TERJEMAHAN

UNIVERSITI SAINS MALAYSIA

Second Semester Examinations
1997/98 Academic Session

August/September 1998

ZCT 206/3 - Electronic II

Time: [3 hours]

Please check that the examination paper consists of SEVEN printed pages before you commence this examination.

Answer all FOUR questions.
Candidates may choose to answer both questions of Section A either in the Malay Language or English Language. It is compulsory to answer both questions of Section B in the Malay Language.

Section A

1. (a) (i) Convert to Binary the decimal number 52_{10}

(ii) Convert to Hex the decimal number 17.6875_{10}

(iii) Negate the following 8-bit, 2s complement number 10111011_2

(iv) Using 2s complement representation find 17 - 25

(v) Subtract the following 8-bit 2s complement binary as indicated, state whether the difference is a correct 8-bit, 2s complement answer.

$$\begin{array}{r} 11010011 \\ -\underline{11100011} \end{array}$$

(30/100)

(b) From the truth table below:

- Write down a Boolean expression for the function F.
- Plot the K-map of F.
- Simplify the function F.
- Implement the simplified function F using any gates.

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A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	X
1	0	1	1
1	1	0	1
1	1	1	0

(30/100)

(c)   Implement the following function using any gates.
Simplify the function and use any gates to implement
the simplified function.

$$F = \left[A + \overline{B}\overline{C}\overline{D} \right] \cdot \left[\overline{AD} + B(\overline{C} + A) \right]$$
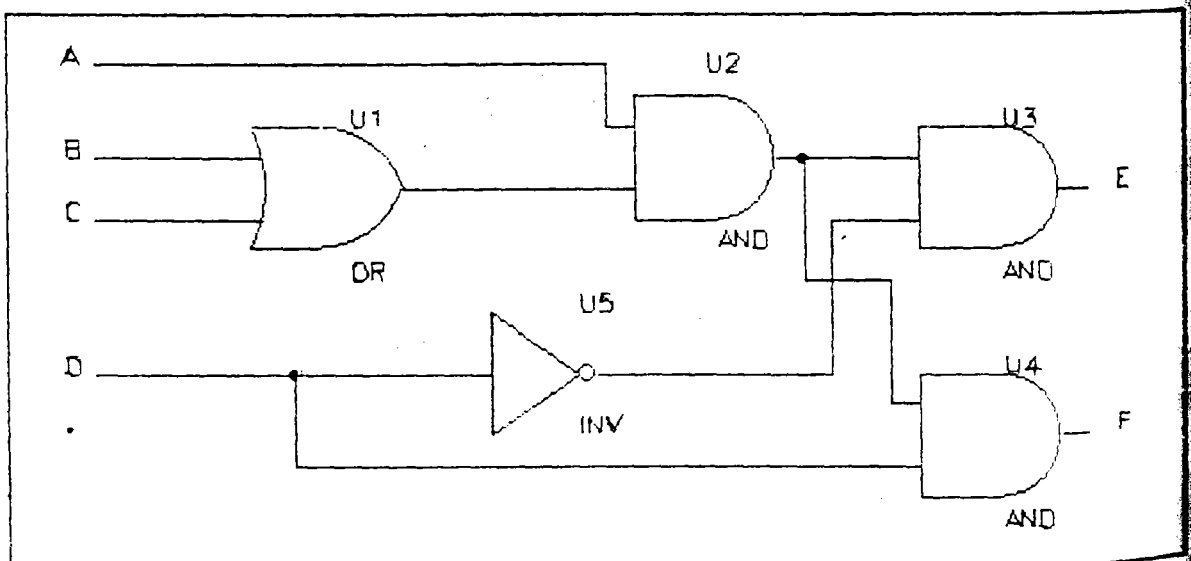
(40/100)

2. (a)   Design a logic circuit to evaluate the following logic
expression. Be sure to simplify the expression before you do
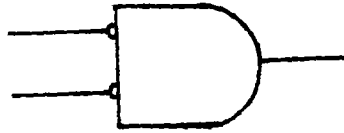the design. Use only positive logic NAND gates.

$$F = \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}C\overline{D} + \overline{A}BCD + \overline{A}BC\overline{D} + \overline{A}BCD + A\overline{B}CD$$

(40/100)

(b)(i) Write the Boolean expression for E and F outputs of the circuit
shown below:

(ii) Implement the expressions of E and F using only one type of gates given below:

(30/100)

(c) Using any gates obtain the simplified realization of a 3-variable function that delivers a logic 1 if the number of "1" input is odd.

(30/100)

Section B

3. (a) Draw a positive edge-triggered D flip-flops using NAND gates only. Explain the operation of this flip-flop based on the timing diagram for three clock pulses.

(40/100)

(b) Draw a master-slave JK flip-flop and explain briefly the operation of this flip-flop using the truth table.

(40/100)

(c) What are the advantages of a master-slave JK flip-flop compared to a JK flip-flop and a D flip-flop compared to a R-S flip-flop.

(20/100)

4. (a) Draw a serial loading controlled shift register. Explain how a data can be stored in this register.

(50/100)

(b) What is the meaning of a counter with a modulus? Draw a modulus-12 counter and briefly explain its operations.

(50/100)

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