大同大學 96 學年度研究所碩士班入學考試試題

考試科目：計算機概論　　所別：通訊工程研究所　　第 1/1 頁

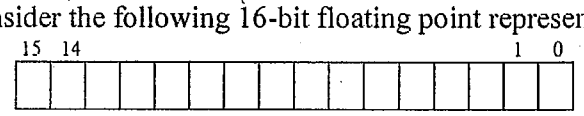
註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. Given the Boolean function F=AB′C+A′C+A′B+BC
   (1) express it in sum of minterms
   (2) express it in product of maxterms
   (3) find the minimal sum of products expression
   (4) find the minimal product of sums expression (20%)

2. Design a sequential circuit with two D flip-flops A and B, and one input x. When x=1, the state of the circuit remains the same. When x=0, the circuit goes through ths state transitions from 00 to 10 to 11 to 01 back to 00, and repeats. (15%)

3. For the standard 2-byte representation of 2's complement integer:
   (1) What is the maximum value (in binary)?
   (2) What is the minimum value (in binary)?
   (3) What is the binary representation of -251? (15%)

4. Consider the following 16-bit floating point representation based on the IEEE floating point format:



- 1 bit for the mantissa's sign (bit 15).
- 5 bits for the exponent (bit 10-14).
- 10 bits for the mantissa (bit 0-9).

.Numeric values are encoded in this format as a value of the form $V=(-1)^S*M*2^E$ where S is the sign bit, E is exponent after biasing, and M is the significand.

   (1) How many floating point numbers are in the interval [1,2)?
   (2) What is the smallest number in the interval [1,2)?
   (3) What is the largest number in the interval [1,2)?
   (4). What is the smallest exponent value E (excepting $-\infty$) after biasing?
   (5). What is the largest exponent value E (excepting ∞) after biasing? (20%)

5. What are the necessary operations of a stack? Give some examples to illustrate your explanation. (15%)

6. What is an interrupt driven I/O? Give some examples to illustrate your explanation. (15%)