Marking Scheme

Exam Paper
BSc CE

Logic Circuits (630211)

Second Exam  First semester  Date  23/12/2018
Section 1
Weighting 20% of the module total

Lecturer:  Dr. Qadri Hamarsheh
Coordinator:  Dr. Qadri Hamarsheh
Internal Examiner:  Eng. Anis Nazer
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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

1) The Boolean function $F$ with don't-care conditions are represented in the K-map for four-variables as shown below, the simplification of the function $F$ in sum-of-products form is:

   a) $\overline{A}D + \overline{A}B + BD + \overline{C}D$
   b) $A\overline{D} + \overline{A}B + \overline{C}D + AB\overline{C}D$
   c) $AD + BD + CD$
   d) $\overline{A}BD + \overline{A}B + BD + AB\overline{C}D$

2) The simplified expression of half adder carry is
   a) $c = xy + x$
   b) $c = xy$
   c) $c = xy + y$
   d) $c = y + x$

3) How many select lines will a 16 to 1 multiplexer will have:
   a) 4
   b) 3
   c) 5
   d) 6

4) Decoder with enable input can be used as:
   a) Encoder
   b) Multiplexer
   c) XOR
   d) Demultiplexer

5) The following circuit is a __________.

   a) 2-4 decoder with active low enable and active low outputs
   b) 2-4 decoder with active low enable and active high outputs
   c) 2-4 decoder with active high enable and active low outputs
   d) 2-4 decoder with active high enable and active high outputs

6) The logic realized by the circuit shown in figure is

   a) $F = B \oplus C$
   b) $F = B \oplus \overline{C}$
   c) $F = A \oplus C$
   d) $F = A \oplus \overline{C}$
An encoder is a digital circuit that performs the **inverse operation** of a decoder. An encoder has $2^n$ (or fewer) input lines and $n$ output lines.

Solution

**Inputs**

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<th>$D_3$</th>
<th>$D_4$</th>
<th>$D_5$</th>
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<th>$D_7$</th>
<th>$X$</th>
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$X = D_4 + D_5 + D_6 + D_7$

$Y = D_2 + D_3 + D_6 + D_7$

$Z = D_1 + D_3 + D_5 + D_7$
Question 3:

a) Solution

\[ F_1 = x'y'z' + xz(y + y') = x'y'z' + xyz + xy'z = \Sigma m(0, 5, 7) \]
\[ F_2 = \Sigma m(2, 3, 4) \]
\[ F_3 = \Sigma m(1, 6, 7) \]

b) Solution