Class Test 1 **Date: December 17, 2022**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

L-3/T-1 CSE 315: Microprocessors, Microcontrollers, and Embedded Systems

1. JNBE instruction is satisfied if and only if $CF = 0$ & $ZF = 0$- do you agree? Justify your answer with examples.

   Answer: JNBE = Jump if Not Below or Equal; Only for unsigned numbers.
   Two parts:

   - Not Equal $\rightarrow ZF = 0$
   - Not Below $\rightarrow$ For unsigned numbers, if first number $>$ second number, no borrow is needed. So $CF = 0$.

   $ZF = 1$ means two numbers are equal, and $CF = 1$ means the first number is less than the second number so a borrow was needed while subtracting. Both of these conditions violate JNBE.

2. For 8086 µprocessor, determine the first three (3) and last three (3) of the logical addresses in the segment:offset form for the physical address 2A3B4h. Write the addresses in HEXADECIMAL format i.e. AAAAh:BBBBh.

   Answer:

First Three Addresses	Last Three Addresses
1A3C:FFF4	2A39:0024
1A3D:FFE4	2A3A:0014
1A3E:FFD4	2A3B:0004

3. Show an example that explains the need for different jump instructions for signed and unsigned representation.

   Answer: AL = 0111 1111; BL = 1111 1111
   Signed: $AL = 127; BL = -1$; so $AL > BL$
   Unsigned: $AL = 127; BL = 255$; so $AL < BL$

   Now for the following code snippet:

```
CMP AL, BL
JA LABEL
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   Though $AL > BL$ in a signed sense; the program does not jump to LABEL as we used the unsigned jump JA and $AL < BL$ in unsigned representation.