國立勤益科技大學 101 學年度研究所碩士班招生筆試試題卷
所別：研發科技與資訊管理研究所　　　　組別：資訊管理組
科目：計算機概論
准考證號碼：□□□□□□□□（考生自填）

考生注意事項：
一、考試時間 100 分鐘。
二、本考科不可使用電子計算機。
三、答案請寫在答案卷上，否則不予計分。試題請連同答案卷一併繳回。

試題一：〈每小題 5 分，共 20 分〉
1. (　　) 內儲存程式架構中，哪一個單元負責算術運算？　(a) Control Unit
　　　　(b) Arithmetic Logic Unit　(c) Memory Unit　(d) Computation Unit
2. (　　) Which searching method is the slower?　(a) Quicksort
　　　　(b) Binary search　(c) Bubble sort　(d) none of the above
3. (　　) How many different symbols can be encoded using Unicode?　(a) 256
　　　　(b) 4096　(c) 65536　(d) 1046476
4. (　　) Using a two's complement notation system in which each value is
　　　　represented by a pattern of six bits, represent the value -3.　(a) 111101
　　　　(b) 000010　(c) 000011　(d) 100011

試題二：〈10 分〉
請說明作業系統產生死結的四個必要條件。

試題三：〈10 分〉
Coupling and cohesion are two main concepts when a system is divided into modules.　Please describe those concepts.

試題四：〈10 分〉
A list, <16, 5, 7, 9, 11, 8>, contains the elements.　Using the binary search algorithm, trace the steps followed to find 5.　At each step, show the values of first, last, and mid.　If the steps are not traced, describe the reasons.

試題五:〈每小題 5 分,共 10 分〉

Please describe the following concepts in software quality.

(a) maintainability

(b) transferability

試題六:〈每小題 5 分,共 10 分〉

(a) What is a stack?

(b) Please give an application for a stack and describe why the application is employed with a stack.

試題七:〈10 分〉

Please describe the difference between a binary tree and a binary search tree.

試題八:〈10 分〉

請利用布林代數之基本定理將 $F(W,X,Y,Z) = WXYZ + WX\bar{Y}Z + \bar{W}X\bar{Y}Z + \bar{W}XYZ$ 化簡成最簡式。

試題九:〈10 分〉

磁碟機之轉速為 7200 RPM,資料傳輸率為 5 MB/Sec,平均搜尋時間為 10 ms,試問存取同磁柱內 5000 Bytes 之資料約需花費多少時間(ms)?

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試題一：〈每小題 5 分，共 20 分〉

1.（b）

2.（c）

3.（c）

4.（a）

試題二：〈10 分〉

互斥（Mutual Exclusion）：某個資源被一個處理元擁有並使用時，它具有獨佔性，其他處理元必須等待此資源被釋放（Release）後，才能競爭此資源。

擁有和等待（Hold and Wait）：處理元已經擁有至少一個獨佔性資源，但仍須等待使用其他處理元已經擁有的獨佔性資源。

不可奪取（Non-Preemption）：若資源已經被某個處理元擁有，則其他處理元不可以強取此資源，而必須等待資源被正常釋放。

循環等待（Circular Wait）：一組處理元 P_0，P_1，...，P_n，其中 P_0 正在等 P_1 所擁有的資源，P_1 正在等 P_2 所擁有的資源，...，P_n 正在等 P_0 所擁有的資源，稱為循環等待。

試題三：〈10 分〉

Coupling is a measure of how tightly two modules are bounded to each other. The more tightly coupled, the less independent they are.

Cohesion is a measure of how closely the modules in a system are related. We need to have maximum possible cohesion between modules in a software system.

試題四：〈10 分〉

That list is not sorted in order.　The binary search cannot be used.

試題五：〈每小題 5 分，共 10 分〉

Maintainability refers to the ease with which a system can be kept up to date and running correctly.

Transferability refers to the ability to move data and/or a system from one plat form to another and to reuse code.

試題六：〈每小題 5 分，共 10 分〉

(a) A stack is a restricted linear list in which all additions and deletions are made at one end, the top.

(b) Stack of coins, stack of books, computer stack. If we want to remove an object other than the one at the top, we must first remove all objects above it.

試題七：〈10 分〉

A **binary tree** is a tree in which a node cannot have more than two subtrees. In other words, a node can have zero, one, or two sub trees.

A **binary search tree** is a binary tree with one extra property: the key value of each node is greater than the key values of all nodes in each left subtrees and smaller than the values of all nodes in each right subtree.

試題八：〈10 分〉

$$F(W, X, Y, Z) = WX\overline{YZ} + WX\overline{Y}Z + \overline{W}X\overline{Y}Z + \overline{W}XYZ$$
$$= WXZ(Y + \overline{Y}) + \overline{W}XZ(\overline{Y} + Y)$$
$$= WXZ + \overline{W}XZ$$
$$= XZ(W + \overline{W})$$
$$= XZ$$

試題九：〈10 分〉

$$Rotation\ Time = (1/(\frac{7200}{60})) \times \frac{1}{2} = \frac{1}{120} \times \frac{1}{2} = 4.2ms$$

$$Transation\ Time = \frac{1}{5} \times \frac{1}{1024} \times 5000 = 1ms$$

$$Access\ Time = Seek\ Time + Rotation\ Time + Transaction\ Time$$
$$= 10ms + 4.2ms + 1ms = 15.2ms$$