

國立臺灣師範大學 95 學年度學士班二年級轉學生招生考試試題

學系(組)：資訊工程學系

專門科目：計算機概論

注意事項：1. 依次序作答，只要標明題號，不必抄題。

2. 答案必須寫在答案卷上，否則不予計分。

[1-20 題，每題 4 分]

1. If we have the declaration $A[1..10][1..10][7..10]$ and α is the address of $A[1][1][1]$, using row major order, what is the address for $A[3][2][7]$?
(A) $\alpha+84$ (B) $\alpha+85$ (C) $\alpha+217$ (D) $\alpha+217$
2. The infix form of the postfix expression $(A\ B\ +\ C\ D\ +\ /\ A\ * \ B\ +)$ is
(A) $(A + B) * (C + D) / (A + B)$ (B) $B + (A + B) / (C + D) * A$
(C) $(A + B) / (C + D) * (A + B)$ (D) $B + ((A + B) / (C + D) * A)$
3. If the ASCII code for "F" is 01000110, then the ASCII code for "W" is
(A) 01010110 (B) 01010111 (C) 01011000 (D) 01000111
4. Perform the indicated operations $((11101010\ \text{AND}\ 10101011)\ \text{OR}\ (00101101\ \text{XOR}\ 10110110))$. The answer is
(A) 10111111 (B) 10101110 (C) 10111011 (D) 10001010
5. If X, Y, and Z are integer set variables then the expression whose value is the set of integers in exactly one of the three sets is
(A) $X * Y * Z$ (B) $X + Y + Z$
(C) $X + Y - Z - Y + Z$ (D) $X + Y + Z - X * Y * Z$
6. If a main memory has 2^{64} words, and the word size is 2 bytes, then how many wires are needed in the data bus?
(A) 16 (B) 32 (C) 64 (D) 128

7. The logical deductive-reasoning principle, called resolution, says that if P, Q, and R are statements, then the statements $(P \vee Q)$ and $(R \vee \neg Q)$ collectively imply : (Let \wedge , \vee , and \neg denote logical operators AND, OR, and NOT, respectively.)
- (A) P (B) $P \vee R$
 (C) $P \vee Q \vee R$ (D) None of the above
8. Which data compression method is a lossy one?
- (A) MPEG method (B) Run length method
 (C) Huffman method (D) Lempel Ziv method
9. Which one is incorrect?
- (A) In distributed operating systems, a program can be run partially on one computer and partially on another computer if they are connected through an inter network such as the Internet.
 (B) The Pentium series of processors developed by Intel are RISC (reduced instruction set computer) architecture.
 (C) HTTP (Hypertext Transfer Protocol) is a protocol for accessing and transferring documents on the WWW.
 (D) The IP (Internet Protocol) address is currently 32 bits in length.
10. Let the depth of a tree be the maximum level of any node in the tree, and the level of a node is defined by letting the root be at level one. Given a depth of the binary tree, k , $k \geq 1$, the minimum number of nodes in the tree is
- (A) $2^k - 1$ (B) 2^k (C) $2^k + 1$ (D) k
11. If “11110110” is a number stored as a two’s complement integer, which one is its decimal representation?
- (A) 245 (B) -10
 (C) -117 (D) None of the above

12. What is the 6 bit binary number representation of decimal number 0.4?
(A) 0.011011 (B) 0.110000 (C) 0.110011 (D) 0.011001

13. Consider the function represented by pseudo-code at right. What is the value of Factor (4) ?

- (A) 24
(B) 120
(C) 625
(D) None of the above

```
Factor (integer  $n$ )  
{  
    if ( $n = 1$ )  
        return 5;  
    else  
        return ( $n * \text{Factor}(n-1)$ );  
}
```

14. Consider the function represented by pseudo-code at right. What is the value of W(7)?

- (A) 13
(B) 41
(C) 99
(D) None of the above

```
W (integer  $n$ )  
{  
    if ( $n \leq 3$ )  
        return 1;  
    else  
        return ( $W(n-2) + 2 * W(n-1)$ );  
}
```

15. Of the code at right, which item best describes the operation being performed?

- (A) Rearrange the first N components of the array A in descending order.
(B) Place the smallest component of the array A in position N.
(C) Compute the value of the smallest component in array A.

```
F := 1;  
for  $i = 2$  to N do  
    if ( $A[i] \leq A[F]$ ) then  
        F :=  $i$ ;  
endfor
```

- (D) Compute the subscript of the last occurrence of the smallest of the first N components of the array A.

16. Of the code at right, what is the value of A[8] ?

- (A) 8
- (B) 13
- (C) 21
- (D) 34

```
A[1] := 1;  
A[2] := 2;  
for i = 3 to 10 do  
    A[i] := A[i-1] + A[i-2]  
endfor
```

17. If the initial values of array Count are
Count[0] = 0; Count[1] = 2; Count[2] = 0;
Count[3] = 0; Count[4] = 5; Count[5] = 0.
After running the code at right, what is the value of Count[5] ?

- (A) -1
- (B) 2
- (C) 3
- (D) 5

```
k := -1; j := 0;  
for j = 1 to 6 do  
    if (count[j] = 0)  
    {  
        count[j] := k;  
        k := j;  
    }  
    j := j + 1;  
endfor
```

18. Consider the function represented by pseudo-code at right. The terminating condition of the Wow function is?

- (A) M is less than 40
- (B) N is less than 40
- (C) M or N is less than 40
- (D) M and N are less than 40

```
Wow (M, N : integer)  
{  
    if (M < 40) then  
        if (N < 40) then  
            Wow := M+N;  
        else  
            Wow := Wow (M, N-2) + N;  
        else  
            Wow := Wow (M-2, N) + M;  
    }  
)
```

19. In using binary search to search a pre-sorted 1250 records, at most how many key-field comparisons are needed to find the desired record?

- (A) 10
- (B) 11
- (C) 12
- (D) 13

20. Which of the following logical expression is not a tautology? (Let \wedge , \vee , and \neg denote logical operators AND, OR, and NOT, respectively.)

(A) $X \wedge X = X$

(B) $\neg(X \vee Y) = \neg X \wedge \neg Y$

(C) $X \vee (Y \wedge Z) = (X \vee Y) \wedge (X \vee Z)$

(D) $X \vee Y = Z$

21. [每格 4 分，共 8 分] Define a function as follows:

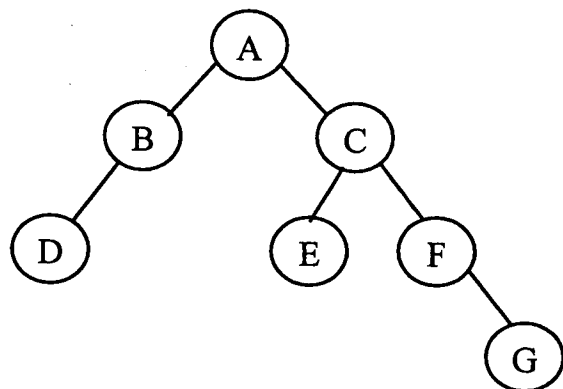
$$f^{(i)}(n) = \begin{cases} n & \text{if } i = 0 \\ f(f^{(i-1)}(n)) & \text{if } i > 0 \end{cases}$$

If $f(n) = 4n$, then $f^{(2)}(n) = \underline{\hspace{2cm}}$ and $f^{(i)}(n) = \underline{\hspace{2cm}}$.

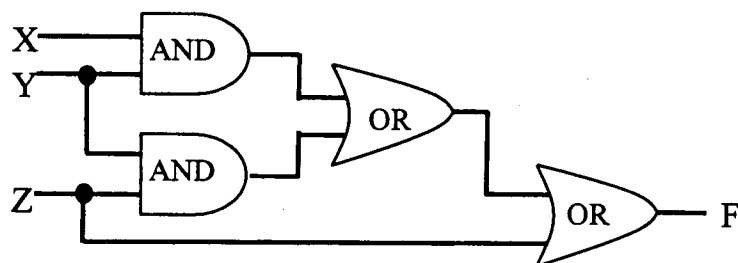
22. [每小題 4 分，共 8 分] Given a binary tree at right.

(1) What is the result of the postorder traversal?

(2) If it is a binary search tree, and stores the keys 4, 6, 9, 12, 10, 15, and 20. Which key is stored in node A?



23.[4 分] Given a combinational logic circuit as follows:



If the output value of F is 0, then whose input value should be 0? X, Y, or Z?