國立臺北科技大學九十五學年度碩士班招生考試

系所組別：4220 商業自動化與管理研究所乙組

第一節 計算機概論 試題

填 准 考 證 號 碼

注意事項：

1. 本試題共三題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、選擇題（60%）：單選，每題 2 分，請在答案卷上每行回答五題，共分六行作答。

1. In object-oriented programming, new classes of objects are created:
(A)by specifying a new class as another object.
(B)by creating a new category of objects.
(C)by choosing an existing class and specifying how the new class differs from the existing class.
(D)by distributing common ancestors.
(E)by inheritance and defined modes for the new classes.

2. Suppose that a certain software product has a mean time between failures of 10,000 hours and has a mean time to repair of 20 hours. If the product is used by 100 customers, what is its availability?
(A)80.2%
(B)90.1%
(C)98.9%
(D)99.8%
(E)100%

3. Software that connects two disparate applications, allowing them to communicate with each other and to exchange data best describes:

(A)C++.

(B)middleware.

(C)XML.

(D)groupware.

(E)Linux.

4. The object-oriented paradigm includes which of the following properties?

    I. Encapsulation II. Inheritance III. Recursion

(A)I only.

(B)II only.

(C)I and II only.

(D)II and III only.

(E)I, II, and III.

5. A set of universal standards using Internet technology for integrating different applications from different sources without time-consuming custom coding best describes:

(A)XML.

(B)HTTP.

(C)Web services.

(D)WAN.

(E)HTML.

6.Which of the following algorithms has running time $\Theta(n^2)$ in the worst case but $\Theta(n\log n)$ on average?

(A)Bubblesort

(B)Mergesort

(C)Heapsort

(D)Quicksort

(E)Turnamentsort

7. Software in a multi-tiered network that provides the business logic for handling all application operations between a user and an organization's back-end business systems best describes:

(A)groupware.

(B)Web server.

(C)capacity server.

(D)query server.

(E)application server.

8. Which of the following is the name of the data structure in a compiler that is responsible for managing information about variables and their attributes?

(A)Abstract Syntax Tree

(B)Attribute Grammar

(C)Symbol Table

(D)Semantic Stack

(E)Parse Table

9. Which of the following refers to the ability of a computer, product, or system to expand to serve a larger number of users without breaking down?

(A)Disintermediation

(B)Reintermediation

(C)Scalability

(D)Modifiability

(E)Expandability

10. Consider the following pseudocode.

```
x:=1;
i:=1;
while (x<=1000)
begin
   x:=2^x ;
   i:=i + 1;
end;
```

What is the value of I at the end of the pseudocode

(A)4

(B)5

(C)6

(D)7

(E)8

11. Which of the following is not one of the TCP/IP layers?

(A)Internet layer

(B)Application layer

(C)Network interface layer

(D)Presentation layer

(E)Transportation layer

12. What of the following statements about Ethernets is typically FALSE?

(A)Ethernets use circuit switching to send messages.

(B)Ethernets uses buses with multiple masters.

(C)Ethernets protocols use a collision-detection method to ensure that messages are transmitted properly.

(D)Networks connected by Ethernets are limited in the length to a few hundred meters.

(E)Packets sent on Ethernets are limited in size.

13. In ascending order, the frequency ranges for communications media are:

(A)radio, infrared, ultraviolet, visible light, X-ray, and gamma/cosmic.

(B)radio, microwave, infrared, ultraviolet, visible light, X-ray, and gamma/cosmic.

(C)radio, microwave, infrared, visible light, ultraviolet light, X-ray, and gamma/cosmic.

(D)gamma/cosmic, X-ray, visible light, ultraviolet, microwave, infrared, and radio.

(E)X-ray, infrared, ultraviolet, microwave, visible light, and gamma/cosmic.

14. Which of the following is(are) true about virtual memory systems that use pages?

    I. The virtual address space can be larger than the amount of physical memory.

    II. Programs must be resident in main memory throughout their execution.

    III. Pages correspond to semantic characteristics of the program.

(A)I only.

(B)II only.

(C)I and II.

(D)I and III.

(E)II and III.

15. Data can be transmitted seamlessly between different wireless networks:

(A)only if they use compatible standards.

(B)only over the Internet.

(C)only with government permission.

(D)only over short distances.

(E)only when cellular phones are used.

16. Hash tables can contribute to an efficient average-case solution for all the problems described below EXCEPT:

(A)Counting distinct values: Given a set of n keys, determine the number of distinct key values.

(B)Dynamic dictionary: Support the operation of insert, delete, and search in a dictionary.

(C)Range search: Given values a and b, find all the records whose key values is in the range $[a, b]$.

(D)Symbol table lookup: Given a program identifier, find its type and address.

(E)Finding intersections: Given two sets of keys, find all key values in common to both sets.

17. Which of the following is the Wi-Fi mode where wireless devices communicate with a wired LAN via access points?

(A)Multiplexed mode

(B)Star mode

(C)Ad-hoc mode

(D)Infrastructure mode

(E)Peer mode

18. In the Internet Protocol (IP) suite of protocols, which of the following best describes the purpose of the Address Resolution Protocol?

(A)To translate Web address to host names.

(B)To determine the IP address of a given host name.

(C)To determine the hardware address of a given host name.

(D)To determine the hardware address of a given IP address.

(E)To determine the appropriate route for a datagram.

19. RosettaNet is:

(A)a new technology for the Internet.

(B)an XML dictionary defining all properties of a PC, such as modems, monitors, and cache memory.

(C)a proprietary database for programmers.

(D)a high-level language translator.

(E)a site with the ability to link the supply chain from top to bottom.

20. Java software was designed:

(A)to run on any computer or computing device regardless of its operating system.

(B)to be downloaded from the Internet as required.

(C)as a new platform for the Internet.

(D)to be applied to communications.

(E)to make writing Web pages easy for the new user.

Questions 21-22 are based on the following information.

Array A contains 256 elements of 4 bytes each. Its first element is stores at physical address 4096.

Array B contains 512 elements of 4 bytes each. Its first element is stores at physical address 8192.

Assume that only arrays A and B can be cached in an initially, physically addressd, physically tagged, direct-mapped, 2 K-bytes cached with an 8-byte block size. The following loop is then executed.

```
for (i = 0; i < 256; i++)
    A[i] = A [i] + B[2* i];
```

21. During the execution of the loop, how many bytes will be written to memory if the cache has a write-through policy?

(A)0

(B)256

(C)1024

(D)2048

(E)4096

22. During the execution of the loop, how many bytes will be written to memory if the cache has a write-back policy?

(A)0

(B)256

(C)1024

(D)2000

(E)4000

23. _____ is a general-purpose language that describes the structure of a document and supports links to multiple documents; it allows data to be manipulated by the computer and is used for both Web and non-Web applications.

(A)LAN

(B)COBOL

(C)HTTP

(D)HTML

(E)XML

24. Linux is:

(A)especially useful for processing numeric data.

(B)an example of open-source software.

(C)primarily concerned with the tasks of end users.

(D)designed for specific machines and specific microprocessors.

(E)a program developed by Niklaus Wirth.

25. Mergesort works by splitting a list of n numbers in half, sorting each half recursively, and merging the two halves. Which of the following data structures will allow mergesort to work in $\Theta(n\log n)$ time?

I. A singly linked list

II. A doubly linked list

III. An array

(A) None

(B) III only

(C) I and II only

(D) II and III only

(E) I, II, and III

26. Which of the following statements about datagrams sent by a node in a network using IPv4 protocol is (are) true?

I. Datagrams at the source must be the size of the smallest maximum transmission unit (MTU) of all the links on a path to the destination.

II. Datagrams may be fragmented during routing.

III. Datagrams are reassembled only at the destination.

(A) I only

(B) II only

(C) III only

(D) I and III

(E) II and III.

27. In a pipelined RISC computer where all arithmetic instruction have the same CPI (cycles per instruction), which of the following actions would improve the execution time of a typical program?

I. Increasing the clock cycle.

II. Disallowing any forwarding in the pipeline.

III. Doubling the sizes of the instruction cached and the data cache without changing the clock cycle time.

(A) I only.

(B) II only.

(C) III only.

(D) I and II.

(E) I and III.

28. Which of the following characteristics of a programming language is best specified using a context-free grammar?

(A)Identifier length

(B)Maximum level of nesting

(C)Operator precedence

(D)Type compatibility

(E)Type conversion

29. Which of the following is NOT a property of bitmap graphics?

(A)Fast hardware exists to move blocks of pixels efficiently.

(B)Realistic lighting and shading can be done.

(C)All line segments can be displayed as straight.

(D)Polygons can be filled with solid colors and textures.

(E)The complexity of the image representation is independent of the image.

30. Software used for creating and manipulating lists, creating files and databases to store data, and combining information for reports best describes:

(A) integrated software.

(B) groupware.

(C) data management software.

(D) presentation graphics.

(E) storage area network.

二、說明 Internet Protocol (IP) 路徑選擇資訊管理的兩種方法（10%），並比較其優缺點（10%）。

三、什麼是 RFID，需要哪些基本組成元件才能應用（10%）？有何優點（5%）？請舉出五種 RFID 的應用（5%）。