

\*請在答案卡內作答

單選題 (1~20), 每題 3 分, 不倒扣

1. Given a decimal number  $(19.375)_{10}$ , please calculate its corresponding **binary value**.  
 (A) 10001.101 (B) 10011.011 (C) 1.011 (D) 1110.0101 (E) None of the above.

2. Let X and Y be two **8-bit signed integers**, where X= 01100001, Y= 00001111  
 The result of X+Y should be  
 (A) 11110000 (B) 00110000 (C) 01110000 (D) 10110000 (E) None of the above

3. Which one of the following circuits is NOT equivalent to a 2-input XNOR (exclusive NOR) gate?

(A)



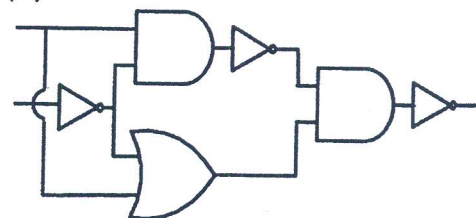
(B)



(C)



(D)



4. X and Y are two real numbers in IEEE single-precision floating-point format:

X= 0 1000001 0111000000000000000000,

Y= 0 10000110 0100001111000000000000

Calculate and show the result of X+Y.

(A) 0 10000110 0100111101000000000000

(B) 0 10000001 0100001111000000000000

(C) 0 10000110 0100001111000000000000

(D) 0 00000000 0100111101000000000000

(E) None of the above

5. An operating system can put resource restrictions on processes to prevent \_\_\_\_.

(A) starvation (B) synchronization (C) paging (D) deadlock

6. Which of the following is true regarding ADT (Abstract Data Types)?

(A) Computer languages do not provide ADT packages. To use an ADT, it is first implanted and kept in a library.

(B) A **stack** is a linear list in which data can only be inserted at one end, call the **rear**, and deleted from the other end, call the front.

(C) **Stacks** are familiar from everyday life. A line of people waiting for the bus at bus station is a queue.

(D) Queues are known as **last in, first out (LIFO)** data structure.

(E) None of the above

7. Which of the following is true regarding **File structures**?

(A) Compared to sequential, indexed and hashed file, only an sequential file can be accessed randomly.

(B) If we need to access a file, one record after another, from beginning to end, we will use a **random access** file structure.

(C) A **indexed file** uses a mathematical function to map the key to the address.

(D) none of the above

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8. Which of the following is **not correct** regarding **Computer Networks**?

- (A) File Transfer Protocol (FTP) is the standard application program used for file transfer.
- (B) The layers in TCP/IP protocol suite are application (layer 5), network (layer 4), transport (layer 3), data link (layer 2), and physical (layer 1).
- (C) The transport layer is responsible for process-to-process delivery of the entire message. The transport layer address is the process identification, called a port number
- (D) TELNET is used to establish a login session on a remote machine. After establishing a session, we can also use TELNET commands to copy files.

9. The \_\_\_\_ layer of the TCP/IP protocol suite transmits a bit stream over a physical medium.

- (A) data-link (B) physical (C) network (D) transport

10. The simplified SOP (Sum Of Product) form of the boolean expression.

 $(P + Q' + R') \cdot (P + Q' + R) \cdot (P + Q + R')$  is?

- (A)  $(P' \cdot Q + R')$
- (B)  $(P + Q' \cdot R')$
- (C)  $(P' \cdot Q + R)$
- (D)  $(P \cdot Q + R)$

11. Which netmask setting should be applied when you want to separate a class C network?

- (A) 255.255.0.0 (B) 2.255.255.255.0 (C) 255.255.255.64 (D) 4.255.255.255.192

12. What will the following program output?

```
int main()
{
    int a=12;
    int *c;
    *c=a;
    printf("c=%d ",*c);
    printf("a=%d ",a);
    *c = *c + 3;
    printf("c=%d ",*c);
}
```

- (A) 12 12 15 (B) 0 0 15 (C) 12 14 15 (D) 12 12 3

13. What will the following program output?

```
int main()
{
    int a=17;
```

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```
int *c=&a;
*c = *c +3;
a = a +5;
printf("a=%d ",a);
}
```

- (A) 17 (B) 3 (C) 5 (D) 20 (E) 25

14. What will the following program output in C language?

```
#include <stdio.h>

int main(void)
{
    int a = 10;
    float b = 4.2;

    printf("%d ", (int) (a / b));
    printf("%f\n", a / b);

    return 0;
}
```

- (A) 2.380953 2.380953 (B) 2 2 (C) 2 2.380953 (D) 2 2.4

15. Consider the C code piece on the right side. Which of the following is correct regarding the computing result?

```
int a = 21;
int *aPtr = &a;

return 0;
```

- (A) a= 21 and &a= 21  
 (B) a=21 and \*aPtr=21  
 (C) aPtr= 21 and \*aPtr= 21  
 (D) &a= 21 and aPtr= 21  
 (E) None of the above

16. What will the following program output in C++ language? D

```
void exam() {
    int i, j;
    for (i = 0; i <= 2; i++) {
        for (j = 0; j <= 2; j++) {
            printf("%3d", i * j);
        }
        printf("\n");
    }
}
```

(A)

0	2	3
0	4	6
0	6	9

(B)

0	0	0
2	4	6
3	6	9

(C)

0	1	2
0	2	4

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0	4	6
---	---	---

(D)

0	0	0
0	1	2
0	2	4

(E)

1	2	3
2	4	6
3	6	9

17. What kinds of sorting algorithm is implemented in following program?

```
#include <stdio.h>      /* Sort */

void main(void) {
    int data[70];
    int i,j,n,temp;

    printf("n= : "); /*input n */
    scanf("%d",&n);
    printf("\n");
    if (n > 69) {
        printf("Please input a number (<69)\n");
        return;
    }
    for (i = 1; i <= n; i++) { /* Enter n number */
        printf("Please enter number : ");
        printf("data[%d]=", i);
        scanf("%d", &data[i]);
    }
    for (i=1; i <= n; i++) {
        for (j = n; j > i; j--) {
            if (data[j-1] > data[j]) {
                temp = data[j-1];
                data[j-1] = data[j];
                data[j] = temp;
            }
        }
    }
    printf("\n After sorting: \n"); /* Output the sorting result */
    for (i = 1; i <= n; i++) {
        printf("%d ", data[i]);
    }
}
```

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(A) Selection (B) Bubble (C) insertion (D) Quick (E) merge

18. What will the following program output in function f1 using c++ language?

```
int f1(int n) {
    if (n == 1) {
        return 1;
    }
    return n + f1(n - 1);
}
```

(A) n=4; output: 0 (B) n=5; output: 10 (C) n=6; output: 21 (D) n=7; output=21 (E) n=8; output=36

19. What problems can be solved in following program f1 using C++ language.

```
int f2(int x, int y) {
```

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```

int tmp;
while (x % y != 0) {
    tmp = y;
    y = x % y;
    x = tmp;
}
return y;
}
int f1(int x, int y) {
    return x * y / f2(x,y);
}
    
```

(A) find (LCM) least common multiple (B) find (GCD) greatest common divisor (C) find Fibonacci (D) find prime numbers

20. What is the meaning of this program using c++ language.

```

int f1(int m, int n) {
    if (n == 0) {
        return m;
    }
    return f1(n, m % n);
}
    
```

(A) find GCD (greatest common divisor) (B) find the average of the two input numbers (C) find Fibonacci number (D) find prime numbers

多選題 (21~30), 一題 4 分, 每一選項單獨計分, 答錯倒扣

21. Choose the following items that are correct regarding computer security.

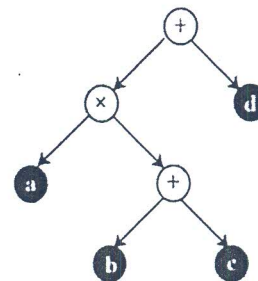
- (A) Three goals of security: confidentiality, integrity, and availability.
- (B) Asymmetric-key cryptography use only one key: public key.
- (C) In symmetric-key cryptography, a practical solution is the use of certificates issued by a certification authority (CA)
- (D) Confidentiality means protecting a message from being modified. To preserve the message, the message is passed through an algorithm called a cryptographic hash function. The function creates a compressed image of the message called a message digit.
- (E) In symmetric-key cryptography, a practical solution is the use of a key-distribution center (KDC)

22. Which of the following statements **are not correct** regarding Turing machine?

- (A) A Turing machine is made of three component: a tape, a controller, and a read/write head
- (B) After reading a symbol, the read/write head moves to the left.
- (C) A supercomputer owned by IBM in 1950s.
- (D) A hypothetical device that manipulates symbols on a strip of tape according to a table of rules.
- (E) A theoretic machine that solves the halting problem.

23. Consider the figure on the right side.

- (A) The order of the nodes using infix notation is:  
 $a \times (b+c) + d$
- (B) The order of the nodes using prefix notation is:  
 $+ \times a + b c d$
- (C) The order of the nodes using postfix notation is:  
 $a b c + \times d +$
- (D) It is **binary** tree
- (E) None of the above



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24. Choose the following items that **are correct** regarding file structures.

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- (A) When a hashing algorithm produces an address for an insertion key and that address is already occupied, it is called a **synonym**.
- (B) In the **modulo division** hashing method, there are no synonyms or collisions.
- (C) In the **division remainder** hashing method, there are no synonyms or collisions.
- (D) In the **modulo division** hashing method, selected digits are extracted from the key and used as the address.
- (E) The **prime** area is the file area that contains all the home addresses.

25. Which of the following items **are correct** in C++ and Java

- (A) A reference is an alias for another variable in C++.
- (B) C++ supports both pointers and references, while Java only supports references
- (C) References can be null in C++
- (D) Inherited private members are not accessible to the derived class functions in C++
- (E) C++ only supports single inheritance

26. Which of the following items **are correct** in C++ and Java

- (A) C++ provides **capabilities** for **object-oriented programming**.
- (B) C++, an extension of C, was developed by **Bjarne Stroustrup** in the early 1980s at Bell Laboratories.
- (C) C++ programs consist of pieces called **classes** and **functions**.
- (D) Java is now used to develop large-scale enterprise applications, to enhance the functionality of web servers, to provide applications for consumer devices and for many other purposes.
- (E) JAVA source code filenames often end with the .cpp, .cxx, .cc or .C

27. Which of the following items **are correct** in C++.

- (A) Sometimes functions are not members of a class. Such functions are called **global functions**.
- (B) Functions in the <cmath> header file are **global functions**
- (C) Function arguments may **not** be constants, variables or more complex expressions.
- (D) The *return-value-type* **void** indicates that a function will **return a value**
- (E) None of the above

28. Which of the following items **are correct** in **pointer** in C++.

- (A) Pointers **cannot** pass-by-reference and **cannot** used to create and manipulate dynamic data structures
- (B) A pointer with the value **1** or **NULL** points to nothing and is known as a null pointer.
- (C) The address operator (\*) is a unary operator that obtains the memory address of its operand.
- (D) The (^) operator, commonly referred to as the indirection operator or dereferencing operator, returns a synonym for the object to which its pointer operand points.
- (E) None of the above

29. Which of the following items **are correct** in **Data Structure**.

- (A) An **Array** is a collection of data in which each element contains the location of the next element
- (B) A **Linked list** is a collection of related elements, possibly of different types, having a single name. Each element in a **linked list** is called a field.
- (C) If we have a list in which a lot of insertions and deletions are expected after the original list has been created, we will use an **array**.
- (D) A **Record** is a collection of data in which each element contains the location of the next element—that is, each element contains two parts: **data and link**.

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(E) None of the above

30. Which of the following items are correct in ADTs (Abstract Data Type)

(A) An abstract data type is a data type packaged with the operations that are meaningful for the data type

(B) A Computer languages do not provide ADT packages. To use an ADT, it is first implemented and kept in a library.

(C) A **stack** is a restricted linear list in which all additions and deletions are made at first in, first out. (**FIFO**)

(D) A **queue** is a last in, first out (**LIFO**) structure.

(E) None of the above

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