 – Digital Principles and Systems Design for  
B.E. (Part-Time) Second Semester – CSE – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Convert  $(101101.1101)_2$  to decimal and hexadecimal form.
2. What are the limitations of Karnaugh map?
3. Write down the truth table of a full subtractor.
4. What is meant by Test Bench?
5. Distinguish between a decoder and a demultiplexer.
6. Compare SRAM and DRAM.
7. Derive the characteristic equation of a JK-flipflop.
8. What is a Mealy circuit?
9. What is primitive flow table?
10. What are static '1' and static '0' hazards?

PART B — (5 × 16 = 80 marks)

11. (a) Reduce the following functions using Karnaugh map technique :

(i)  $f(A, B, C) = \Sigma m(0, 1, 3, 7) + \Sigma d(2, 5)$

(ii)  $F(w, x, y, z) = \Sigma m(0, 7, 8, 9, 10, 12) + \Sigma d(2, 5, 13)$ .

Or

- (b) Simplify the Boolean function using Quine McCluskey method :

$$F(A, B, C, D, E, F) = \Sigma m(0, 5, 7, 8, 9, 12, 13, 23, 24, 25, 28, 29, 37, 40, 42, 44, 46, 55, 56, 57, 60, 61).$$

12. (a) Design a full adder using 2 half adders.

Or

- (b) Design a combinational circuit to convert binary to gray code.

13. (a) Implement the switching function  $F = \Sigma m(0, 1, 3, 4, 12, 14, 15)$  using an 8 input MUX.

Or

- (b) Implement the switching functions

$$Z_1 = a\bar{b}\bar{d}e + \bar{a}\bar{b}\bar{c}\bar{d}\bar{e} + bc + de$$

$$Z_2 = \bar{a}\bar{c}e$$

$$Z_3 = bc + de + \bar{c}\bar{d}\bar{e} + bd$$

$$Z_4 = \bar{a}\bar{c}e + ce \text{ using } 5 \times 8 \times 4 \text{ PLA.}$$

14. (a) Using D flip-flops, design a synchronous counter which counts in the sequence, 000, 001, 010, 011, 100, 101, 110, 111, 000.

Or

- (b) Design a shift register using JK flipflops.

15. (a) (i) Explain the types of hazards in digital circuits.  
(ii) Implement the switching function  $F = \Sigma m(1, 3, 5, 7, 8, 9, 14, 15)$  by a static hazard free 2 level AND-OR gate network.

Or

- (b) Explain the steps for the design of asynchronous sequential circuits.