國立臺北科技大學九十七學年度博士班招生考試

系所組別：2150 電機工程系博士班戊（計算機）組

第一節　計算機理論　試題

注意事項：

1. 本試題共五題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

Before beginning to answer a question make sure that you read it carefully. If you are confused about what the question means, state any assumptions that you make in formulating your answer.

一、(5%) From the following list, extract a collection of numbers whose sum is 6330:

52, 78, 208, 390, 806, 1008, 1586, 1990, 2312, 2346

What is the complexity of your technique for solving this problem? Dose this appear to be a polynomial problem or a non-polynomial problem?

二、(5%) Draw the complete undirected graphs for one, two, three, four and five vertices. Prove that the number of edges in the n-vertex complete graph is $n\,(n\text{-}1)\,/\,2$.

三、(10%) What are the time complexities (average) to sort n items using (a) bubble sort, (b) quick sort, (c) heap sort, (d) selection sort, and (e) merge sort algorithms?

四、Briefly explain the following terms:

1. (5%) virtual memory
2. (5%) turing machines
3. (5%) preemptive multitasking
4. (5%) linear programming problems
5. (5%) minimum spanning tree problems
6. (5%) page fault problems

五、Describe the distinctions between the following terms:

1. (10%) top-down and bottom-up design strategies
2. (10%) depth-first search and breadth-first search in graph theory
3. (10%) controlled and uncontrolled redundancy in database systems
4. (10%) multiprocessing and multithreading
5. (10%) write-back and write-through cache policies