Philadelphia University
Faculty of Engineering

Marking Scheme

Exam Paper

BSc CE

Logic Circuits (630211)

Second Exam First semester Date 02/01/2020

Section 1

Weighting 20% of the module total

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Marking Scheme

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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** ***(5 marks)***

1) The **sum** of ripple carry adder is

a) $S_i = A_i \oplus B_i \oplus C_i$
b) $S_i = A_i B_i + A_i C_i + B_i C_i$
c) $S_i = A_i + B_i + C_i$
d) $S_i = A_i B_i C_i$

2) A **BCD-to-7 segment decoder** has **0100** on its inputs. The active outputs are

a) **a, c, f; g** **b)** **b, c, f; g**
c) **b, c, e, f** **d)** **b, d, e, g**

3) A **6x64** line decoder can be built using:

a) **six 2x4 line decoders only** **b)** **nine 2x4 line decoders only**
c) **seven 3x8 line decoders only** **d)** **nine 3x8 line decoders only**

4) A **demultiplexer** can be used as

a) **Encoder** **b)** **Multiplexer**
c) **Decoder** **d)** **None of the above**

5) An **8-to-1** multiplexer has inputs **A, B** and **C** connected to the selection inputs **S2, S1** and **S0**, respectively. The data inputs **I0** through **I7**, are as follows:

$I_1 = I_2 = 0$; $I_3 = I_5 = I_7 = 1$; $I_0 = I_4 = \bar{D}$ and $I_6 = D$

The **Boolean function** that the multiplexer implements is:

a) $F = \Sigma m\,(0,6,7,8,10,11,13,14,15)$
b) $F = \Sigma m\,(1,2,3,4,5,9,12)$
c) $F = \Sigma m\,(0,6,7,8,9,11,13,14,15)$
d) $F = \Sigma m\,(0,6,7,9,11,14,15)$

Question 2: ***(7 marks)***

a) ***(2 marks)***

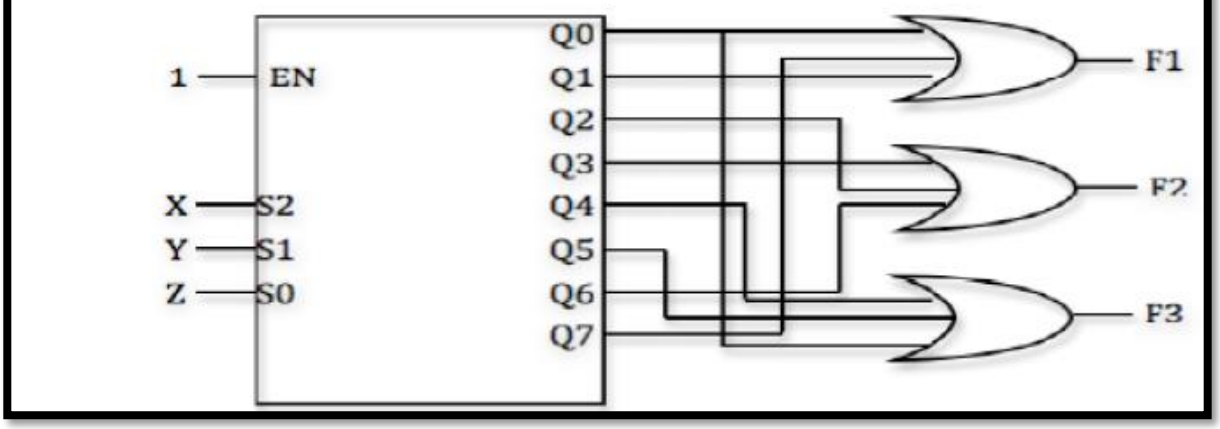
Solution

$F(x,y,z) = m_2 + m_4 + m_5$

b) ***(5 marks)***

Solution

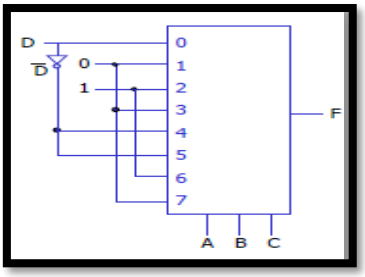
F1 =(X+Y)' + XYZ = X'Y' + XYZ = X'Y'Z' + X'Y'Z + XYZ = Σ m(0,1,7)
F2 = (XZ)'Y = X'Y + YZ' = X'YZ + X'YZ' + XYZ' + X'YZ' = Σ m(3,2,6)
F3 = (X'+Y)'+X'Y'Z' = XY' + X'Y'Z' = XY'Z' + XY'Z + X'Y'Z' = Σ m(4,5,0)



Question 3: ***(5 marks)***

Solution

A	B	C	D	F	
0	0	0	0	0	D
0	0	0	1	1	D
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	1	1
0	1	0	1	1	1
0	1	1	0	0	0
0	1	1	1	0	0
1	0	0	0	1	$\overline{D}$
1	0	0	1	0	$\overline{D}$
1	0	1	0	1	$\overline{D}$
1	0	1	1	0	$\overline{D}$
1	1	0	0	1	1
1	1	0	1	1	1
1	1	1	0	0	0
1	1	1	1	0	0



Question 4: ***(3 marks)***

Solution