元智大學 100 學年度研究所 碩士班 招生試題卷

系(所)別：生物與醫學資訊碩士學位學程　組別：不分組　科目：計算機概論　用紙第 1 頁共 3 頁

●不可使用電子計算機

一、單選題(每題有五個選項，其中正確選項只有一個。每題 2 分，共 20 分)

請在答案卷中繪出下列表格，並將正確答案選項填入各題對應答案欄中。

題號	1	2	3	4	5	6	7	8	9	10
答案										

1. The _____ protocol defines how messages are formatted and transmitted.
(a) HTTP (b) HTML (c) WWW (d) TCP/IP (e) UDP/IP

2. If a bit pattern represents an unsigned integer, which of the following operations divides the number by two?
(a) AND (b) OR (c) XOR (d) LEFT-SHIFT (e) RIGHT-SHIFT

3. If a hard disk has 4 platters (8 sides), each with 1,000 tracks, then it will have
(a) 8 cylinders with each cylinder consisting of 2,000 tracks (62.5 for each platter)
(b) 1,000 cylinders with each cylinder consisting of 4 tracks (1 for each platter)
(c) 8 cylinders with each cylinder consisting of 1,000 tracks (125 for each platter)
(d) 1,000 cylinders with each cylinder consisting of 8 tracks (2 for each platter)
(e) 4,000 cylinders with each cylinder consisting of 8 tracks (2 for each platter)

4. Which of the following characteristic is typical for the RISC machine?
(a) Powerful instructions (b) Large CPI (c) Poor code density (d) More addressing modes
(e) None of above

5. Which of the following is not an image file format?
(a) JPG (b) GIF (c) MPG (d) TIF (e) WMF

6. If a two-dimensional array is declared as **A**[0...**M**][0...**N**]. It is stored in row major order and each entry occupies 4 memory cells. We know that the address of **A**[3][2] is at 320 and the address of **A**[4][4] is at 392. What is the value **N**=?
(a) 16 (b) 18 (c) 20 (d) 24 (e) None of above

7. ____ refers to a type of communication in which it is possible to send and receive data at the same time, over the same channel.
(a) Full duplex (b) Double duplex (c) Half duplex (d) Parity (e) Simplex

8. The series of electronic pulses created by the CPU at a predetermined rate that affect machine cycle time is called
(a) Instruction speed (b) Cycle speed (c) Clock speed (d) Cycle speed (e) GPU speed

9. Which of the following algorithms is NOT applied for CPU scheduling in an operating system?
(a) C-SCAN (b) Short-Job First (c) Priority scheduling (d) Round Robin (e) None of above

10. Which of the following expressions are False?
(a) $\overline{X}Y + X\overline{Y} = \overline{(XY + \overline{X}\overline{Y})}$

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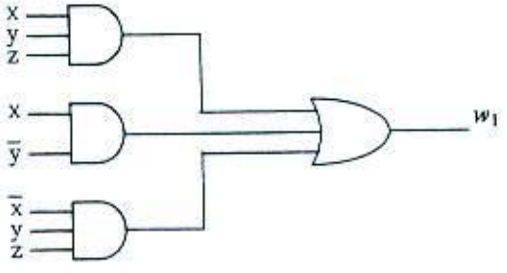
(b) $\overline{X+Y}=\overline{X}+\overline{Y}$
(c) $X+\overline{X}Y=X+Y$
(d) $X(Y+\overline{Z})=XYZ+XY\overline{Z}$)
(e) None of above

二、(a) Convert the binary pattern 1010101101011101 to its equivalent hexadecimal representation. (5%)
(b) Convert the base ten value −19 to its equivalent two's complement representation in which the value is represented in 8 bits. (5%)

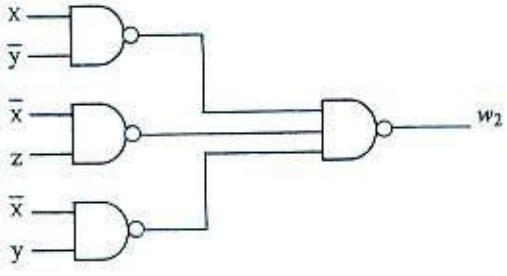
三、The layout for IEEE Standard 754 binary single-precision (32-bit) floating-point number is shown in the following figure. It has three basic components: the sign bit, the exponent which is biased by adding 127, and the mantissa with an implicit leading digit. Please convert the value 100.25 into its equivalent IEEE Standard 754 binary single-precision floating-point representation. (10%)

Field	Sign	Exponent	Mantissa
Number of bits	1	8	23
Bit(s)	31	30–22	22–0

四、Write the simplest Boolean (logic) expressions for the following logic circuits.
(a) (5%)



(b) (5%)



五、What is a machine cycle? List the main steps in a machine cycle and brief describe the jobs performed in each step. (10%)

六、What is the Hamming distance between 10000001 and 10101010? (5%)

七、Given the following traversal sequence of a binary tree
Preorder: A B D E C F G H I J
Inorder: D B E A G F I H J C
Postorder: D E B G I J H F C A
(a) Construct the binary tree from the preorder and inorder traversal sequences. (5%)
(b) Is it possible to construct the binary tree from the preorder and post order traversal sequences? Why? (5%)

八、Show that "*for any nonempty binary tree T, if n_0 is the number of leaf nodes and n_2 is the number of nodes of degree 2, then $n_0 = n_2 + 1$*". (10%)

九、Write down the output of the following C++ code segments.

(a) (5%)

```
#include <iostream>
using namespace std;

int fun1(int n)
{
    int sum = 0;
    if ( n > 0 )
    {
        sum += n;
        fun1( n – 1 );
    }
    else
        return ( n + sum );
}
main()
{
    cout << fun1( 5 );
    return 0;
}
```

(b) (5%)

```
#include <iostream>
using namespace std;

main()
{
    int N, SUM=0;

    for ( N = 10 ; N > 0 ; N –= 3 )
        SUM += N;
    cout << "N=" << N++ << " SUM="
        << ++SUM;

    return 0;
}
```

(c) (5%)

```
#include <iostream>
using namespace std;

class TestV
{
public:
    TestV(int v)
        :Value(v)
    {

        cout << "Object" << Value
            << " constructor called" << endl;
    }
    ~TestV()
    {
        cout << "Object" << Value
            << "descructor called" << endl;
    }
private:
    int Value;
};

main()
{
  TestV obj1(1), obj2(2);
  static TestV obj3(3);

  return 0;
}
```

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