H.U. Spring 2007

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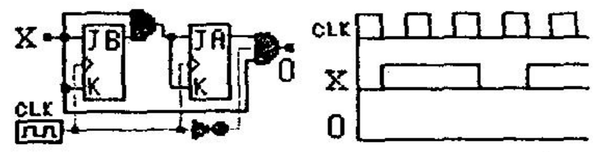
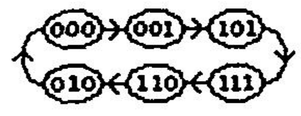
PHY 233
Quiz II

1. Answer ONE of the following two questions: *(20 pts.)*

1A. For the circuit shown to the right
   a. Prepare the present state next state table. *(7 pts.)*
   b. Draw the State Transition Diagram. *(9 pts.)*
   c. Draw the output (O) on the timing diagram. *(4 pts.)*



1B. The figure shows the state transition diagram of a counter *(0,1,5,7,6,2,0...)*



   a. Prepare the Present state / next state table. *(6 pts.)*
   b. Prepare the Karnaugh maps for D Flip Flops. *(8 pts.)*
   c. Convert the maps to that for JK Flip Flops. *(6 pts.)*
   d. Draw the counter circuit. *(5 pts.)*

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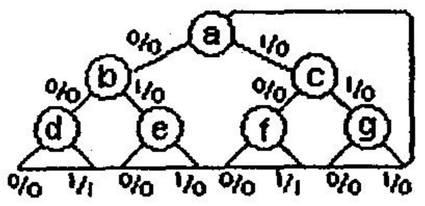
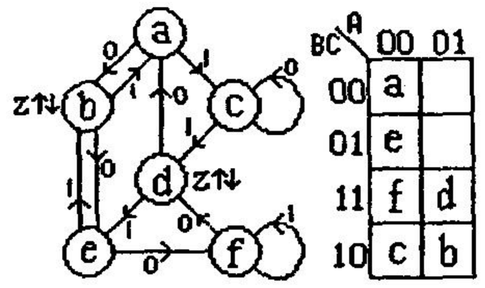
2. The For the state transition diagram shown



   a. Reduce the number of states by the *method of grouping*
   (Note: No points for other methods) . *(12 pts.)*
   b. Draw the reduced state transition diagram. *(3 pts.)*



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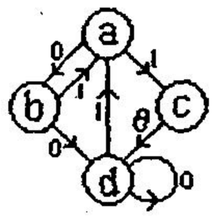
3. To what degree does the state assignment shown satisfy the 4 rules for the state transition diagram shown? *(15 pts.)*

Note: You must justify your answers explicitly.



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4. Realize the 4 state machine shown by the One-Hot method, using D- Flip Flops.. You are free to use gates or multiplexers.
Note: No points for other methods. *(15 pts.)*

4 states
⇒ $2^n = 4$ n = 2 flip flops

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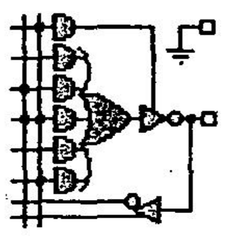
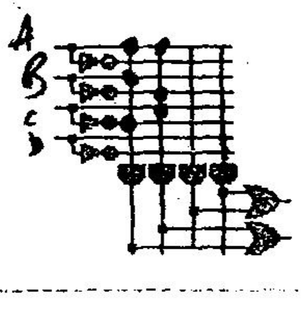
5. Answer 5 of the following 7 questions. *(7x5 = 35 pts.)*

Note: The 6th answer will be ignored.

   a. Identify the Read Only Memory circuit shown in the figure opposite. Justify your answer briefly.
   b. How many 16x4bit memory chips would you need to construct a 1Kx8bit memory?
   c. To what extent is the Alternate State Transition Method applied in Question 1?
   d. In which type of chips would you find the AND/OR fragment shown to the right? Justify your answer briefly.



   e. How many unique ways are there to assign the labels AB to an state machine of just two states (a , b)? Justify your answer any which way you can (graphic, algebraic....)
   f. Perform the division 1000.11/10.1 explicitly. *(no points for saying 8.75 ÷ 2.5 = 3.5)*
   g. Realize the function F = A(BXC) using the array shown.



Good Luck!

20 + 3X15 + 35 = 100