※ 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. (62%, 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) disk formatting (2) XOR operation (3) interrupt (4) CUDA: Compute-Unified Device Architecture (5) LRU: Least Recently Used (6) machine language (7) FTTH: Fiber To The Home (8) twisted-pair cable (9) DRAM (10) Unicode (11) TCP/IP (12) QoS (13) recursive (14) private key (15) rootkit (16) RISC: Reduced Instruction Set Computer (17) VPN: Virtual Private Network (18) augmented reality (19) DRM: Digital Rights Management (20) SQL: Structured Query Language (21) DBMS (22) HTML (23) phishing (24) page swap in (25) carry (26) overflow (27) odd parity (28) Hamming code (29) Fibonacci sequence (30) Tower of Hanoi (31) pseudo random number generator

2. (6%) Please write full names of P and NP in computational complexity and explain in detail. Is P=NP?

3. (6%) Please write the seven layers of Open Systems Interconnection model (OSI model).
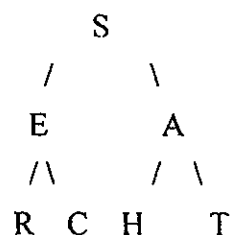
4. (4%) Please describe stack and queue data structures and differences.

5. (4%) Please describe the differences, advantages, and disadvantages of compiler and interpreter.

6. (4%) Please convert in-order expression a+b*c+c/d into post-order expression.

7. (4%) Please convert decimal 113.375 into binary representation.

8. (4%) Please write the outputs of depth-first search and breadth-first search of the following binary tree:

```
        S
      /   \
     E     A
    /\    / \
   R  C  H   T
```

9. (6%) Please list the result of each pass when applying insertion sort algorithm to the list:
18, 99, 21, 14, 149, 31, 8

<div align="center">試題隨卷繳回</div>