Quiz 2

Q1. Use IEEE 754 32-bit format. Find

a) $(-16.5)_{10}$
   A. 1 1000 0011 0000 1000 0000 0000 0000 000
   B. 1 1000 0110 0000 1000 0000 0000 0000 000
   C. 1 1000 0011 0001 0000 0000 0000 0000 000
   D. 1 1000 0001 0000 1000 0000 0000 0000 000
   E. None of the answers.

b) $(5A)_{16}$
   A. 0 1000 0101 0110 1000 0000 0000 0000 000
   B. 0 1000 0101 0111 1000 0000 0000 0000 000
   C. 0 0100 0101 0110 1000 0000 0000 0000 000
   D. 0 1000 0101 1110 1000 0000 0000 0000 000
   E. None of the answers.

c) $(73.725)_{10}$
   A. 0 1000 0101 0010 0110 1110 0110 0110 011
   B. 0 1000 0101 0010 0110 1110 1110 0110 011
   C. 0 1000 0111 0010 0110 1110 0110 0110 011
   D. 0 1000 0101 0010 0110 1110 0110 1110 011
   E. None of the answers.

0 1000 0101 0010 0110 1110 0110 0110 011

Solution:

For detailed steps, please refer to the solution of Q3 in tutorial week 3.

a) 1 1000 0011 0000 1000 0000 0000 0000 000
b) 0 1000 0101 0110 1000 0000 0000 0000 000
c) 0 1000 0101 0010 0110 1110 0110 0110 011

Q2. To find the scientific notation of $(0.08888)_{10}$ in 16-bit floating point representation. Use 1 sign bit, 9 mantissa bits, and 6 exponent bits.

A. $(0.0110\ 1100\ 0\ [00\ 0100])_2$
B. $(0.0110\ 1100\ 0\ [11\ 1100])_2$
C. $(1.1110\ 1001\ 1\ [00\ 0000])_2$
D. $(0.1011\ 0110\ 0\ [11\ 1101])_2$
E. None of the answers.

Solution:

$(0.08888)_{10} \cong (0.0001\ 0110\ 1100\ 0)_2$ To move the radix point 3 places to the right so that it becomes 0.xxxxxxx that is 2 to power -3 or exp= [111101]

$= (0.1011\ 0110\ 0)_2 \times 2^{(11\ 1101)_2}$

Therefore, the answer is $(0.1011\ 0110\ 0\ [11\ 1101])_2$

Q3. Which of the following is the correct set builder notation for the given set below?

$$\{1.1, 2.2, 3.3, 4.4, 5.5, 6.6, 7.7, 8.8, 9.9\}$$

A. $\{x \in \boldsymbol{R} \mid 1.1 \leq x \leq 9.9\}$
B. $\{x \in \boldsymbol{Z} \mid 1.1 \leq x \leq 9.9\}$
C. $\{(1.1x) \mid x \in \boldsymbol{R}, 1 \leq x \leq 9\}$
D. $\{(1.1x) \mid x \in \boldsymbol{Z}, 1 \leq x \leq 9\}$
E. $\{(1.1x) \mid x \in \boldsymbol{Z}, 1 < x < 9\}$

Q4. A is a set $\{0,1,\{1,2\},\{1,2,3\}\}$. How many elements are there in the power set $P(A)$?

A. 14
B. 15
C. 16
D. 17
E. None of the answers.

Solution:

The cardinality of the power set $P(A)$ is 2^n, where n is the cardinality of set A.

In our case, $n = 4$. $|P(A)| = 2^4 = 16$.