EGE 534 HW #3 Dr. Izadi

First Name:_____ Last Name: _____

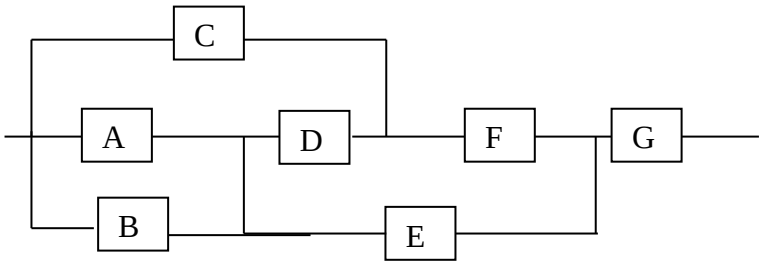
Problem 1 (20 Points)
Using the combinatorial model, determine the reliability of a simplex, TMR, and 5MR systems as a function of reliability of a simplex system, R(t) . You may assume a fault-free voter. Using MATLAB, plot the reliability of the three systems versus R and comment on their relative reliabilities.

Problem 2 (25 Points)
Using Markov model, determine the discrete solution for the reliability of a 5MR system with λ failure rate and μ repair rate. You may assume that the system initially is fault free. Moreover, you may assume that once the 5MR has 3 more faulty modules, it enters a failed state that can't be repaired. Using MATLAB plot R(t) from 0 to 5 hours using

a. $\Delta t = 0.01$, $\lambda = .01$ and $\mu. = .01$
b. $\Delta t = 0.01$, $\lambda = .1$ and $\mu. = .1$
c. $\Delta t = 0.01$, $\lambda = .1$ and $\mu. = .01$

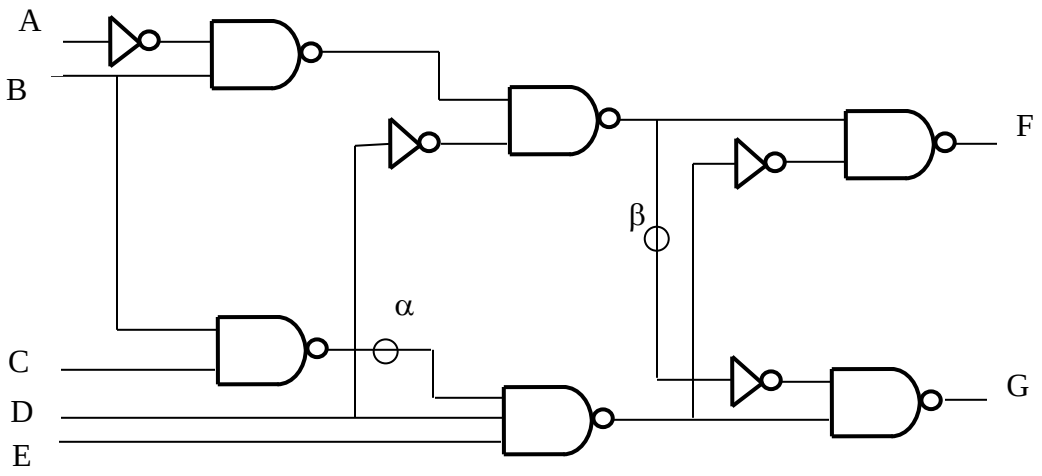
Problem 3 (25 Points)

a) Determine an exact expression for the reliability of the following system, given that the reliability of each component X is R_X.
b) Assume that $R_A=R_B=R_C=R_D=R_E=R_F=R_G =R$, determine the reliability of the system in term of R.
c) Determine the upper limit approximation of the system reliability.



Problem 4 (25 Points)

a. Mark all single stuck faults on the following figure, taking one fault from each equivalence class.
b. Use the D-algorithm to obtain a test pattern T_α that detects the fault "line α stack-at-1" in the logic circuit.
c. Use the D-algorithm to obtain a test pattern T_β that detects the fault "line β stack-at-0" in the logic circuit.
d. Identify at least three other stuck at faults that are detected by T_α.
e. Identify at least three other stuck at faults that are detected by T_β.



Due 3/11/2016