國立虎尾科技大學九十七學年度研究所（碩士班）入學試題

所別：資訊管理系碩士班
科目：考試科目 1 （計算機概論）

注意事項：
（1）本試題共有選擇題十五題，每題三分，共四十五分；問答題六題，共五十五分，合計一百分。
（2）請依序作答在答案卷上並註明題號。

一、 單選題：（每題 3 分，共 45 分）

1. Which of the following scripts is NOT a server-side scripting technology? (A) PHP (B) ASP (C) ASP.NET (D) JavaScript (E) none of the above

2. Check the transmitted 7-bit data by odd-parity error detection，which of the following is correct？(A) 11100011 (B) 11110101 (C) 10101010 (D) 11011011 (E) none of the above

3. What kind of data structure is often used for function call? (A) graph (B) tree (C) queue (D) stack (E) none of the above

4. Which of the following has the fastest data transmission rate? (A) Shielded Twisted-Pair (B) Unshielded Twisted-Pair (C) Coaxial Cable (D) Fiber-Optic Cable (E) none of the above

5. In many telecommunications network, the device used to amplify signals between stations is a (A) multiplexer (B) modem (C) repeater (D) router (E) none of the above

6. Which of the following is a new technology that refers to a new wireless era in which you can connect to the Internet at anytime and anywhere? (A) Wi-Fi (B) CSMA/CD (C) ADSL (D) XML (E) none of the above

7. $(0.625)_{10}$= (A) $(0.101)_2$ (B) $(0.110)_2$ (C) $(0.100)_2$ (D) $(0.111)_2$ (E) none of the above

8. A computer system that used multiple processors is said? (A) RISC (B) Parallel processing (C) CISC (D) Batch processing (E) none of the above

9. Which of the following statements is incorrect about HTML tags? (A) <table> creates a table structure contents　(B) <callback> indicates that

the query should be submitted to another URL in form (C)
 inserts a single carriage return (D) <!--> allows you to insert comments and have them completely ignored by the browser (E) none of the above

10. The security attack that refers to the block of a service by sending an enormous number of requests to the service is (A) Salami (B) Trojan house (C) DoS (D) Trapdoor (E) none of the above

11. The following traversals unambiguously define a binary tree. What is its preorder traversal?
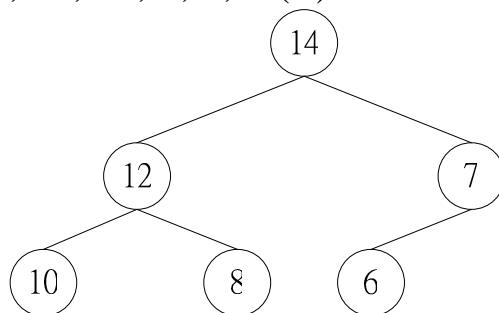   Inorder traversal: AIBHCGDFE
    Postorder traversal: ABICHDGEF
    (A) ABCDEFGHI (B) ABCDEIHGF (C) FGHIABCDE (D) ABCGHIDEF
    (E) none of the above

12. Consider a binary tree T. What is the maximum number of nodes in T of depth k, k > 1? (A) 2^k (B) 2^{k-1} (C) $2^k - 1$ (D) $2^{k-1} - 1$ (E) none of the above

13. To save the memory space, which of the following data structure is used to express a sparse matrix? (A) linked list (B) tree (C) graph (D) queue (E) none of the above.

14. The following figure is a max heap. If the number 13 is inserted into the heap, what is the sequence of the heap according to the level order? (A) 14, 13, 12, 10, 8, 7, 6 (B) 14, 12, 13, 10, 8, 6, 7 (C) 14, 13, 12, 10, 8, 6, 7 (D) 14, 12, 13, 10, 8, 7, 6 (E) none of the above.

15. What is the time complexity of T(n) defined below? Assume that n is a power of 2.

$$T(n) = \begin{cases} 1 & n = 2 \\ T(n/2) + \log n & n > 2 \end{cases}$$

(A) $\log \log n$ (B) $(\log n)^2$ (C) $n \log n$ (D) $n^2 \log n$

二、問答題：

1. Suppose that $n = n_1 + n_2 + ... + n_m$, please show that the computational complexity of $\sum_{i=1}^{m} n_i \log n_i$ is $O(n \log n)$. (5pts)

2. What is the broadcast address of a host with an IP address of 172.16.210.0/22? (10pts)

3. For Cyclic Redundancy Code, original message is 1101011011, generator polynomial is $x^4 + x + 1$, what is the ckecksum. (10pts)

4. Consider the following virtual page reference sequence: page 2, 3, 2, 1, 5, 2, 4, 5, 3, 2, 5, 2. Consider FIFO Replacement Algorithm with three-page frame. Please calculate the number of page faults and write it with an F in where indicated. (10pts)

5. Please calculate average waiting time for preemptive and non-preemptive SJF (Shortest Job First) scheduling. (10pts)

Process	Arrival Time	Burst Time
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	5.0	4

6. Consider the following C program. Show and explain (a) what result will be printed? (b) what would be it's output if we modify the instruction **continue** to **break**? (10 pts)

```c
#include <stdio.h>
#include <stdlib.h>
int main()
{
    int x = 1,y=2;
    y+=x*2;
    while(x<5)
    {
            if(x++==3)
                continue;
            printf("%d\n",x);
    }
    printf("%d * %d = %d\n",x,y,x*y);

    system("pause");
    return 0;
}
```