

- 1) Please explain the following terminology. (4% for each)
 - a) Vertical Redundancy Check (VRC)
 - b) Out-of-Band Signaling
 - c) Message-based Call Control
 - d) Switched Virtual Circuit (SVC)
- 2) Why is data fragmentation necessary in a wireless network? (9%)
- 3) a) What is "public key encryption" system? (5%)
b) Explain the following terms that are important aspects in security. (4%)
(i) privacy. (ii) non-repudiation
- 4) a) Write down the pseudo code for the quick sort. (5%)
b) Show why the average and the worst time complexity for the quick sort is $O(n \log n)$ and $O(n^2)$, respectively. (5%)
- 5) Data compression methods can be divided into two broad categories: lossless and lossy (i.e. some information is lost during data compression). Determine whether the following methods are lossless or lossy. (6%) (a) run-length; (b) Huffman; (c) Lempel Ziv; (d) MP3; (e) JPEG; (f) MPEG.
- 6) Please give the codes for defining and initializing a doubly circular linked list. (5%)
Give an application in which a doubly circular linked list is used. (5%)
- 7) A critical problem may arise in computing $99!$ (99 階乘) is about overflow. Please describe your approach for resolving this issue. (10%)
- 8) Given n integers a_1, a_2, \dots, a_n , we defined $A_{ij} = a_i + \dots + a_j$ for $1 \leq i \leq j \leq n$. Write a procedure that computes all A_{ij} for $1 \leq i \leq j \leq n$, and analyze the required run time. (5%)

- 9) 物件導向之三大特性? (6%)
- 10) What is "English Auction"? What is "Dutch Auction"? (6%)
- 11) 請解釋 Web Services 的運作架構 (8%)
- 12) 有一「二元搜尋常式的流程圖」如下圖，請追蹤此圖並得到所有可能的路徑。(5%)

