

8. Convert the expression $x' + x(x + y')(y' + z')$ into sum of products and product of sums. (6 points)

9. Define or explain the following terms (3 points each)

(a) glitch

(b) combinational circuit

(c) negative logic

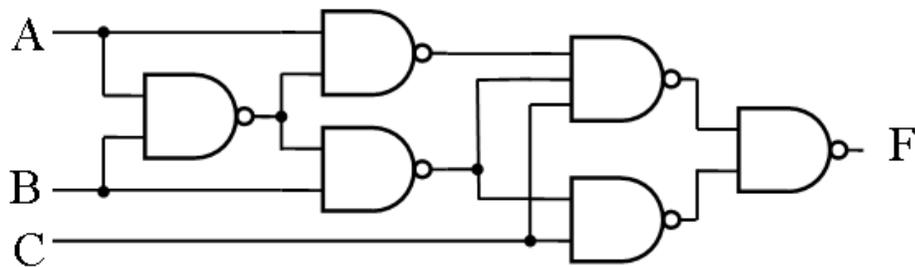
(d) multiplexer

(e) decoder

10. What operation results from taking the XOR of a bit vector? (e.g. $b_4 \oplus b_3 \oplus b_2 \oplus b_1 \oplus b_0$) (4 points)

11. Explain the difference between *structural* Verilog and *dataflow* Verilog. (5 points)

12. Write a Verilog module for the following logic operation. (10 points)



13. Draw the symbol for a 2-to-1 multiplexer. (2 points)

14. Design a 4-to-1 multiplexer using 2-to-1 multiplexers. (4 points)

15. Write a Verilog module for a 2-to-1 multiplexer, using the conditional-if operator. (4 points)

16. Write the Boolean equations corresponding to the following concurrent operations. Express the equations in Verilog notation (10 points)

