

Name: KEY ID#: \_\_\_\_\_

Computer Organization and Microprocessor- ENCS2380 (INEMER)

Quiz#3 (10 pts., 13 mins.), Date: Wednesday, Dec. 18, 2024

Answer the following questions:

- i. Express  $(-6.75)_{10}$  as an IEEE standard single precision (i.e. 32 bits) floating-point number (write it in **Hex**). Show your solution **step by step**.

①  $\rightarrow$  Sign = 1 (-ve).

$\rightarrow 6.75 \rightarrow 110.11 = 1.1011 \times 2^2$

①  $\rightarrow$  Fraction = 10110.....0.

①  $\rightarrow$  Exponent =  $2 + 127 = 129 \rightarrow 1000\ 0001$

①  $\Rightarrow$   $11000\ 0000\ 1101\ 1000\ 0000\ 0000\ 0000\ 0000\ 0000$   
 0XC 0 D 8 0 0 0 0

- ii. Given the below 16 bits' non-standard floating-point representation, what is the **decimal** value for **0xC720**? Show your solution **step by step**.

$\rightarrow 1100\ 0111\ 0010\ 0000$

Sign (S): 1 bit	Exponent (E): 5 bits	Mantissa: 10 bits
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①  $\rightarrow$  Sign = 1 (-ve).

①  $\rightarrow$  Exponent =  $10001 (15+2) \rightarrow B = 2^{5-1} - 1 = 16-1 = 15$   
 $\rightarrow 17$

①  $\rightarrow$  Fr./Mant. = 1100100000

$\rightarrow -(1.110010 \times 2^{15}) = -(111.001)$   
 $= -7.125$

①

STUDENTS-HUB.COM iii. The two numbers given below are multiplied using the **Booth's** algorithm: Uploaded By: anonymous  
**Multiplicand:** 0101101011101110 **Multiplier:** 0111011110111101

How many **additions and subtractions** are required in total for the multiplication of the two numbers?

②

a. 6

b. 7

c. 8

d. 9

e. 10

f. None