※注意：作答時，請於答案卷上標明作答之部份及其題號。

第一部份： 選擇題（單選）25題，每題2分，共50分。**請在答案卷內清楚的標示題號並依序作答，否則不予以計分。**

1. [ ] Which of the following is wrong about FTP? (A) FTP stands for "File Transfer Protocol" (B) to use anonymous login to an FTP site, you needs to provide your email address as the password (C) the command to download a file from an FTP site is "GET" (D) the command to upload a file to an FTP site is "UPLOAD" (E) all of the above are correct.
2. [ ] Which of the following is wrong about Internet? (A) 'Internet' refers to the collection of computers and devices connected together via only wired communications devices (B) the standard protocol for communication is TCP/IP (C) today more than 100 million hosts connect to the Internet (D) Web is an application over the Internet (E) all of the above are correct (choose this one only if none of the above can be chosen).
3. [ ] Which of the following is a new jargon that refers to a new wireless era in which you can connect to the Internet virtually anywhere at any time? (A) Wi-Fi (B) MANET (C) SOHO (D) Ad Hoc Networks (E) Nomadic Computing.
4. [ ] Which of the following wireless technology is developed mainly to replace personal devices cable attachment, and is gaining its popularity recently? (A) IEEE 802.11 (B) IEEE 802.11b (C) Bluetooth (D) Infra red (E) none of the above.
5. [ ] Which of the following is wrong? (A) USB stands for "Universal Serial Bus" (B) USB can daisy chain up to 127 peripheral devices (C) USB is "Plug and Play" (D) USB supports a higher speed data transfer than traditional serial port on PCs (E) all of the above are correct.
6. [ ] Which of the following technology allows businesses to send common business forms electronically? (A) EDI (B) POS (C) EFT (D) FFT (E) EDD.
7. [ ] Which of the following is correct about Ethernet? (A) the bandwidth of Ethernet is 1Mbps (B) a token is circulated to reduce collisions among nodes (C) Ethernet uses a method called "carrier sense multiple access with collision detection (CSMA/CD)" to control the access of the communication link (D) when a collision occurs between two nodes, each node must wait for some constant time before attempting to re-transmit data (E) none of the above is correct.
8. [ ] A file kept on the client site with a record of web site activities that are often added by the web sites you visited without your knowledge is (A) bookmark (B) cookie (C) cache (D) registry (E) preference.
9. [ ] The security attack that refers to the block of a service by sending an enormous number of requests to the service is (A) bomb (B) salami (C) trapdoor (D) Trojan horse (E) DoS.
10. [ ] Among the three languages C, C++, Java, which is (are) not object-oriented? (A) only C (B) only C and Java (C) only Java (D) only C++ (E) all are object-oriented.
11. [ ] Which of the following is correct? (A) an assembler translates the assembly-language program into machine language (B) an interpreter converts the entire program of a high-level language into machine language before computer executes the program (C) a compiler converts each high-level language statement into machine language and executes it immediately, statement by statement (D) machine language cannot be executed without any language translation (E) natural languages are also known as 4GL.
12. [ ] URLs that begin with what indicate that the users are connected to a server that provides secure transactions? (A) 'https://…' (B) 'shttp://…' (C) 'http_s://…' (D) 'http://…' (E) none of the above.
13. [ ] Which of the following is wrong? (A) public key encryption is also called asymmetric key encryption because the encryption and decryption use different keys (B) private key encryption is also called symmetric key encryption because the encryption and decryption use the same key (C) public key encryption scheme can be used for digital signature (D) PGP is used to secure email messages (E) all of the above are correct
14. [ ] Which of the following storage devices is volatile? (A) CompactFlash (B) MemoryStick (C)

Microdrive (D) Smartmedia (E) all of the above are non-volatile.

15. [ ] Which of the following is wrong? (A) the process of starting or restarting a computer is called 'booting' (B) a warm boot is the process of restarting a computer that is powered off (C) the core of an operating system is called 'kernel' (D) part of an operating system must be stored in a non-volatile storage space (E) all of the above are correct (choose this one only if none of the above applies).

16. [ ] Which of the following is wrong? (A) 'spooling' sends jobs to a buffer instead of sending them immediately to the printer (B) 'spooling' allows more than one job to be printed at a time (C) 'spooling' increases CPU utilization (D) a 'buffer' is a segment of memory or storage in which items are placed while waiting to be transferred to or from an input or output device (E) all of the above are correct (choose this one only if none of the above applies).

17. [ ] A technique that allows a computer to recognize a new device and assist you in its installation by loading the necessary drivers automatically and checking for conflicts with other devices is called (A) play and plug (B) plug and play (C) plug and run (D) plug and install (E) install and play.

18. [ ] When using public key encryption schemes, how to let A securely transmit a message from B, and let B believe that the message is indeed sent by A? (A) use A's public key to encrypt the message, and then use B's private key to encrypt the previous encrypted message (B) use A's private key to encrypt the message, and then use B's public key to encrypt the previous encrypted message (C) use B's public key to encrypt the message, and then use A's private key to encrypt the previous encrypted message (D) use B's private key to encrypt the message, and then use A's public key to encrypt the previous encrypted message (E) none of the above.

19. [ ] Which of the following gates are sufficient to implement all kind of logical circuits?

I. AND
II. OR
III. NAND
IV. NOT

(A) only I (B) only I and II (C) only I, II and III (D) only I, II and IV (E) only III

20. [ ] Which of the following is wrong about operating systems? (A) An OS contains instructions that coordinate all the activities among computer hardware devices (B) OS also contains instructions that allow you to run applications (C) OS must be loaded into memory and executed before application software can be invoked (D) the part of code in PCs that load OS from hard disk into the computer's memory is called 'BIOS' (E) all of the above are correct (choose this one only if none of the above can be chosen).

21. [ ] Which of the following is a high-level synchronization construct that allows at most one process to be inside the construct at a time? (A) thread (B) fork (C) monitor (D) barrier (E) synchronizer.

22. [ ] Which of the following normal form makes very nonprime attribute A in a relational schema R fully functionally dependent on the primary key of R? (A) first (B) second (C) third (D) fourth (E) none of the above.

23. [ ] Which of the following normal form says that for a relation schema R, if whenever a nontrivial functional dependency $X \rightarrow A$ holds in R, either (i) X is a superkey of R, or (ii) A is a prime attribute of R. (A) second (B) thrid (C) fourth (D) BCNF (E) none of the above.

24. [ ] Which of the following is wrong about the OSI reference model? (A) it has seven layers (B) the third layer is transport (C) the sixth layer is presentation (D) the second layer is data link (E) all of the above are correct (choose this one when none of the above can be chosen).

25. [ ] Which of the following is wrong about the OSI reference model? (A) routing is a key issue in the network layer (B) the basic function of the transport layer is to accept data from the session layer, split it up into smaller units if needed, pass them to the network layer (C) the presentation layer manages abstract data structures used in applications and converts them to the network standard representation and back (D) frame control is the main subject of the data link layer (E) all of the above are correct (choose this one when none of the above can be chosen).

接次頁

第二部份：問答題，三大題，共50分。

1. (10 分) What function does the following C program perform?

```
Void guessme(char *s, char *t) {
 while (*s++ = *t++); }
```

2. (25 分) Consider a community of n persons. Each person knows (or has heard the name of) a subset (possibly empty) of persons in the community. Note that, as in the real world, A knows B does not necessarily imply B knows A. A *celebrity* of the community is defined as someone who is known by everyone but does not know anyone. Let us assume that we have a database storing, for each person, the name of the persons he knows. The database offers a query function KNOW(A, B) that given two persons A and B, answers whether or not A knows B. Suppose that we are given the names of the n persons. Then clearly at most $n(n\text{-}1)$ queries to the database will be enough to determine the celebrity. The problem for you is to design an algorithm of query sequence so that at most $O(n)$ queries will be needed to find out the celebrity. How many queries does your algorithm actually need?

   (Hint. When you issue a query, you can know someone that cannot be the celebrity.)

3. (15 分) Consider a WWW access model in which there is a client C, proxy X, and server S. When the client C requests a page from S, the request first goes to X. If X has the page in its cache, it returns the page to C. Otherwise, it forwards the request to S. After the server sends the page to X, X caches the page and forwards it to C. Assume that the transmission speed of the link between C and X is 1Mbps, the transmission speed of the link between X and S is 100Kbps, and the cache hit ratio at X is 0.8. Answer the following questions.

   (i) Suppose that on average each http request has size 1/8 KB (Bytes), and each web page has size 4KB. Suppose that computation time is negligible compared to communication delay. Then, what is the expected time to read a page at C (that is, the delay in between the time an http request is issued at client C, to the time at which the requested Web page is received at C)?

   (ii) In the above we did not consider the cache consistency problem. Suppose now that an eager client-initiated approach is used so that whenever X receives an http request, if X has the page in cache, it will check with S to see if the copy X has is up-to-date. Server S will send X the new copy if it determines that X's copy is stale. The validation check and response messages each has 1/8KB in length. Under these circumstances, what is the expected time to read a page at C?