

## 2000 Paper 3 Question 5

### Data Structures and Algorithms

Describe an efficient algorithm based on Quicksort that will find the element of a set that would be at position  $k$  if the elements were sorted. [6 marks]

Describe another algorithm that will find the same element, but with a guaranteed worst case time of  $O(n)$ . [7 marks]

Give a rough estimate of the number of comparisons each of your methods would perform when  $k = 50$ , operating on a set of 100 random 32-bit integers. [7 marks]