1. A combinational circuit is defined by the following three Boolean functions:
   \[ F_1(x, y, z) = x' y' z' + xz \]
   \[ F_2(x, y, z) = xy' z' + x' y \]
   \[ F_3(x, y, z) = x' y' z + xy \]
   Design the circuit with a 3-to-8-line decoder and external gates. (10%)

2. Given the following state diagram:

![State Diagram](image)

Design the clocked sequential circuit with D flip-flops and external gates. (10%)

3. Describe five different addressing modes and show how to get the value of the operand. (10%)

4. Explain the following terms for pipelining: (10%)
   a. Structure hazards  
   b. Data hazards  
   c. Control hazards  
   d. Delayed branches  
   e. Data forwarding

5. Describe the major functions performed by the following layers of the ISO OSI model: (10%)
   a. The physical layer  
   b. The data link layer  
   c. The network layer  
   d. The transport layer  
   e. The presentation layer

6. Given \( f(n) = a_n n^6 + \ldots a_1 n + a_0 \), prove \( f(n) = O(n^6) \). (10%)
7. Change the expression of \((\frac{a}{b-c+d})^*(e-a)^*c\) to the postfix notation. (5%) 

8. Write a partial program (choice language by yourself) to visit a graph based on the Breadth First Search Algorithm. (15%) 

9. Given a symbol list and its display frequency as following table, (a) design the corresponding code using “Huffman Coding Algorithm”; (b) decode the string of “11110010000110” based on your design. (10%) 

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
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<tbody>
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<td>0.3</td>
<td>0.18</td>
<td>0.05</td>
<td>0.12</td>
</tr>
</tbody>
</table>

10. Describe the RSA working principle and explain why it is secure for open networking system. (10%)