

本試題是否可以使用計算機：  可使用，  不可使用（請命題老師勾選）

1. Convert each of the following values. (12%)
  - a.  $(111011.001)_2 = ( \quad )_{16}$
  - b.  $(57)_{10} = ( \quad )_8$
  - c.  $(AD)_{16} = ( \quad )_{10}$
  - d.  $(4321)_8 = ( \quad )_{16}$
2. Explain the following abbreviations: (25%)
  - a. CASE
  - b. AI
  - c. TCP/IP
  - d. ODBC
  - e. DBMS
3. What are the advantages of multi-tier architecture as compared to client-server architecture?. (10%).
4. Convert the expression  $a/b-c+d+e-a+c$  into postfix form. (5%)
5. What is the maximum number of comparisons required if
  - (a) **binary search**
  - (b) **sequential search**is used with a list of  $n$  items? (10 %)
6. Given a recursive function  $S(n)$  for  $n \geq 1$ , compute the value of  $S(n)$ . (5%)
$$S(n) = \begin{cases} 1, & n=1 \\ n+S(n-1), & n>1 \end{cases}$$
7. Draw a graph to express a Link-list and convert it into an array. (8%)
8. Write a QuickSort algorithm. (10%)
9. A shop floor is equipped with machines (M1, M2 etc.) of different types and robots (R1, R2, etc.) for transferring parts form one machine to another. Each machine has its own input queue (Q1, Q2 etc). A robot unloads parts form a machine and transfers them to the input queue of another machine. Assume the robot is much faster than the machines so that no output queue is necessary for the machines.
  - (1) Draw a diagram to express the shop floor. (7%)
  - (2) Try to convert the statement into a semantic network (8%)