• Give an explanation for each term below and describe its purpose:
  (每題 3 分, 共 15 分)
  (1) URL:
  (2) Foreign Key:
  (3) OLE:
  (4) Abstract data type:
  (5) Sparse matrix:

• True/False questions: (每題 1 分, 共 10 分)
  (1) In a relational database a file is also called a relation.
  (2) Graphic images can be produced through bit mapping or vector graphics.
  (3) Object-oriented languages are procedural language that presents a step-by-step process of solving a problem.
  (4) The definition of transborder data flow includes only electronic data.
  (5) The inference engine is the only procedural part of a rule-based system.
  (6) Most executive support systems are developed through prototyping because executive needs change so rapidly.
  (7) Groupware, also called collaborative software, provides a group of people using shareware and collected data, however, it does not support a team to accomplish a specific project.
  (8) Formal planning tools can help system manager monitoring progress toward goals.
  (9) The principle of structured design is that a system should be designed using top-down, hierarchical method.
  (10) Data Encryption Standard (DES) is a data encryption method using 50-bit binary code that serves as the key for converting number and other data into text 8 times.
Multiple choice questions (單選): (每題 2 分，共 20 分)

(1) In the traditional file environment:
   a. all files are flat sequential files
   b. all files are on tape
   c. there are usually separate files and programs for each application
   d. all of the above
   e. none of the above

(2) If a field of a record is used to tie this record to another then this field is termed:
   a. an index field
   b. a pointer field
   c. a chain field
   d. a key field
   e. none of the above

(3) Which of the following does NOT require a firm to be responsible for managing its telecommunications:
   a. LAN
   b. WAN
   c. VAN
   d. all of the above
   e. none of the above

(4) With virtual storage:
   a. a single program is broken into a number of separate pages
   b. a large number of programs can be resident in primary memory
   c. small machines can execute a program of any size
   d. all of the above
   e. both b and c

(5) A PERT chart can:
   a. speed up the coding process and reduce the paper used
   b. help managing several tasks by their order and time in a project
   c. show the critical path, highlighted in the chart, to indicate the combination of
events requiring the most time.

d. both b and c
e. none of the above

(6) Graphical user interfaces:

a. make extensive use of icon, buttons, bars and boxes
b. are older operating systems than MD-DOS
c. are used only on Macintosh computers
d. are command-driven
e. both a and d

(7) With object-oriented programming:

a. a data object is hidden from other parts of the program
b. separate procedures must be coded every time when someone wants to take
   an action on a particular piece of data
c. programmers can produce programs with fewer bugs even though this may
   increase the time and the cost of programming.
d. all of the above
e. none of the above

(8) ROM is used in general purpose computers to store:

a. certain utility programs of the operating system
b. frequently used programs or computing routines
c. program instructions supplied by the user
d. both a and b
e. none of above

(9) The internet

a. is a WAN that spans the globe using unique network topology
b. is used by the U. S. Department of Defense only
c. has formal management organization in every country around the globe
d. allows relatively easy and limited connection for every organization
e. none of the above
10. The interface definitely needed for connecting two different types of LAN is:
   a. bridge
   b. gateway
   c. router
   d. all of the above
   e. none of the above

4. (a) Simplify the Boolean function
   \[ F(A,B,C,D,E) = \Sigma m(2,3,4,5,6,7,8,10,12,13,15,18,19,20,21,22,23,24,26,28,29) \]
   using both Sum-of-Product (SOP) and Product-of-Sum (POS) terms. (5分)
   (b) Draw the logic circuits for one of the results you obtained. (5分)

5. Describe three popular transmission accessing control techniques and explain what type of
   network topology is better used with each technique. (5分)

6. Using C++, C, or Pascal to write a recursive function for finding GCD (Greatest Common
   Divisor) of two positive integers, A and B. (10分)

7. Explain and compare the RISC and CISC techniques. (5分)

8. (a) Write an algorithm to "insert" a node in a double linked list. (5分)
   (b) Write an algorithm to "delete" a node in a double linked list. (5分)

9. Convert the following infix expressions to both prefix expressions and postfix expressions.
   (a) \((a+b)*c+d/(e+f*g)+h\) (5分)
   (b) \(((a+b)-c*(d+e)+f)/(g+h*i)\) (5分)

10. Discuss four categories of data models used for building database. Your discussion
    should include data relationship (cardinality) between records in files. (5分)