

Name _____

CSE 241 Digital Systems

February 25, 2011

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(a) Find the product of $1001011_{(2)}$ and $1110_{(2)}$. Express the result in hexadecimal (base-16).

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1(b) Convert the base-3 number 201.21 to base-6. Use any method.

<p>1(a) _____</p> <p>1(b) _____</p>

2(a) Compute $140.2_{(5)} - 213.0_{(5)}$. Use signed 5's-complements subtraction, and express the result as a signed 5's-complement number.

2(b) What is the distance on the number line between the base-9 signed 9's-complement number 1_s700 and the offset origin? Write your answer as a decimal number.

2(a) _____

2(b) _____

Name _____

3. Let $f(x,y,z)=g(x,y)+h(y,z)$ where $g(x,y)=\sum m(1,3)$, and $h(y,z)=\prod M(1,3)$.

(a) Write $f(x,y,z)$ above in CNF (Conjunctive Normal Form).

(b) Explain the general difference between how Disjunctive Normal Form (DNF) and minterm Canonical Form (CF) are defined. One or two sentences is adequate. Illustrate your explanation by giving an example of a DNF which is not a minterm CF.

3(a) _____

3(b) _____

4.
$$f(w, x, y, z) = x(y+z') + w(x+y') + ((w+x')' + (y+z')')'$$

(a) Sketch the logic diagram which realizes this Boolean function. Assume double rail logic. Work directly from the expression above, do not first simplify or expand f. For compound complements draw either bubbles or NOT-gates.

(b) Sketch a logic diagram which realizes the same $f(w,x,y,z)$ using only NAND gates. You can use both a-form and b-form NAND gates in your answer.

4a

4b