UNIVERSITY OF THE WEST INDIES
CAVE HILL CAMPUS

Department of Computer Science, Mathematics & Physics

ELET1210 - Digital Electronics 1

Class Test 2 **Thursday, December 2, 2021**

1. 01010110 is passed through a parity checker and the output is 1.
   Is this an EVEN or ODD parity system? [1]

2. How many flip-flops will be complemented when the counter below is incremented

   01100111 [1]

3. Which Logic Family has the shortest Propagation Delay? [1]

4. Implement the following function using a 3 x 8 decoder and one additional logic gate

   $$F = \left(A + \bar{B}\right)\left(B + C\right)$$ [3]

5. Implement the following function using a 4 x 1 multiplexer

   $$F = \bar{A}\bar{C} + BC + AB\bar{C}$$ [4]

EITHER DO QUESTION 6 OR QUESTION 7 BUT NOT BOTH

6. A 3-bit finite state device, built with J-K flip flops, has the following flip-flop input functions

   $\mathrm{JA} = \bar{B} + AB\bar{C}$ $\quad\quad$ $\mathrm{KA} = 1$
   $\mathrm{JB} = C$ $\quad\quad$ $\mathrm{KB} = \bar{A}B + A\bar{B}\bar{C} + \bar{A}B\bar{C}$
   $\mathrm{JC} = A\bar{B}$ $\quad\quad$ $\mathrm{KC} = \bar{B} + A$

   Draw the State Diagram and find the State Equations
   What are the unused states?
   Is the device self-correcting? [15]

7. A 3-bit finite state device, built with J-K flip flops, has the following repeating sequence

   2,1,7,3,5…...

   Find the simplified flip flop input functions and analyze the unused state behavior
   Draw the State Diagram [15]