Name: KEY **Id#**

ICS 233, Term 081

Computer Architecture & Assembly Language

Quiz# 5

Date: Saturday, Dec. 27, 2008

Q.1. What is the decimal value of the following single-precision floating-point number?

0100 0010 1100 0111 1000 0000 0000 0000

$= + (1.10001111000\ldots0)_2 * 2^{(133-127)} = + (1.10001111000\ldots0)_2 * 2^6$
$= + (1100011.11000\ldots0)_2$
$= + 99.75$

Q.2. Show the single precision binary representation for: **-1000.5**.

$1000.5=(1111101000.1)_2 = (1.1111010001)_2 * 2^9$
Exp. = 9 +127=136
Single precision binary representation:

1100 0100 0111 1010 0010 0000 0000 0000

Q.3. Perform the following floating-point operation rounding the result to the **nearest even**. Perform the operation using **guard**, **round** and **sticky** bits.

```
  0100 0000 0111 1111 1111 1111 1111 1111
+ 0011 1101 0000 0000 0000 0000 0000 0001
```

We add three bits for each operand representing G, R, S bits as follows.

```
      1.111 1111 1111 1111 1111 1111 000 x 2^1
+     1.000 0000 0000 0000 0000 0001 000 x 2^-5
-------------------------------------------------
      1.111 1111 1111 1111 1111 1111 000 x 2^1
+     0.000 0010 0000 0000 0000 0000 001 x 2^1  (align)
-------------------------------------------------
     10.000 0001 1111 1111 1111 1111 001 x 2^1

= +   1.000 0000 1111 1111 1111 1111 101 x 2^2  (normalize)
= +   1.000 0001 0000 0000 0000 0000     x 2^2  (round)
```