TUTORIAL QUESTION FOUR **2014**

(a) Perform all the following conversions. Unless specified otherwise, treat all hex and binary numbers as signed, two's complement, 32-bit integers:

(i) Convert 98H to decimal;

(ii) Convert 11011110101011011011111011101111 to hex;

(iii) Convert 0FFFFFE00H to decimal;

(iv) Convert –31 to hex;

(v) Convert –1025 to binary;

(vi) Convert FFFFH (as *unsigned* 16-bit integer) to decimal.

(b) Perform all the following conversions *without* a calculator. Unless specified otherwise, treat all hex and binary numbers as signed, two's complement, 12-bit integers:

(i) Convert hex $01E_{hex}$ to decimal;

(ii) Convert 110100101110_{bin} to hex;

(iii) Convert $FE0_{hex}$ to decimal;

(iv) Convert –27 to hex;

(v) Convert **unsigned 12-bit integer** FFF_{hex} (as an unsigned 12-bit integer) to decimal.

(c) (i) Represent –10.4375 in a single IEEE 754 representation and express as a hex number.

(ii)Given a single IEEE 754 representation hex number: 3EA80000, what is this in decimal?

(d) Convert the following decimal numbers to IEEE single precision floating-point numbers.

Report the answer as hexadecimal value

(a) –65 (b) 0.8 (c) – 42.16

(e) Perform the following decimal scientific notation with a fraction significand. Compute correctly and normalize

(a) $(- 0.8173 \times 10^{6}) + (+ 0.8085 \times 10^{7})$

(b) $(1.076 \times 10^{-7}) - (9.987 \times 10^{-8})$

(f) What decimal number is represented by the result of the following binary arithmetic on 16-bit signed numbers

(c) 2C50H + 46B0H

(d) 0C000H + 6500H

(g) Perform the following decimal number arithmetic using BCD

(e) 19 + 46

(f) 256 – 63

(g) Explain the booth algorithm and draw its flow chart

(h) Determine the product of 4 and -3 using the booth algorithm

(i) What is the advantages of using the booth algorithm as compared to other algorithm

(j) Explain the five exaples of the Input output devices and state the type of information they convey

(k) State the differences between the available types of buses

(l) Draw the organization diagram between the CPU parts and the system busses, elaborate all the arrow directions presented

(m) Explain the significant for each of the bus characteristics that is bus width, bus speed and Bus bandwidth, which one of them is very crucial in determination of computer performance

(n) Explain the concept of Nus arbitration

(o) What is the difference between centralized and distributed bus arbitration

(p) Explain the three types of the centralized bus arbitration

(q) State the differences between synchronous and asynchronous bus timings. State the advantage and disadvantages of each

(r) Explain the five major functions of the I/O module

(s) Explain the possible sequence of steps, for a data transfer between a device and the CPU (over the bus)

(t) Describe the I/O address decoding and explain the two possible ways of doing this