Jordan University of Science & Technology
Electrical Engineering Department

Mid Examination

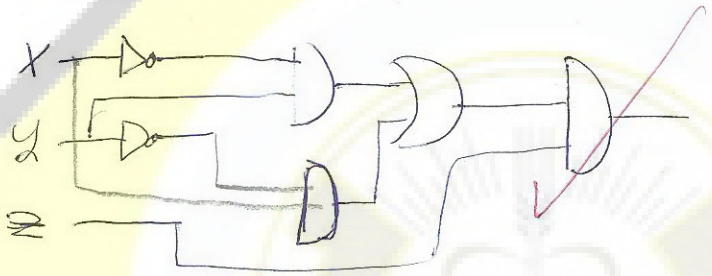
EE 346 *Introduction to Microcontrollers Lab* **30.11.2010**

12/30 22

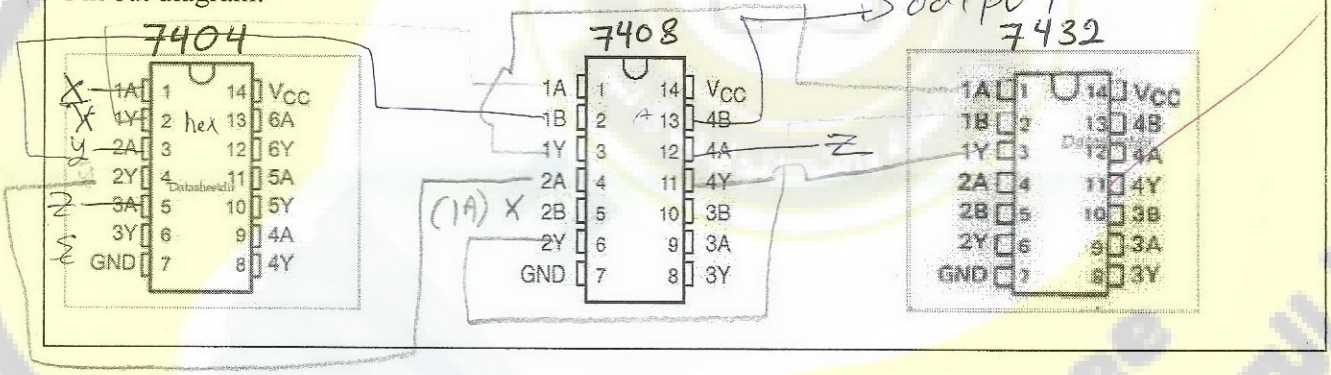
Q1) a. Implement the following Boolean expressions using the given gates. Construct a circuit diagram and a pin out diagram on the chips shown below. Show your connections in details $Z(\bar{X}y + X\bar{y})$

1. $E = X'YZ + XY'Z$. Chips needed are: 7404(hex invertir), 7408(quad 2 input AND and gate) and 7432(quad 2 input OR gate)

Circuit diagram:

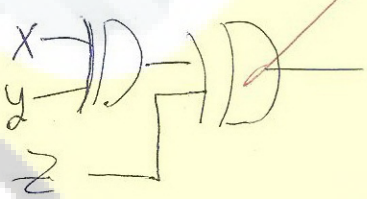


Pin out diagram:

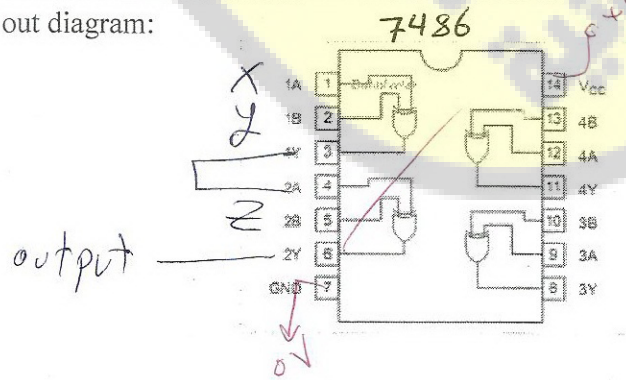


2. $D = X \oplus Y \oplus Z$. Chip needed 7486 (Quad 2 input XOR gate)

Circuit diagram:

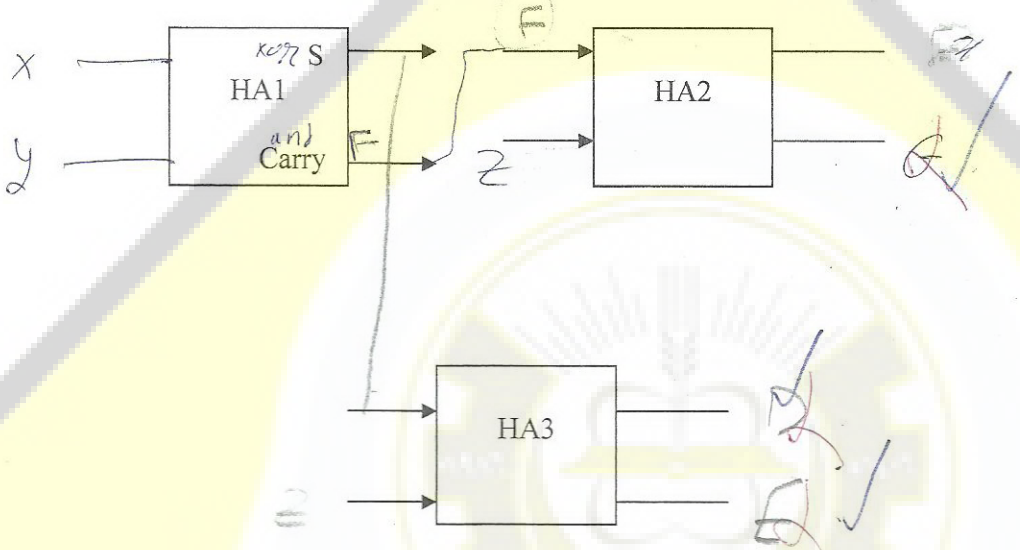


Pin out diagram:



Q1. b. Implement the following 4- Boolean expressions using 3-half adders shown below.

$$D = X \oplus Y \oplus Z$$
$$E = X'YZ + XY'Z$$
$$F = XYZ' + (X' + Y')Z$$
$$G = XYZ$$

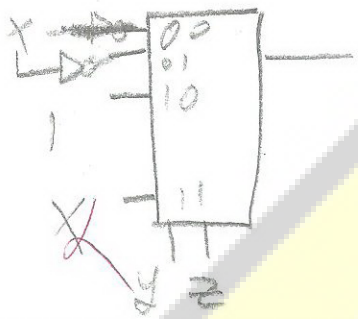


Q2. Implement the function in the truth table (keep the use of such gates to a minimum.)

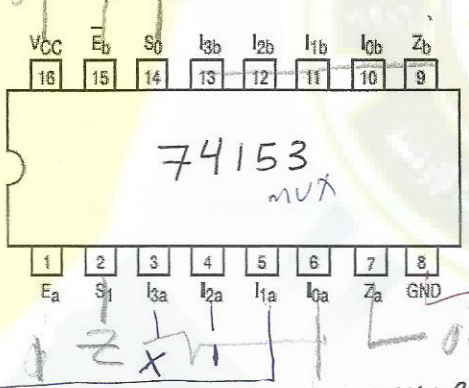
a. Using 4*1 MUX (Use chip 74153 and any additional gates to construct your circuit)

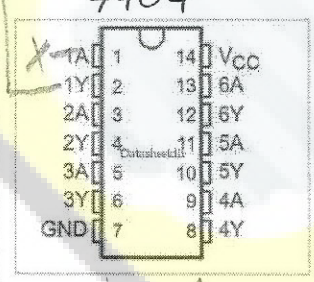
X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

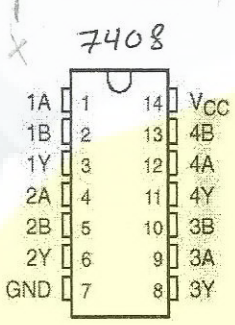
Circuit diagram (Part a)

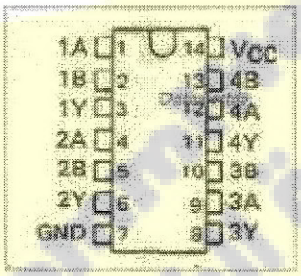


Pin out diagram (Part a)



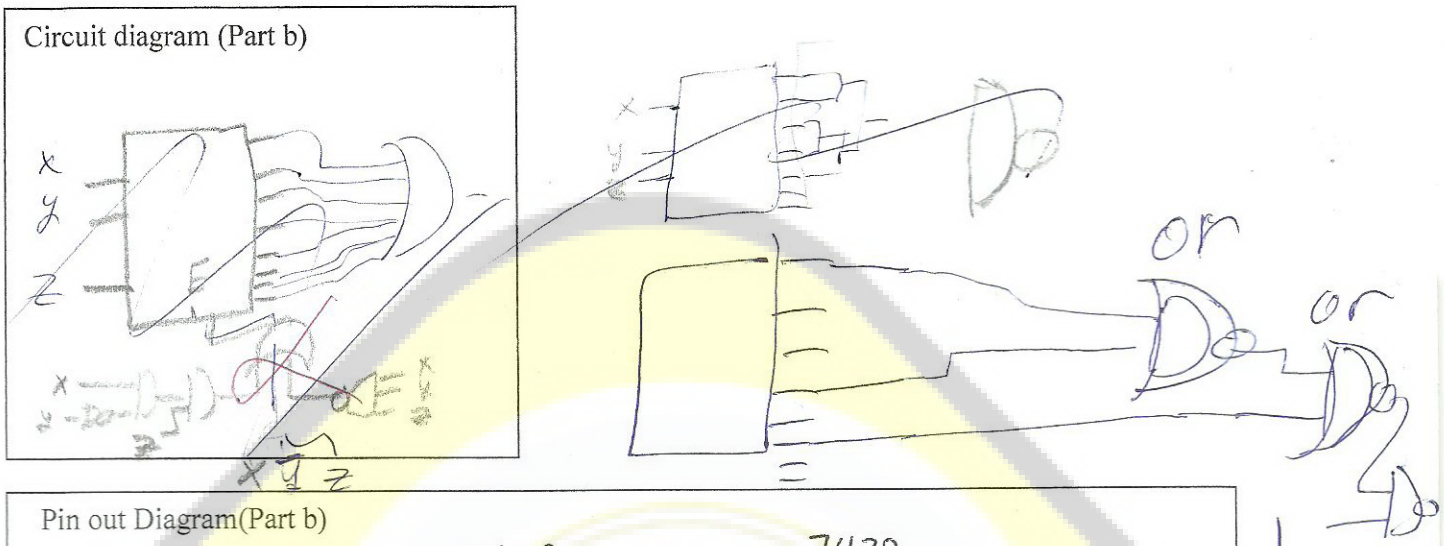






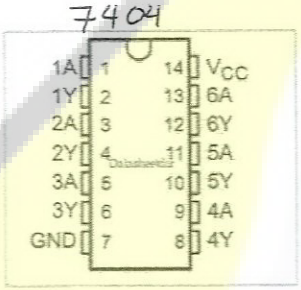
Q2. b. Using 3x8 Decoder (Use chip 74138 and any additional gates to construct your circuit)

Circuit diagram (Part b)

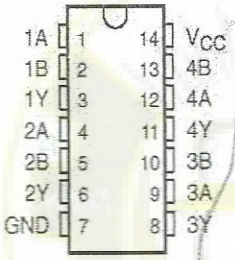


Pin out Diagram(Part b)

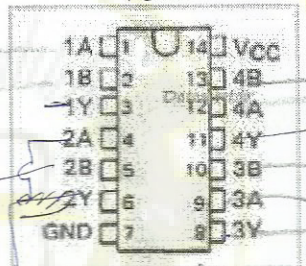
7404

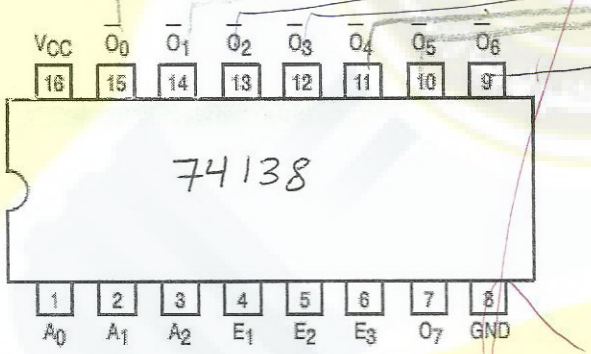


7408



7432





PIN NAMES

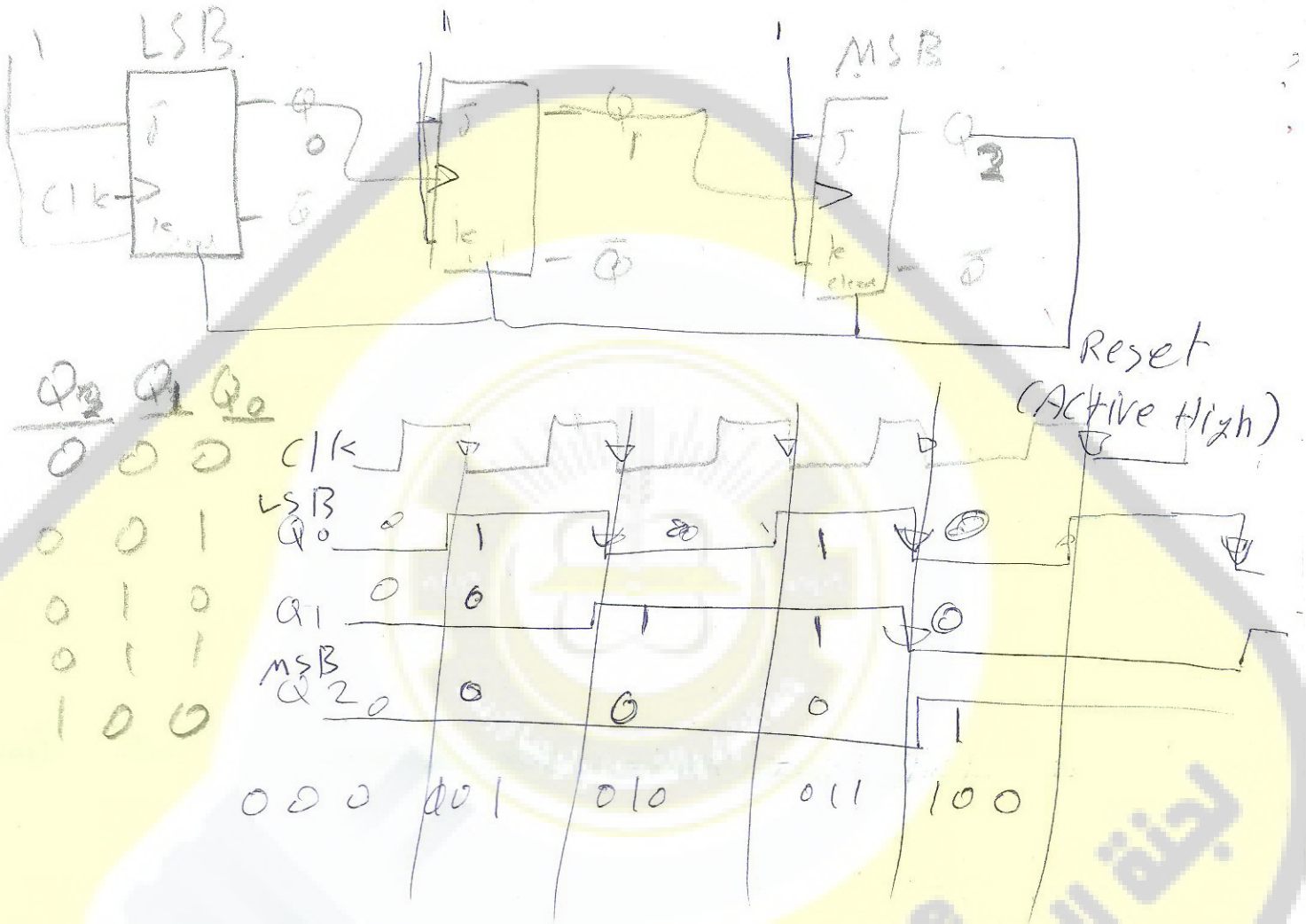
A_0–A_2	Address Inputs
E_1, E_2	Enable (Active LOW) Inputs
E_3	Enable (Active HIGH) Input
O_0–O_7	Active LOW Outputs (Note b)

$\overline{A\,B}$

$\overline{A} + \overline{B}$

0

Q3. Design a Mod-5 ripple counter using JK flip flops. (Show your circuit diagram in details)



Good Luck