1. [2] No, they cannot. Because the ZF is set to 1 when all the bits of the result is 0. SF is set to 1 when the most significant bit of the result is 1. So, the most significant bit cannot be 0 and 1 at the same time.

2. [4] `cmpl %ebx, %eax`  
    `jne out`  
    `cmpl %ecx, %ebx`  
    `jb out`  
    `je out`  
    L1: `addl %eax, %ebx`  
    `addl %ebx, %ecx`  
    out:

3. [9]

<table>
<thead>
<tr>
<th>instruction#</th>
<th>instruction</th>
<th>rax</th>
<th>rbx</th>
<th>CF</th>
<th>ZF</th>
<th>SF</th>
<th>OF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initially</td>
<td></td>
<td>0xFFFFFFFF</td>
<td>0x00000001</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td><code>addq %rbx, %rax</code></td>
<td>0x0000000000</td>
<td>0x0000000001</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td><code>testq %rbx, %rax</code></td>
<td>0x0000000000</td>
<td>0x0000000001</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td><code>cmpq %rbx, %rax</code></td>
<td>0x0000000000</td>
<td>0x0000000001</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

4. [5] `int foo(int a){`  
    `int i;`  
    `int result = a+2;`  
    `for(i = 0; i < a ; i++ ) {`  
    `result += i + 5;`  
    `result *= i+3 ;`  
    `}`  
    `return result;`  
    `}`