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Student ID:

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EHB 205E: Introduction to Logic Design

Quiz 1

Duration: 45 Minutes
Grading: 1) 20%, 2) 40%, 3) 40%,
Quiz is in closed-notes and closed-books format
For your answers please use the space provided in the exam sheet
GOOD LUCK!

1. Answer the following statements with T(true) or F(false) only.
(**do not guess**: points are deducted for wrong answers. If you do not know the answer, leave it blank)

a) ____ Finite decimal fraction can be always converted to finite binary fraction

b) ____ Finite hexadecimal fraction can be always converted to finite binary fraction

c) ____ (The population of Burundi was below 1 million in 2013) NAND (banana is tastier than apple)

d) ____ A circuit performing a binary addition of two *n*-bit numbers needs *n* outputs.

e) ____ A circuit performing a binary multiplication of two *n*-bit numbers needs 2*n* outputs.

2. Consider a 4-variable Boolean function $\boldsymbol{f(x_1, x_2, x_3, x_4)} = \sum(1,3,4,5,9,11,12,13,14,15)$; $\boldsymbol{x_1}$ is the most significant bit. Obtain a minimal sum-of-products (SOP) expression for $\boldsymbol{f}$ using a **Karnaugh** map. Show all prime and essential prime implicants.

3. Obtain a minimal sum-of-products (SOP) expression for $\boldsymbol{f}$ using a **Karnaugh** map.

$$f = \overline{x_1}\,\overline{x_2}\,\overline{x_3} + x_1\,\overline{x_2}\,\overline{x_4} + \overline{x_1}x_2x_3\overline{x_4} + \overline{x_1}x_2\,\overline{x_3}\,x_4$$