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CSE 241 Digital Systems

October 12, 2009

Hourly Exam #1

Instructions: Write your name on the top of each sheet. Show all work in the space provided, writing your answers in the answer box at the bottom of each page. No calculators or other electronic devices allowed. 50 min closed book.

1. Let $A=1010.1$ and $B=11.1$

(a) Find $C=A*B$ for A, B, C all base-2

(b) Find $C=A*B$ for A, B, C all base-5

(c) Find $D=A/B$ for A, B, D all base-2

1(a) _____

1(b) _____

1(c) _____

2(a) Find $X - Y$ where $X = 0s218$ and $Y = 0s219$ are both duodecimal (base-12) numbers. Use any method, but show your result as a base-12 complement.

2(b) A Binary-Coded Duodecimal Code (BCDD code) encodes base-12 digits as n -bit binary numbers. Design a BCDD using the smallest n such that you can detect all 1-bit errors. Tell what n is for your code, show how you code the duodecimal alphabet $0, 1, 2, 3, \dots, 9, A, B$ and how you detect if there has been a 1-bit error.

2(a) _____

2(b)

Name _____

3.
$$f(x, y, z) = (x' + y)(y' + z') + (xz)'$$

(a) Sketch the maxterm realization (circuit diagram) using AND and OR gates. Assume double-rail logic.

(b) Repeat (a) using only NAND gates (a-form and b-form ok).

3 (a)

3 (b)

