注意事項	1. 本科目合計100分(每題2.5分)，答錯不倒扣。
	2. 請於答案卷上依序作答，並標註清楚題號（含小題）。
	3. 考完請將答案卷及試題一併繳回。

1. 執行下列虛擬碼之後，S結果為何？

```
int S = 0;   int I = 0;    int J = 0;
while (I >= 5)
{
    for (J = 1; J <= I; J++)
    {
        S = S + J;
    }
    I = I + 1;
}
```

(A) 0　　(B) 20　　(C) 35　　(D)以上皆非。

2. 下列程式(A[2]+A[4]+A[6]+A[8])%4 的執行結果為何？

```
int[] A = new int[11];     int K = 0;
for (K = 1; K <= 10; K++)
{
    A[K] = (K*K) % 7;
}
```

(A) 0　　(B) 1　　(C) 2　　(D) 3

3. A , B 分別為八位元資料，下列八位元邏輯運算式，下列何者結果為真?
(A) NOT(A AND B) = NOT A OR NOT B　　(B) NOT(NOT A OR NOT B) = A OR B
(C) A OR NOT A = 00000000　　　　　　　(D) A AND NOT A = 11111111

4. 假設4位元二進位數 1100 和 0011，若將此二數值進行二次的互斥或(XOR)運算，則此 (1100 XOR 0011 XOR 0011)的結果為何？　(XOR: ExclusiveOR、互斥或)
(A) 1111　　　　(B) 0000　　　(C) 1100　　　(D) 0011

5. 在遞迴程式執行中，通常會何種資料結構來紀錄遞迴程式之間的關係？
(A) 佇列(Queue)　　(B) 二元樹(binary tree)
(C) 堆疊(stack)　　(D) 鏈結串列(Linked List)

背面尚有試題

6. 執行下列虛擬碼之後，j 結果為何？

```
double i = 0;   double j = 1;   int n = 7;
for (i = 2; i <= n; i++)
{
        j = j * ((i * 2) / (n - i + 2));
}
```

(A)64　(B)128　(C)256　(D) 以上皆非

7. 下列那一個IP在不同的子網段中？
   (A) 192.168.200.31/27　(B) 192.168.200.33/27
   (C) 192.168.200.36/27　(D) 192.168.200.43/27

8. 下列何者<u>不是</u>正確的「子網路遮罩」(Subnet Mask)？
   (A) 255.255.255.0　　　(B) 255.255.254.0
   (C) 255.255.255.248　　(D) 255.255.250.0

9. 資料庫正規化中，刪除所有遞移依賴性(transitive dependency)，無重複群、無部分依賴性，則稱此資料庫具有第幾正規式(Normal Form)的資料庫
   (A) 1NF　　(B) 2NF　　(C) 3NF　　(D) 4NF

10. 有一資料表如下表所示，在此資料表中包含三個屬性：「Name」、「Age」與「City」，

Name	Age	City
張三	25	New Taipei
李四	26	New Taipei
李四	20	Taipei
王五	22	New Taipei
王五	24	New Taipei

下列何者可視為此資料表的主鍵？
(A) { Name }　　(B) { Name , City }　　(C) { Name , Age }　　(D) 以上皆非

11. 下列布林函數可化簡為何？
$$F(X,Y,Z) = XYZ + X\overline{Y}Z + XY\overline{Z} + X\overline{Y}\overline{Z}$$
(A) $X + \overline{Y} + XY$　(B) $X + Y\overline{Z}$　　　(C) X　　　　(D) None of the above.

背面尚有試題

12. 執行下列虛擬碼之後，A[3 , 3]結果為何？

```
int I = 0;   int J = 0;   int[,] A = new int[4, 4];
for (I = 0; I <= 3; I++)
{
        A[I, 0] = 1;
        A[0, I] = 1;
}
for (I = 1; I <= 3; I++)
{
        for (J = 1; J <= 3; J++)
        {
                A[I, J] = A[I, J - 1] + A[I - 1, J];
        }
}
```

(A) 6　(B) 20　(C) 63　(D)以上皆非。

13. The following code $F(n)$. Which of the following statement is true?
long F(long n) {
IF ($n = 1$) OR ($n = 2$) OR ($n = 3$) Return n;
ELSE Return $F(n - 1) * F(n - 2) * F(n - 3)$ }
(A) $F(5) = 5$　　　　　　　　　　(B) $F(6) = 9$
(C) $F(5) = 36$　　　　　　　　　(D) None of the above.

14. Which of the following is correct? The CPU scheduling algorithms **FCFS** schema:
    (A) is preemptive
    (B) is nonpreemtive but processes can be interrupted
    (C) is preemptive but processes cannot be interrupted
    (D) None of the above.

15. Which of the following is correct? The CPU scheduling algorithms **RR** schema:
    (A) is always similar to FCFS.
    (B) is similar to FCFS only when the time quantum is large.
    (C) is different to FCFS only when the time quantum is large.
    (D) None of the above.

背面尚有試題

16. Match the corresponding layers of DoD and ISO models?

A. Application	1. Application
B. Host to Host	2. Presentation
C. Internet	3. Session
D. Network Access	4. Transport
	5. Network
	6. Data Link
	7. Physical

Which is the best choice?
(A) A ⇔ 1,2,3, B ⇔ 4,5, C ⇔ 6, D ⇔ 7
(B) A ⇔ 1,2,3, B ⇔ 4, C ⇔ 5, D ⇔ 6,7
(C) A ⇔ 1,2,3, B ⇔ 4, C ⇔ 5,6, D ⇔ 7
(D) A ⇔ 1,2, B ⇔ 3,4, C ⇔ 5,6, D ⇔ 7

17. The structure of Domain Name Systems is
(A) hierarchical　　　(B) networked　　　(C) ring　　　(D) bus

18. Match the following:

A. Hub	1. Data Link Layer
B. Switch	2. Network Layer
C. Router	3. Physical Layer

Which is the best combination?
(A) A ⇔ 1, B ⇔ 3, C ⇔ 2　　　(B) A ⇔ 3, B ⇔ 1, C ⇔ 2
(C) A ⇔ 3, B ⇔ 2, C ⇔ 1　　　(D) A ⇔ 1, B ⇔ 3, C ⇔ 2

19. Which of the following address is an example of a **subnet address** on the network 192.168.100.65 with a subnet mask of **255.255.255.224**?
(A) 192.168.100.0
(B) 192.168.100.65
(C) 192.168.100.64
(D) 192.168.100.255

20. Which of the following address is an example of a **broadcast address** on the network 192.168.100.65 with a subnet mask of **255.255.255.128**?
(A) 192.168.100.255
(B) 192.168.100.128
(C) 192.168.100.127
(D) 192.168.100.254

背面尚有試題

21. How many ports are allowed in TCP/UTP?
    (A) 16　　　　　(B) 1024　　　　　(C) 32768　　　　　(D) 65536

22. Which Internet protocol is used to assign dynamic IP addresses?
    (A) DHCP　　　　(B) DNS　　　　　(C) TCP　　　　　(D) UTP

23. You have an IP of 140.113.131.56. The default subnet mask is 16 bits in Class B. There is additional 7 bits to the default subnet mask. How many hosts and subnets are possible?
    (A) 126 hosts and 510 subnets　　　　(B) 510 hosts and 128 subnets
    (C) 128 subnets and 512 hosts　　　　(D) 512 subnets and 128 hosts

24. How many bytes are used in an IPv6 address?
    (A) 4　　　　　(B) 8　　　　　(C) 16　　　　　(D) 32

25. In a database, a(n) _____ field is a field that uniquely identifies each record in a file.
    (A) primary key　　　　　　　　(B) session key
    (C) secondary key　　　　　　　(D) master

26. Which of the following command can be used to display the default gateway, IP address, media access control(MAC) address and DNS servers?
    (A) TRACERT　　(B) IPCONFIG/ALL　(C) NSLOOKUP　　(D) NETSTST

27. Which of the following is one of the protocols for e-mail service?
    (A) SMTP　　　　(B) HTTP　　　　(C) FTP　　　　　(D) BBS

28. Let $(51.3)_8 + (3C.A)_{16} = (X)_{10}$, the value of X is ____.
    (A) 102　　　　(B) 101.13　　　　(C) 101.4　　　　(D) 70

背面尚有試題

29. Which of the following is true for the minimum spanning tree of a graph with n vertices?
    (A) The minimum spanning tree is cyclic.
    (B) The result of minimum spanning tree is a unique.
    (C) Prim's algorithm starts from any vertices in the graph.
    (D) The minimum spanning tree of this graph consists of $n+1$ edges.

30. Suppose a binary tree starts from level 1. Let T be a binary tree with n nodes, and let h denote the height of T. Which of the following statement is true?
    (A) The number of external nodes in T is at most 2^{h-1}
    (B) The number of internal nodes in T is at most 2^{h-2}
    (C) The height of T is at least $\log_2(n+1)$
    (D) The height of T is at most $(n-1)/2$

31. Which of the following running time is the **slowest**?
    (A) $T(n) = T(n/2) + cn$ (B) $T(n) = 2T(n/2) + cn$
    (C) $T(n) = T(n-1) + cn$ (D) $T(n) = T(n/3) + cn$

32. Given a binary tree, its
    Preorder traversal sequence: F, B, A, D, C, E, G, I, H (root, left, right),
    Inorder traversal sequence: A, B, C, D, E, F, G, H, I (left, root, right);
    Which is **Postorder** traversal sequence (left, right, root)?
    (A) A, C, E, D, B, H, I, G, F   (B) A, C, E, D, B, G, H, I, F
    (C) A, B, C, D, E, G, H, I, F   (D) None of the above.

33. Which of the following are correct that the time complexity of the **merge sort** and **quick sort** algorithm in the average case respectively?
    (A) $O(n \log n), O(n \log n)$ (B) $O(n^2), O(n \log n)$
    (C) $O(n^2), O(n^2)$ (D) $O(n \log n), O(n^2)$

34. In binary search tree which traversal is used for ascending order values?
    (A) Preorder   (B) Inorder
    (C) Postorder   (D) None of the above.

35. If you create a **heap** and store it in an array. Which of the following is a heap?
    (A) 5,6,8,13,17,9,15,18,22,12,10　　　　(B) 5,10,8,7,22,4,15,6
    (C) 3,4,7,9,6,10,18,15,13　　　　　　　(D) None of the above.

36. If you create a **heap** and store it in an array. Suppose you have the following heap:[2,4,6,8,10,13,12]. After performing a DeleteMin, what will the heap look like?
    (A) 6,4,12,8,10,13　　　　　　　　　　(B) 4,6,10,8,12,13
    (C) 4,8,6,12,10,13　　　　　　　　　　(D) None of the above.

37. If you create a **heap** and store it in an array. Suppose you have the following heap:[5,8,9,10,14,13]. After inserting the value 7, what will the heap look like?
    (A) 5,8,7,10,14,13,9　　　　　　　　　(B) 5,7,8,9,10,13,14
    (C) 5,8,9,10,14,13,7　　　　　　　　　(D) None of the above.

38. Which of the following formula is used to calculate the average case time complexity for **quick sort** of n records?
    (A) $T(n) = T(n/2) + cn$　　　　　　　(B) $T(n) = 2T(n/2) + cn$
    (C) $T(n) = T(n-1) + cn$　　　　　　　(D) None of the above.

39. (C) Which of the following is a FIFO structure?
    (A) Array　　　　　(B) Stack　　　　　(C) Queue　　　　　(D) Binary search tree

40. How many vertices are there in a tree if the tree has n edges?
    (A) $n-1$　　　　(B) n　　　　(C) $n+1$　　　　(D) n^2

試題結束