

Name: _____

Problem One (10 Points)

Design a self-dual of:

$$F = A'C + BC' + AB'$$

Problem Two (10 Points)

Design a totally self-checking checker with 8 inputs.

Problem Three (20 Points)

Consider a random-access memory that has a word format $X_5 X_4 X_3 X_2 X_1 X_0$ of size 6 bits. We can use Hamming code to correct any single bit in this memory.

- Determine the H (or P) matrix such that the syndromes s_i computed by your SEC Hamming code specifies that the single-bit error is at position i . Also, give the error-free syndrome s^* .
- Explain how you would modify the SEC code you have defined above in order to obtain an SEC/DED code.

Problem Four (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 MathLab, plot the reliability of the three systems versus $R(t)$ and comment on their relative reliabilities.

Problem Seven (25 Points)

Using Markov model, determine the discrete solution for the reliability of a 3MR system with λ failure rate and μ repair rate. You may assume that the system initially is fault free. Using MathLab plot $R(t)$ from 0 to 5 hours using

- $\Delta t = 0.01$, $\lambda = .0001$ and $\mu = .01$
- $\Delta t = 0.01$, $\lambda = .001$ and $\mu = .01$
- $\Delta t = 0.01$, $\lambda = .0001$ and $\mu = .001$

Due: Friday October 21, 2005 at Noon