※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

1. (46%, 2 points for each problem) Please define the following terms and explain the content, purpose, and application of each term and give an illustrative example if possible. If possible, define the term in mathematical equation. If it is an acronym, please write the full name. For example: CD-ROM: Compact Disk-Read Only Memory: the most common type of optical storage medium; data is written in a series of lands and pits on the surface of a disk, which can be read by a laser in a CD-ROM drive; stores approximately 650 MB but cannot be altered.

(1) network topology (2) dynamic programming (3) greedy algorithm (4) disk defragmentation (5) disk formatting (6) volatile memory (7) DDR: Double Data Rate (8) assembly language (9) dynamic linking library (10) SSD: Solid-State Drive (11) FTP (12) CNN: Convolutional Neural Network (13) SVM: Support Vector Machine (14) OCR: Optical Character Recognition (15) iris recognition (16) edge computing (17) big data (18) AIoT (19) four steps of machine instruction cycle (20) von Neumann architecture (21) dead lock (22) interrupt (23) object-oriented programming

2. (8%) Please write the full names of SRAM and DRAM. Please describe the differences, advantages, and disadvantages of SRAM and DRAM.

3. (6%) Please write the two's complements of -101 and 57. Please show the computation in two's complement for -101+57.

4. (4%) If LRU (Least Recently Used) page replacement is used with four page frames and initially all empty. Please write content of four page frames for each time instant sequentially. How many page faults (i.e. swap outs, excluding the initial four swap ins) will occur for reference string 1234524167641542? For example: Oldest - - Newest => - - - - => - - - 1 => - - 1 2 => - 1 2 3 => 1 2 3 4 => 2 3 4 5 => ...

5. (8%) What is DNS: Domain Name System. Please list at least three other top-level domains, full names, and entities using, for example: .org, .organization, non-profit organization.

6. (4%) Please describe the differences, advantages, and disadvantages of IPv4 and IPv6.

7. (8%) Please explain and write computer program for quicksort. Please write the step by step content of array with numbers: 3, 7, 8, 5, 2, 1, 9, 5, 4. What is the average sorting time for n items?

8. (8%) Please define 8-queen problem and explain in detail how to use backtracking to solve 8-queen problem. Please draw one solution for 4-queen problem.

9. (8%) Please define and explain how to find MST: Minimum Spanning Tree in detail. Please draw the minimum spanning tree for the following graph.

試題隨卷繳回