1. 
a. Truth Table: [3 pts]

\[
\begin{array}{ccc}
A & B & F \\
0 & 0 & 0 \\
0 & 1 & 1 \\
1 & 0 & 0 \\
1 & 1 & 0 \\
\end{array}
\]

Boolean function: \( F = A'B \) \hspace{1cm} (A’ means NOT A)

b. [3 pts]

\[
\begin{array}{ccc}
A & B & F \\
0 & 0 & 0 \\
0 & 1 & 0 \\
1 & 0 & 1 \\
1 & 1 & 0 \\
\end{array}
\]

Boolean function: \( F = AB' \)

2. 
a. [1 pt]
Since we want to present numbers from 0 to 3, we need only two bits.

b. [1 pt]
By looking at the picture of the seven-segment display we can see that we need 7 outputs: a, b, c, d, e, f, and g.
### c. [10 pts]

<table>
<thead>
<tr>
<th>In 1</th>
<th>In 2</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
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<tbody>
<tr>
<td>0</td>
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</tbody>
</table>

### 3. [2 pts]

![Diagram of a digital circuit with 2x1 multiplexers](image-url)