

國立中正大學

113 學年度碩士班招生考試

試題

[第 1 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。

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系所組別：資訊管理學系-甲組、乙組

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[Section I] Multiple Choice (70 points)

Choose ONE answer only for each question (2 points for each question)

1. The binary representation of 28-10 is:

- A. 10000 B. 10001 C. 10010 D. 10011

2. The binary notation of 66.375 is:

- A. 1000100.111 B. 1000100.101 C. 1000010.101 D. 1000010.011

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

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

4. The technique to consolidate multiple signals into a single composite signal is called:

- A. multiplexing B. pipelining C. multiprocessing D. multitasking

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

Process	Arrival Time	Burst Time
P1	0	8
P2	1	5
P3	2	2

- A. 4.67 B. 5.00 C. 5.33 D. 5.67

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

- A. 9.00 B. 9.33 C. 9.67 D. 10.00

7. Which of the following has the worst space efficiency?

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

8. Each time the dispatcher awards a time slice to a process, it initiates a timer circuit that will indicate the end of the slice by generating a signal called:

- A. interrupt B. signaling I/O C. deadlock D. spinlock

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

- A. 254 B. 256 C. 65534 D. 65536

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10. Which of the following connects two bus networks?
A. switch B. access point C. repeater D. all of the above
11. Which of the following refers to a small piece of data sent from a website and stored on the user's computer by the user's web browser while the user is browsing so as to remember stateful information?
A. etag B. proxy C. cookie D. register
12. The application layer protocol of LINE is:
A. HTTP B. SMTP C. SNMP D. VoIP
13. Which of the following is polynomially bounded?
A. $100^{\log n}$ B. 2^n C. n^n D. all of the above
14. The worst time complexity of quick sort is:
A. $O(n)$ B. $O(n \log \log n)$ C. $O(n \log n)$ D. $O(n^2)$
15. The average time complexity of insertion sort is:
A. $O(n \log \log n)$ B. $O(n \log n)$ C. $O(n^2)$ D. $O(n^2 \log n)$
16. What is the printed value of the following code?
`sum=0;`
`for(int i=1; i<=8; ++i)`
 `sum+=i;`
`cout << sum << endl;`
A. 32 B. 36 C. 0 D. 40320
17. What is the value of arr[5] of the following code?
`int arr[10];`
`for(int i=0; i<10; ++i)`
 `arr[i]=0;`
`for(int i=0; i<10; ++i)`
 `if (i==5)`
 `continue;`
 `arr[i]=i*i;`
A. 0
B. 5
C. 25

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D. 36

18. 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%3==1)
        cout << arr[i] << " ";
    if(i==5)
        break;
cout << endl;
```

A. 1 16

B. 0 1 4 9 16

C. 1 16 49

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

19. ____ allows one class to encompass the properties of another.

A. encapsulation B. polymorphism C. inheritance D. interface

20. The way to give the function direct access to the actual parameters by telling it the addresses of the actual parameters in the calling program unit is called ____.

A. call by value

B. call by reference

C. fruitful function

D. all of the above

21. A problem occurred during a program's execution is called ____.

A. compile error B. syntax error C. exception D. none of the above

22. Given $T(n)=2T(n/2)+1$, $T(0)=0$, $T(1)=1$, $T(n)=?$

A. $\Theta(\log n)$ B. $\Theta(n)$ C. $\Theta(n \log \log n)$ D. $\Theta(n \log n)$

23. Given $T(n)=2T(n/2)+\log n$, $T(0)=0$, $T(1)=1$, $T(n)=?$

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

24. Which of the following has the lowest complexity?

A. 100!

B. $2^{\log n}$

C. n

D. $4^{\log n}$

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25. Given a binary search tree. The inorder and postorder traversal of this tree are 1,3,5,7,9,11,13 and 1,5,3,7,13,11,9, respectively. What is the preorder traversal of this tree?
A. 9,7,3,1,5,13,11
B. 9,7,3,1,5,11,13
C. 9,7,3,5,1,13,11
D. 9,7,3,1,5,11,13
26. Given a binary tree with 16 nodes, and it has 3 nodes with degree 1. How many leafs in this tree?
A. 5 B. 6 C. 7 D. 8
27. In the relational database, a column in a relation is called _____.
A. dictionary B. item C. tuple D. attribute
28. Which of the following extracts columns from a relation?
A. SELECT B. PROJECT C. CHOOSE D. JOIN
29. Which of the following is not an animation software?
A. 3ds Max B. TensorFlow C. Maya D. all of the above
30. The _____ model is a RNN model.
A. LSTM B. VGG16 C. FaceNet D. actor-critic
31. The _____ model is not for reinforcement learning.
A. GRU B. DQN C. DDPG D. PPO
32. Which of the following is not a branch of machine learning?
A. unsupervised learning
B. particle swarm optimization
C. reinforcement learning
D. all of the above
33. Which of the following is a non-computable problem?
A. traveling salesman problem
B. clique problem
C. subset sum problem
D. halting problem

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

- A. depth-first-search problem
- B. spanning tree problem
- C. all-pairs-shortest-path problem
- D. 0/1 knapsack problem

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

- A. all-pairs-shortest-path problem
- B. 0/1 knapsack problem
- C. traveling-salesman problem
- D. clique problem

[Section II] Problems and Calculations (30 points)

1. Convert the Hexadecimal number $(6F)_{16}$ into the following carry number:

- (a) (3 pts) Octal number
- (b) (3 pts) Decimal number

2. (6 pts) Please use the do-while loop in C/C++ to calculate the product of integers from 1 to 10.

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

4. (6 pts) Given a binary tree with 32 nodes, write its maximal and minimal height.

5. (6 pts) What is the relationship between artificial intelligence, machine learning, and deep learning?