臺灣綜合大學系統 105 學年度學士班轉學生聯合招生考試試題

科目名稱	計算機概論	類組代碼	A06
		科目碼	A0602
※本項考試依簡章規定各考科均「不可以」使用計算機		本試題共計　2　頁	

一、單選題 (75%) 每題五分，答錯倒扣三分

1. What is the design and writing of a program in a structured form?
(A) Software engineering (B) Hardware engineering (C) Algorithm development (D) Instructional architecture (E) None of the above

2. How many five-instruction programs can be written in a programming language with 10 instructions if no instructions are repeated?
(A) 10000 (B) 100000 (C) 1024 (D) 32768 (E) None of the above

3. What is the decimal number of $(011110.01)_2$?
(A) 121 (B) 30 (C) 30.01 (D) 121.1 (E) None of the above

4. What is the hexadecimal number of $(13.7)_8$?
(A) $(C.7)_{16}$ (B) $(C.E)_{16}$ (C) $(B.E)_{16}$ (D) $(B.7)_{16}$ (E) None of the above

5. Which information needs to be stored when a fractional part is normalized?
(A) Sign (B) Exponent (C) Mantissa (D) All of the above (E) None of the above

6. What is the sign and magnitude with 8-bit allocation of -107?
(A) 01101011 (B) 10010100 (C) 11101011 (D) 11101001 (E) None of the above

7. What is the result of 5 + 5 in the two's complement representation with a 4-bit allocation?
(A) 10 (B) -10 (C) 2 (D) -6 (E) None of the above

8. When we want to flip all of the bits of a bit pattern, we can make a mask of all 1s and apply which operator to the bit pattern and the mask?
(A) OR (B) XOR (C) AND (D) NOT (E) None of the above

9. What is the method for synchronizing the operation of the CPU with an I/O device and the CPU is idle until the I/O operation is finished?
(A) Interrupt-driven I/O (B) Programmed I/O (C) Isolated I/O (D) DMA (E) None of the above

10. What is the sum of $(012A)_{16} + (0E27)_{16}$ in 16-bit two's complement representation?
(A) $(0F51)_{16}$ (B) $(014F)_{16}$ (C) $(F0AE)_{16}$ (D) $(8F51)_{16}$ (E) None of the above

11. How many operations can be defined when a control bus has eight wires?
(A) 8 (B) 16 (C) 256 (D) 512 (E) None of the above

12. Which layer of the TCP/IP protocol takes responsibility for source to destination delivery of the entire message?
(A) Transport layer (B) Physical layer (C) Data-link layer (D) Network layer (E) None of the above

13. Which protocol is the protocol for email services?
(A) HTTP (B) FTP (C) TCP (D) SCTP (E) None of the above

14. Which event can be prevented when the operating system puts resource restriction on processes?
(A) Starvation (B) Deadlock (C) Paging (D) Synchronization (E) None of the above

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15. Which item will be consisted in an empty linked list?
    (A) A node (B) Two nodes (C) A null head pointer (D) Data and a link (E) None of the above

二、問答題 (25%)
16.　Given the following program

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

int main()
{
    double * pdata;
    double data[4][4] = { { 5, 4, 12, 17 }, { 9, 10, 31, 21 }, { 7, 14, 12, 8 }, { 27, 34, 42, 18 } };
    pdata = data[3];
    cout << *pdata << endl;
    cout << (--pdata)[4] << endl;
    cout << ++(--pdata)[1] << endl;
    cout << ++*(data + 2)[0] << endl;
    cout << --pdata++[-7] << endl;
    return 0;
}
```

Can the program be compiled? If yes, what are the output values of the cout functions? If no, please explain the reason. (6%)

17.　Implement a C++ function that swaps two integers, and use pointers as arguments. Implement the other C++ function that computes the factorial of the summation of the two integers using rvalue references as arguments. The function of computing the factorial needs to be a recursive function. Implement a C++ program that uses these functions. The user can input two integers as 2 and 5, and the program needs to show the results of the functions (9%)

18.　Implement a C++ program to dynamically allocate a three dimension int array by using int***. The dimensions of the array are 2, 3 and 4, respectively. The allocated memory needs to be deleted. (10%)