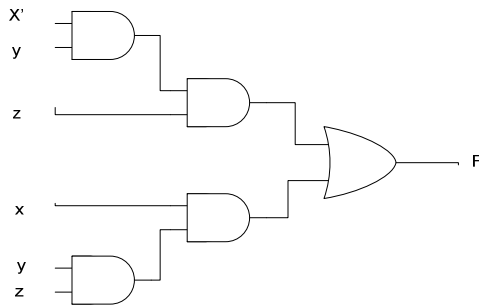


Course: Digital Systems Design	Course Number: COEN312/1	Section: CC
Examination: Midterm	Date: July 20, 2008	Time: 1 hour 10 min.
Instructor: Dr. M.R. Soleymani		# of pages: 1
Books and Material: Only one crib sheet allowed, no calculator allowed.		
Special Instructions: Try all questions.		

- 1) Using Boolean Algebra minimize:

$$F = (x + y'z')(x' + yz)(x + y')(x + z). \quad (4 \text{ Marks})$$

- 2) For the following circuit,  
a. Draw the truth table (2 Marks).  
b. Simplify the logic using K-map (3 Marks).



- 3) Simplify the function  $F$  with the don't care condition  $d$  :

$$F(w, x, y, z) = \sum (0,2,5,7,8,10,13,15)$$

$$d(w, x, y, z) = \sum (1,6,14). \quad (4 \text{ Marks})$$

- 4) Design the function  $F(w, x, y, z) = \sum (1,3,4,11,12,14,15)$  using an  $8 \times 1$  multiplexer. (4 Marks).  
5) Design (with minimum number of gates) a circuit with four inputs A, B, C and D and an output F such that F is equal to 1 if the number represented by ABCD is divisible by 4. (4 Marks).  
6) Implement:

$$F = (x + y)(x' + z)(y + z')$$

- a) with OR, AND and NOT gates (2 Marks).  
b) With NOR gates only. **The inputs are only available in non-inverted form** (2 Marks).