Name: KEY   **Id#**

Quiz# 1

Date: Sunday, Sep. 6, 2015

Q1. Determine the **decimal** value of the following numbers:

i. $(11011100.011)_2$

Integer part = $(2^5 - 2^2) + (2^8 - 2^6)$ = 32-4+256-64=288-68=220
OR: 255-32-3 = 255-35 = 220
Fraction part = 1/4 + 1/8 = 0.25 + 0.125 = 0.375
Thus, the number is equal to 220.375.

ii. $(2A.C)_{16}$

= 2*16 +10 + 12/16 = 42.75

Q2. Represent the following numbers in **binary**. Use as many bits as needed, and use only **4 <u>binary</u>** digits to represent the fraction:

i. $(499.7)_{10}$

Integer part= 511 − 12 = 111110011
Fraction part: 0.7 *16 = 11.2 => First hex fraction digit is B => $(0.B)_{16} = (0.1011)_2$
Thus, the number in binary is $(111110011.1011)_2$

ii. $(E3.5)_{16}$

= $(11100011.0101)_2$

Q3. Perform the following arithmetic operations in the given bases:

     i.   **$(01110111)_2$ + $(01011011)_2$**

         = $(11010010)_2$

    ii.   **$(A2)_{16}$ - $(8E)_{16}$**

         = $(14)_{16}$

    iii.   **$(5E)_{16}$ * $(32)_{16}$**

         = $(125C)_{16}$

Q4. Fill in the Spaces: (Show all work needed to obtain your answer)

   a. Given that the base R number $(222)_R$ is equal to $(62)_{10}$. Then the base R = <u>5</u>.

      $2R^2 + 2R + 2 = 62 \Rightarrow R^2 + R + 1 = 31 \Rightarrow R^2 + R - 30 = 0 \Rightarrow (R+6)(R-5)=0$
      $\Rightarrow$ R=-6 or R=5

   b. The largest unsigned decimal value that can be expressed using 6 binary integer digits and 2 binary fractional digits is <u>$2^6-2^{-2}=63.75$</u>.

   c. The number **53** is represented in **BCD** as <u>0101 0011</u>.

   d. Given that an 8-bit register stores the ASCII code of a character in the least significant 7 bits and a parity bit in the most significant bit. Assuming that the register contains the hexadecimal value **C4** representing a character, the character stored in the register is <u>'D'</u> and the <u>parity</u> used is <u>odd</u> (i.e. even or odd parity). Note that the ASCII code of character 'A' is 41h and the ASCII code of character 'a' is 61h.