

元智大學 102 學年度研究所 碩士班 招生試題卷

系(所)別： 生物與醫學資訊 組別： 不分組 科目： 計算機概論 用紙第 1 頁共 2 頁
 碩士學位學程

●不可使用電子計算機

一、單選題(每題有 5 個選項，其中正確選項只有一個，每題 3 分，共 30 分)
 請在答案卷中繪出下列表格，並將正確答案選項填入各題對應答案欄中。

題號	1	2	3	4	5	6	7	8	9	10
答案										

1. Which of the following statements is incorrect?
 (a) $2.25_{(10)} = 10.01_{(2)}$. (b) $3167_{(8)} = 121313_{(6)}$. (c) $1011010010011111_{(2)} = B49F_{(16)}$. (d) $A4F_{(16)} = 5107_{(8)}$.
 (e) None of above.
 2. What is the largest positive integer that an 8-bit two's complement notation can represent?
 (a) 128. (b) 127. (c) 256. (d) 255. (e) 64.
 3. Which of the following statements is the best description for "pipelining"?
 (a) A means of processing more than one instruction at a time.
 (b) A means of isolating particular bits within a bit pattern.
 (c) The interface between a computer and a peripheral device.
 (d) A means of restricting the capabilities of different processes.
 (e) A means of encoding instructions.
 4. Which of the following is a protocol for controlling the right to transmit a message in a network?
 (a) TCP. (b) FTP. (c) ICANN. (d) CSMA/CD. (e) UDP.
 5. Which of the following tasks is not performed by the kernel of an operating system?
 (a) Process scheduling. (b) Resource allocation. (c) Deadlock avoidance. (d) Cache block replacement. (e) File allocation.
 6. Which of the following programs can self-terminate?
 (a) $X \leftarrow 3$
 while $(X \neq 8)$ do
 $X \leftarrow X + 2$
 (b) $X \leftarrow 3$
 while $(X < 8)$ do
 $X \leftarrow X - 1$
 (c) $X \leftarrow 3$
 repeat $(X \leftarrow X - 1)$
 until $(X > 8)$
 (d) $X \leftarrow 3$
 repeat $(X \leftarrow X - 1)$
 until $(X = 3)$
 (e) None of above.
 7. Which of the following statements is incorrect?
 (a) $n \log n - n^2 = O(n^3)$. (b) $O(2^n) > O(n!)$. (c) $2^3 - 1000n^{100} = O(2^n)$. (d) $3n + 2n^2 = O(n^2)$. (e) $O(n!) > O(n^{1000})$.
 8. Which of the following is the postfix notation of the infix notation $4/2 - (3+5*6)+4*3$?
 (a) $42/356*+ -43*+$. (b) $42/3 - 5+6*4+3*$. (c) $-/42++3*56*43$. (d) $4235643/-+*+*$. (e) $3*4+6*5-3-2/4$.
 9. $f = X'YZ'+X'YZ+X'YZ+XYZ$ is functionally equivalent to?
 (a) $YX+Z$. (b) $YZ+X'Z$. (c) $YZ+XY$. (d) $Y'Z+XZ$. (e) None of above.
 10. Which of the following combinations about the tree traversal is correct?
 (a) Pre-order: ABCEDGF, In-order: ECBDAFG, Post-order: ECDBGFA. (b) Pre-order: ABDECFG, In-order: DBEAFCG, Post-order: FGCDEBA. (c) Pre-order: ABCEDFG, In-order: CEBDAGF, Post-order: ECDBGFA. (d) Pre-order: CGFAEBD, In-order: FCGADBE, Post-order: FGCDEBA. (e) None of above.
- 二、複選題(選出正確選項，全對才給分，每題 5 分，共 10 分)
11. Which of the following logic gate combinations can implement any combinational Boolean function?
 (a) AND, NOT. (b) XOR, NOT. (c) XOR, AND. (d) XOR, OR. (e) AND, OR.

元智大學 102 學年度研究所 碩士班 招生試題卷

系(所)別: 生物與醫學資訊 組別: 不分組 科目: 計算機概論 用紙第 2 頁共 2 頁
 碩士學位學程

⊗ 不可使用電子計算機

12. Which of the following algorithms require the use of a queue?
 (a) DFS of a graph. (b) BFS of a graph. (c) Pre-order traversal of a tree. (d) In-order traversal of a tree. (e) Post-order traversal of a tree. (f) Level-order traversal of a tree.

三、名詞解釋(每題 5 分, 共 30 分)

13. Dispatch latency. 14. Context switch. 15. Temporal locality. 16. Power wall. 17. Page fault. 18. Data hazard.

四、問答題(每題 6 分, 共 30 分)

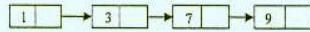
19. Draw the min-heap tree after the following operations are performed beginning with an empty heap.

1. Insert 33, 21, 58, 15.
2. Delete min.
3. Insert 41, 32, 45, 59.
4. Delete min.

20. The following is a function for computing the sum of all the elements in an array. Here, *list[]* is the target array and *n* is the element count in *list[]*. In this program, there is an incorrect statement. Find out the statement and correct it.

```
float rsum(float list[], int n)
{
    if (n) return rsum(list, n) + list[n-1];
    return 0;
}
```

21. Order the following steps for adding a node with a value 5 into the linked list in between node 3 and node 7 in the correct sequence.



1. Set the link field of node 3 to the address of the new node.
 2. Set the data field of the new node to 5 and find the location (node 3) for inserting the new node.
 3. Create a new node.
 4. Set the link field of the new node to the link field of node 3.
22. Consider a non-pipelined machine with five execution steps of lengths 50ns, 60ns, 60ns, 60ns, and 50ns. Suppose that due to clock skew and setup, pipelining the machine adds 5ns, 10ns, 5ns, 10ns, and 10ns, of overhead to the five execution stages, respectively. Ignoring any latency impact, how much speedup in the instruction execution rate will we gain from a pipeline?

23. Consider the following set of processes, with the length of the CPU burst time given in milliseconds:

Process	Burst Time	Priority
P1	4	2
P2	3	3
P3	5	5
P4	8	1
P5	7	4

The process are assumed to have arrived in the order P2, P5, P3, P1, P4, all at time 0. What is the average waiting time for the non-preemptive SJF scheduling algorithm?