國立中正大學
115 學年度碩士班招生考試
試 題

[第 3 節]

科目名稱	計算機概論
系所組別	資訊管理學系－甲組 乙組
	資訊管理學系醫療資訊管理

－作答注意事項－

※作答前請先核對「試題」、「試卷」與「准考證」之系所組別、科目名稱是否相符。

1. 預備鈴響時即可入場，但至考試開始鈴響前，不得翻閱試題，並不得書寫、畫記、作答。
2. 考試開始鈴響時，即可開始作答；考試結束鈴響畢，應即停止作答。
3. 入場後於考試開始 40 分鐘內不得離場。
4. 全部答題均須在試卷（答案卷）作答區內完成。
5. 試卷作答限用藍色或黑色筆（含鉛筆）書寫。
6. 試題須隨試卷繳還。

國立中正大學115學年度碩士班招生考試試題

科目名稱：計算機概論　　本科目共 5 頁　第 1 頁

系所組別：資訊管理學系-甲組、乙組
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[Section I] Multiple Choice (60 points) Choose ONE answer only for each question (2 points for each)

1. The binary representation of 37-12 is:

A. 11011　B. 10101　C. 10111　D. 11001

2. The binary notation of 51.75 is:

A. 110011.11　B. 110011.01　C. 110001.11　D. 110001.01

3. Which of the following has the highest access speed?

A. main memory　B. hard disk　C. register　D. cache

4.Which one is the control instruction?

A. LOAD　B. ADD　C. ROTATE　D. HALT

5. The following processes arrive for execution at the times indicated. Each process will run the listed amount of time. Suppose the first-in-first-out (FIFO) scheduling algorithm is used, what is the average waiting time for these processes?

Process	Arrival Time	Burst Time
P1	0	6
P2	1	3
P3	3	4

A. 3.33　B. 3.67　C. 4.00　D. 4.33

6. Following the question above. What is the average turnaround time for these processes?

A. 8.00　B. 8.33　C. 8.67　D. 9.00

7. Which of the following applies the mirroring technique?

A. RAID 0　B. RAID 1　C. RAID 3　D. RAID 5

8. Which of the following is a required condition of deadlock?

A. preemption　B. circular waiting　C. progress　D. none of the above

9. How many IP addresses are in a class C network?

A. 256　B. 254　C. 65536　D. 65534

10. The application layer protocol of the e-mail system is:

A. HTTP　B. DNS　C. SMTP　D. P2P

11. Which of the following is the base station in the Wi-Fi network?

A. cell tower　B. router　C. switch　D. access point

12. The operating system of Raspberry Pi is based on:

A. Windows　B. macOS　C. Linux　D. Android

13. Which of the following is not polynomially bounded?

A. $100^{\log n}$　B. 2^n　C. 50!　D. nlogn

14. The time complexity of binary search is:

A. O(1)　B. O(loglogn)　C. O(logn)　D. O(n)

15. The time complexity of bubble sort is:

A. O(n)　B. O(nloglogn)　C. O(nlogn)　D. $O(n^2)$

16. What is the printed value of the following code?

```
product=1;
for(int i=1; i<=7; ++i)
        if (i%2==1)
                product*=i;
cout << product << endl;
```

A. 0　B. 1　C. 105　D. 5040

17. What is the printed value of the following code?

```
int arr[10];
for(int i=0; i<10; ++i)
        arr[i]=i*i;
        if(i%2==1)
                cout << arr[i] << " ";
        if(i==7)
                 break;
cout << endl;
```

A. 1 9 25 49

B. 0 1 4 9 16 25 36 49

C. 1 9 25

D. 0 1 4 9 16 25 36 49 64 81

18. C# is a kind of ____.
A. machine language
B. formal language
C. assembly language
D. OOP language

19. Which of the following has the highest complexity?
A. 100!　B. nloglogn　C. nlogn　D. n

20. Given T(n)=2T(n/2)+n/logn, T(0)=0, T(1)=1, T(n)=?
A. $\Theta(n)$　B. $\Theta(nloglogn)$　C. $\Theta(nlogn)$　D. $\Theta(n^2)$

21. Given T(n)=2T(n/2)+logn, T(0)=0, T(1)=1, T(n)=?
A. $\Theta(n)$　B. $\Theta(nloglogn)$　C. $\Theta(nlogn)$　D. $\Theta(n^2)$

22. Given a binary tree with 15 nodes, and it has 4 nodes with degree 1. How many leafs in this tree?
A. 4　B. 5　C. 6　D. 7

23. The ____ model is not a RNN model.
A. LSTM　B. BiLSTM　C. GRU　D. TD3

24. The ____ model is not for reinforcement learning.
A. VLM　B. Dueling DQN　C. D3QN　D. PPO

25. Which of the following package is for deep learning?
A. scikit-learn　B. torch　C. cv2　D. none of the above

26. Which of the following package is widely used for reinforcement learning?
A. gym　B. math　C. cv2　D. none of the above

27. Which of the following is a mathematical model of computation?
A. von Neumann architecture
B. Turing machine
C. TCP/IP Protocol Suite
D. none of the above

28. Which of the following is not a NP-complete problem?

A. 2-SAT problem

B. 3-SAT problem

C. subset sum problem

D. partition problem

29. Which of the following is a NP-complete problem?

A. all-pairs-shortest-path problem

B. 0/1 knapsack problem

C. halting problem

D. all of the above

30. Finding the maximal complete subgraph in a graph is called:

A. 4-coloring problem

B. independent set problem

C. vertex cover problem

D. clique problem

[Section II] Problems and Calculations (40 points)

1. Convert the Decimal number $(75)_{10}$ into the following carry number:

(a) (4 pts) Octal number

(b) (4 pts) Hexadecimal number

2. (8 pts) Given tight asymptotic bounds for each of the following recurrences.

(a) (4 pts) $T(n) = T(n/5) + T(4n/5) + n$

(b) (4 pts) $T(n) = T(n/6) + T(5n/7) + n$

3. (8 pts) What sequence of numbers would be printed by the following recursive function if we started it with N assigned the value 1?

```
def func_1(N):
    print(N)
    if N < 100:
        func_1(N * 3)
    else:
        print(100)
    print(N+1)
```

4. (8 pts) Given 7 data 6,2,7,4,3,5,1, write the result of each iteration in bubble sort (in ascending order).

5. (8 pts) Given a binary search tree. The inorder and postorder traversal of this tree are 1, 2, 3, 4, 5, 6, 7, 8, and 1, 3, 2, 6, 5, 8, 7, 4, respectively. What is the preorder and level order traversal of this tree, respectively?