Philadelphia University
Faculty of Engineering

Marking Scheme

Exam Paper

BSc CE

Logic Circuits (630211)

Second Exam Second semester Date 01/05/2019

Section 1

Weighting 20% of the module total

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Marking Scheme

Logic Circuits (630211)

The presented exam questions are organized to overcome course material through 4 questions.
The *all questions* are compulsory requested to be answered.

Marking Assignments

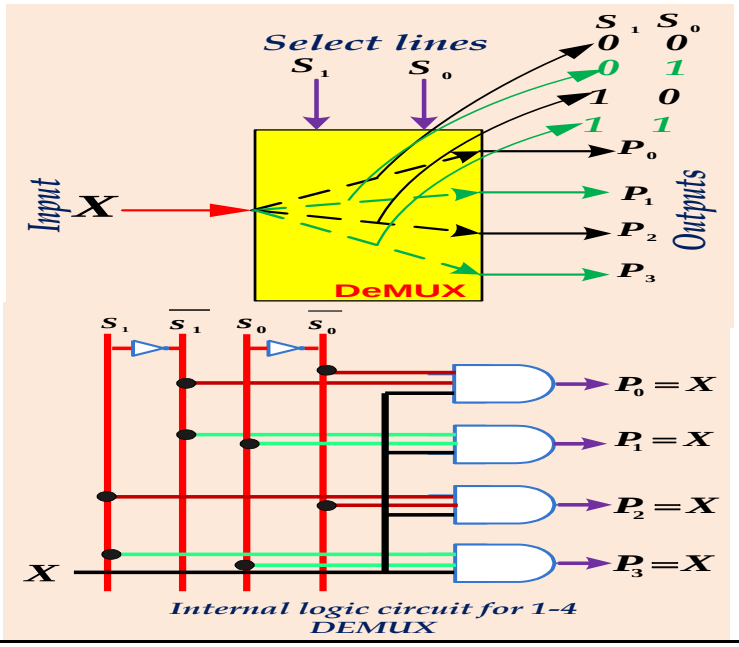
Question 1 **Multiple Choice** ***(6 marks)***

1) **BCD** to **7 segments** is
   - **a) encoder** **b) mux**
   - **c) decoder** **d) demux**
2) To implement **binary full adder** using **decoders** we need:
   - **a) 3-to-8 active high decoder with one AND logic gate**
   - **b) 3-to-8 active high decoder with two AND logic gates**
   - **c) 3-to-8 active high decoder with one OR logic gate**
   - **d) 3-to-8 active high decoder with two OR logic gates**
3) The **carry propagation** in binary full adder can be expressed as _____.
   - ***a)*** $C_p = AB$ **b)** $C_p = A + B$
   - ***c)*** $C_p = A \oplus B$ **d)** $C_p = A \oplus \overline{B}$
4) **Encoders 3x8** are made by three
   - **a) AND gate** **b) OR gate**
   - **c) XOR gate** **d) NAND gate**
5) If the input combination **S=1, R=1** is applied to **NOR** Based **SR** Latch circuit, the (steady state) output will be:
   - **a) Q=0, Q'=0** **b) Q=0, Q'=1**
   - **c) Q=1, Q'=0** **d) Q=1, Q'=1**
6) Flip flop is:
   - **a) level sensitive** **b) Edge sensitive**
   - **c) Both of a and b** **d) None of the above**

Question 2: ***(3 marks)***

Solution

The demultiplexer is a combinational logic circuit that performs the reverse operation of multiplexer (Several output lines, one input line).



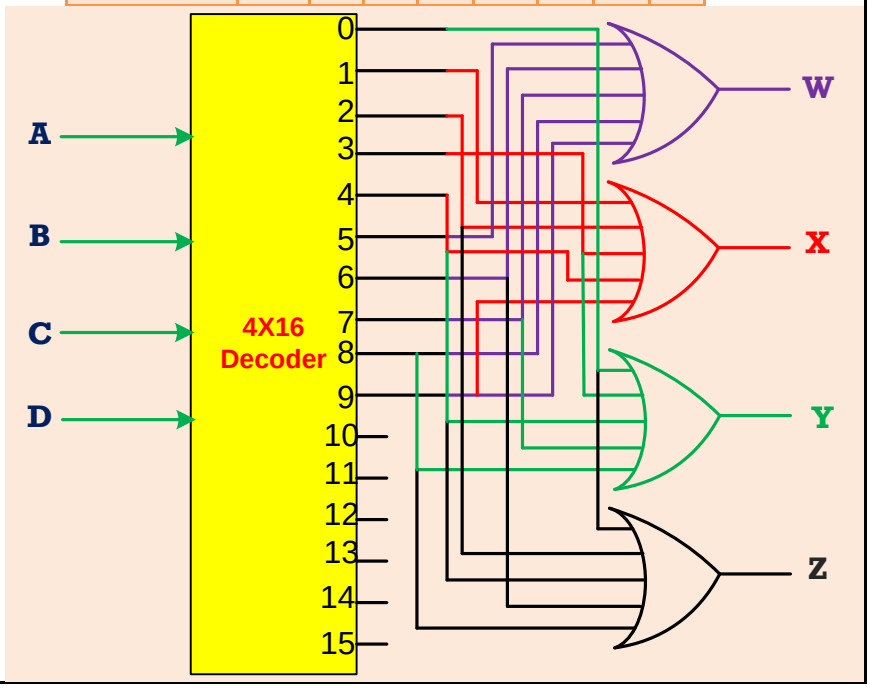
Internal logic circuit for 1-4 DEMUX

Question 3: *(6 marks)*

Solution

Truth table

Decimal digit	Input BCD code				Output Excess-3			
	A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	1	1
1	0	0	0	1	0	1	0	0
2	0	0	1	0	0	1	0	1
3	0	0	1	1	0	1	1	0
4	0	1	0	0	0	1	1	1
5	0	1	0	1	1	0	0	0
6	0	1	1	0	1	0	0	1
7	0	1	1	1	1	0	1	0
8	1	0	0	0	1	0	1	1
9	1	0	0	1	1	1	0	0
10	1	0	1	0	X	X	X	X
11	1	0	1	1	X	X	X	X
12	1	1	0	0	X	X	X	X
13	1	1	0	1	X	X	X	X
14	1	1	1	0	X	X	X	X
15	1	1	1	1	X	X	X	X



Question 4: ***(5 marks)***

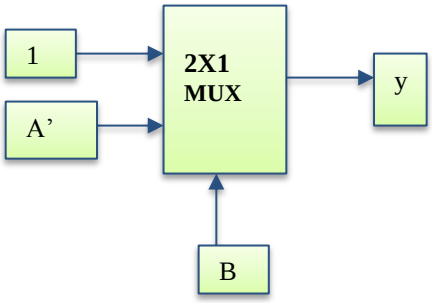
a) ***(3 marks)***

Solution

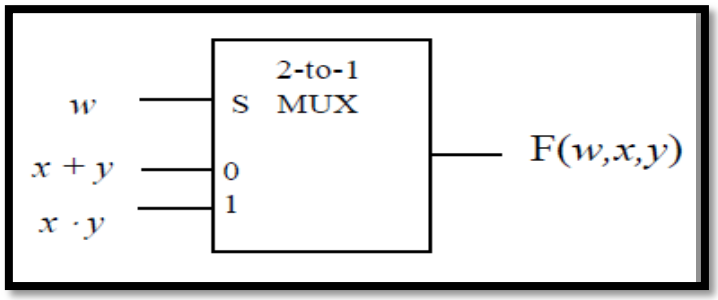
Truth table

A	B	y
0	**0**	**1**
0	**1**	**1**
1	**0**	**1**
1	**1**	**0**

Logic diagram



b) ***(2 marks)***



Solution

$$F(w,x,y) = \bar{w}x + \bar{w}y + xy$$