KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF ELECTRICAL ENGINEERING

EE 200 DIGITAL LOGIC CIRCUIT DESIGN

EXAMINATION II

December 5, 2007

NAME :					
I.D. # :					
SECTION :	**1**	**2**	**3**	**4**	**5**

PROBLEM #	SCORE	MAXIMUM
1.		40
2.		30
3.		30
TOTAL		100

Q.# 1)

Design a combinational circuit that implements the following Boolean functions:

$$F_1(A,B,C,D) = \sum(0,2,8,9,10,11,13,15)$$
$$F_2(A,B,C,D) = \Pi(0,2,8,10,13,15)$$

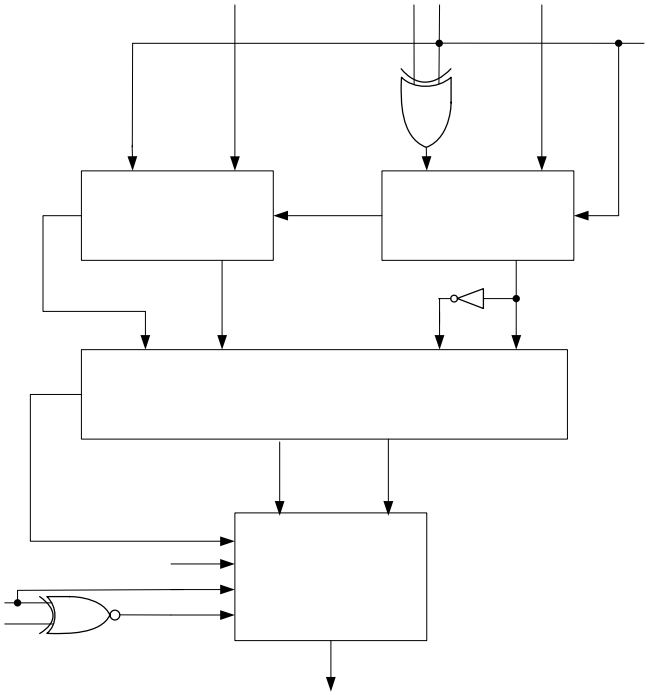
1. using a decoder made with NAND gates and external gates. Determine the type of external gates.
2. Using a PLA with the minimum number of product terms. Determine the size of the PLA and its program table.
3. Draw the logic circuit of the PLA showing the fuse pattern.

Q # 2)

In the logic circuit shown below, the inputs are $x_2 x_1 x_0$ and the final output is F .

a. Derive the truth table that describes the operation of this circuit. Show the logic values at D_0, D_1, D_2, D_3 , A, B, V and F

b. Find out what the output function F represents in terms of the input variables.



X_0

X_2

Q # 3)

You would like to build a circuit that implements the function

$$F(A,B,C,D) = A'B + A'C + A'D' + BD' + AB'C'D$$

Only a 4x4 ROM and a 4x1 MUX are available. Program the ROM in the following circuit to implement the function F .

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