



Ⅰ. 選擇題50% (答案請將25題寫在一起，並依下面方式寫在答案紙上)：

1. ( )    2. ( )    3. ( )    4. ( )    5. ( )

6. ( )    7. ( )    8. ( )    9. ( )    10. ( )

11. ( )    12. ( )    13. ( )    14. ( )    15. ( )

16. ( )    17. ( )    18. ( )    19. ( )    20. ( )

21. ( )    22. ( )    23. ( )    24. ( )    25. ( )

1. Hiring a well known musical artist to represent your product in the soft drink market is an example of which strategy?
  - A. Cost leadership strategy
  - B. Differentiation strategy
  - C. Innovation strategy
  - D. Growth strategy
2. Wal-Mart has expanded from a few simple retail outlets to nationwide Super Wal-Mart stores with pharmacies and grocery departments. This is an example of which strategy?
  - A. Cost leadership strategy
  - B. Differentiation strategy
  - C. Innovation strategy
  - D. Growth strategy
3. All of the following are basic competitive strategies discussed in MIS text *except*:
  - A. Cost leadership
  - B. Innovation
  - C. Product differentiation
  - D. Strategic dominance
4. A sales company such as eBay would be most likely to use information technology to promote \_\_\_\_\_.
  - A. online stock trading
  - B. point-of-sale inventory tracking
  - C. online auctions
  - D. virtual manufacturing alliances
5. When a firm strives to find ways to help its suppliers and customers reduce their costs or to increase the costs of their competitors, it is pursuing a strategy of \_\_\_\_\_.
  - A. innovation
  - B. alliance
  - C. cost leadership
  - D. growth
6. A customer-focused business can build customer value and loyalty by:
  - A. Making a loyal customer feel special with website personalization.
  - B. Letting customers place orders directly, or through distribution partners.
  - C. Letting customers check order history and delivery status.
  - D. All of the choices are correct.



7. A firm that focuses on customer value:
  - A. Recognizes that price, rather than quality, has become the primary determinant in a customer's perception of value.
  - B. Anticipates future customer needs and responds to customer concerns.
  - C. Provides better-than-average customer service.
  - D. None of the choices is correct.
8. Business process reengineering is best defined as:
  - A. A key technology to reduce customer late payments
  - B. A radical redesign of business processes to achieve improvements in cost, quality, speed, or service
  - C. A key way to ensure successful improvement in processing
  - D. All of the choices are correct.
9. An agile company supports \_\_\_\_\_ by offering individualized products while maintaining high volumes of production.
  - A. high growth
  - B. mass customization
  - C. its suppliers and competitors
  - D. All of the choices are correct.
10. A virtual company:
  - A. Uses IT to link people, organizations, assets, and ideas.
  - B. Creates virtual workgroups and alliances to exploit fast-changing business opportunities.
  - C. Uses the Internet, intranets, and extranets to support alliances with manufacturers.
  - D. All of the choices are correct.
11. A(n) \_\_\_\_\_ is a standard set of rules and procedures for the control of communication in a network.
  - A. amplification
  - B. algorithm
  - C. protocols
  - D. transponders
12. The \_\_\_\_\_ layer in an OSI model provides communications services for end users.
  - A. application
  - B. data link
  - C. network
  - D. transport
13. Communications channels such as microwave, fiber optics, or satellite transmission that provide high-speed transmission rates typically use \_\_\_\_\_ channels.
  - A. broadband
  - B. narrow-band
  - C. wireless
  - D. voice-band
14. VoIP works by digitizing a voice signal, chopping it into \_\_\_\_\_, and then sending them over a company's computer network or the Internet, much like data or email.
  - A. bits
  - B. packets
  - C. characters
  - D. waves



15. Electronic mail, voice mail, faxing, Web publishing, bulletin board systems, and paging are considered \_\_\_\_\_ tools.
- electronic communication
  - collaborative work management
  - electronic conferencing
  - All of the choices are correct.
16. Marketing information systems can help marketing managers with:
- Customer relationship management
  - Product planning and pricing
  - Targeted marketing strategies
  - All of the choices are correct.
17. Advertising strategies based on a variety of tracking techniques, such as Web "cookies" is an example of which targeted marketing component?
- Context.
  - Content.
  - Community.
  - Online behavior.
18. When a manufacturer automates production of a product by installing computer systems to monitor processes and robots to do some of the assembly tasks, it is an example of \_\_\_\_\_.
- computer integrated manufacturing
  - computer-aided manufacturing
  - process control
  - task control
19. Which of the following statements most accurately describes the *strategic* level of management?
- Composed of a board of directors and an executive committee of the CEO and top executives who develop overall organizational goals, strategies, policies, and objectives as part of a strategic planning process
  - Composed of self-directed teams and middle managers, who develop short-and medium-range plans, schedules, and budgets
  - Composed of self-directed teams or supervisory managers who develop short-range plans, according to procedures and within the budgets and schedules established for the teams and other workgroups of the organization
  - None of the choices are correct.
20. Business intelligence applications are based on all of the following *except*:
- Personalized and Web-enabled information analysis
  - Knowledge management
  - Rapid information input processes
  - Decision support technologies
21. An intelligent agent is:
- A software surrogate that accomplishes specific tasks for users
  - Database software used to analyze current sales trends
  - A marketing software system used to do statistical analysis
  - A software package used by robots



22. Which of the following is an example of an intangible cost?
- Employee salaries
  - Loss of customer goodwill
  - Reduced inventory-carrying costs
  - Improved customer service
23. User interface design refers to the development of:
- Programs and procedures to be used by end-users
  - Display screens, forms and reports, and interactive computer user dialogs
  - User training manuals
  - The structure of databases and files accessible by end users
24. The chief information officer is a(n) \_\_\_\_\_ level IT manager.
- tactical
  - strategic
  - operational
  - departmental
25. Which of the following is the number one reason that companies outsource?
- Reduce and control operating costs
  - Accelerate re-engineering benefits
  - Gain access to world-class capabilities
  - Share risks

II. 問答題 50%(請清楚標註題號，寫在答案紙上)：

- A1. What are Server Farms, Virtualization, Cloud computing, Edge computing, and Autonomic computing? (10%)
- A2. You are the chief information officer (CIO) of a small company with a rapidly growing customer base. You are considering using one of the following kinds of CRM systems: on-premise, on-demand, and open-source. Describe and discuss the pros and cons of each type of CRM system for your business. (10%)
- A3. There are four major threats to wireless networks: rouge access points, war driving, eavesdropping, and RF jamming. Describe each of them, and analyze which of these threats is the most dangerous for a business, and which is the most dangerous for an individual? (12%)
- A4. Define enterprise storage, and describe the various types of enterprise storage. (8%)
- A5. Describe three alternate methods that can be used for systems development, other than SDLC and prototyping. (10%)



- 一、 下列那一個程式片段是在鏈結串列中間插入一個節點。(假設新節點為 NEW，欲插入在 Pointer 節點之後) (3 分)
- Next [NEW] = Pointer;  
Pointer = NEW;
  - Pointer = NEW;  
Next [NEW] = Pointer;
  - Next [NEW] = Next [Pointer];  
Next [Pointer] = NEW;
  - Next [Pointer] = Next [NEW];  
Next [NEW] = Pointer;
  - 以上皆非
- 二、 下列那一個程式片段是刪除鏈結串列中間節點。(假設欲刪除節點為 Pointer，Back 為前一個節點，-1 表示未用空間) (3 分)
- Next [Pointer] = -1;
  - Next [Back] = -1;
  - Back = Next [Pointer];  
Next [Pointer] = -1;
  - Next [Back] = Next [Pointer];  
Next [Pointer] = -1;
  - 以上皆非
- 三、 有一個遞迴式如下：(15 分)
- ```
int Maze (int a, int b, int c)
{
    if (a < b)
        return a;
    else
        return ((a % b) + c* Maze (a/b, b, c));
}
```
- 試計算出下列程式呼叫後所得之最後的值。
- Maze (1020, 10, 7) =?
  - Maze (352, 4, 11) =?
  - Maze (16, 2, 2) =?
- 四、 試寫出一個遞迴函數的程式，以找出二元樹中最長路徑之長度。(15 分)



五、試計算下列運算式的值 (6分)

(a) 前序運算式： $**76-/821$

(b) 後序運算式： $576*82+5/-*$

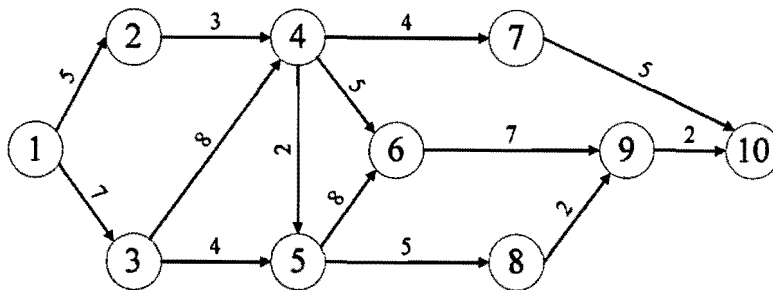
六、假設有一陣列，其大小為有 11 個位置，今擬使用二次方探索法來處理雜湊碰撞的問題，若第一次發生雜湊碰撞的位置在 11 個位置中的第 5 個位置，請寫出第二次發生雜湊碰撞的位置及第三次發生雜湊碰撞的位置。(8分)

七、請分別計算下列兩個算式的 Big-O：(10分)

第一式： $n^2 + 10^{100}n$

第二式： $\sum_{i=1}^n i^2$

八、對下列頂點工作網路(AOV, Activity On Vertex Network)進行拓樸排序 (Topology Sort)，可能的結果有哪些？(10分)



九、Insert the integers 1 to 8 into an empty max-heap. Draw the step-by-step process. (10分)

十、Let  $Y$  be a pre-defined constant and  $A$  be an array declared as follows.

var  $A$ : array[1..159, 1.. $Y$ ] of integer.

Assume that  $A$  is stored in row major order in the main memory and each integer needs two bytes. If  $A[4, 5]$  is stored at address 2012, and  $A[111, 12]$  is stored at address 2940, what is the value of  $Y$ ? (10分)

十一、Let  $b_n$  be the number of distinct binary trees with  $n$  nodes. We have

$$b_n = \sum_{i=0}^{n-1} b_i b_{n-i-1}, \text{ where } n \geq 1 \text{ and } b_0 = 1$$

What is the value of  $b_5$ ? (10分)



**第一部分：單選題，每題 2 分，共 50 分。**

1. A (An) \_\_\_\_ is a specialized version of a linked list in which nodes can be inserted only at the start of the list and deleted only from the end of the list.  
(A) queue            (B) stack            (C) tree            (D) array
2. The set of public member function of a class is referred to as the class's \_\_\_\_.  
(A) constructor      (B) interface      (C) encapsulation   (D) overload
3. The \_\_\_\_ object sends information, such as XHTML and text, to the client.  
(A) Response        (B) Request        (C) Server            (D) Session
4. The Apache web server cannot server \_\_\_\_.  
(A) Perl              (B) PHP              (C) Python            (D) ASP.Net
5. Cat 5e and Cat 6 wiring can carry Ethernet traffic 100 meters up to \_\_\_\_.  
(A) 10 Mbps        (B) 100 Mbps      (C) 1 Gbps            (D) 10 Gbps
6. Packet switching is most efficient for \_\_\_\_ data.  
(A) relatively constant            (B) high-latency  
(C) high-priority                    (D) bursty
7. Topology is a \_\_\_\_ layer concept.  
(A) physical        (B) data link        (C) internet            (D) transport
8. In NAT, the \_\_\_\_ creates new external source IP addresses and port numbers.  
(A) router            (B) firewall        (C) source host      (D) destination host
9. 128.171.17.13:1234 is \_\_\_\_.  
(A) a host            (B) a socket        (C) a port number   (D) an IP address
10. A (An) \_\_\_\_ provides an alias- an alternate name- for the variable. While passing \_\_\_\_ arguments, a (an) \_\_\_\_ to the variable in the calling program is passed.  
(A) value            (B) address        (C) reference        (D) property
11. What technology could replace universal product code (bar code) tags on products?  
(A) Bluetooth      (B) 802.11        (C) UWB              (D) RFIDs
12. In structured systems analysis, the \_\_\_\_ defines the interactions of the application with the external world.  
(A) ERD              (B) DFD  
(C) Context Diagram            (D) Dependency Diagram
13. Which of the following is used for structural modeling in UML?  
(A) class diagrams            (B) use case diagrams  
(C) component diagrams      (D) deployment diagrams







23. Which of the following is the scope of a variable?
- (A) The type associated with the variable
  - (B) The structure associated with the variable
  - (C) The number of characters in the variable's name
  - (D) The portion of the program in which the variable can be accessed
24. The main benefit of IPv6 over IPv4 is \_\_\_\_.
- (A) two more bits in the IP address
  - (B) two more bytes in the IP address
  - (C) the ability to support more possible hosts
  - (D) the ability to have quality-of-service guarantees
25. Which of the following is false?
- (A) An XHTML element may be referred to in JavaScript by its *id* attribute.
  - (B) Only the *document* object has an *all* collection.
  - (C) An element's tag is accessed with the *tagName* property.
  - (D) The *frames* collection contains all the frames on a page.

**第二部分：問答題，每題 10 分，共 50 分。**

1. Discuss the capabilities that should be provided by a DBMS.
2. Discuss each of the tasks of the core operating system's components – process management, thread management, communication management, memory management and supervisor.
3. Compare connectionless (UDP) and connection-oriented (TCP) communication for the implementation of each of the following application-level or presentation-level protocols:
  - i) virtual terminal access (for example, Telnet);
  - ii) file transfer (for example, FTP);
  - iii) user location (for example, rwho, finger);
  - iv) information browsing (for example, HTTP);
  - v) remote procedure call.
4. Initial exchanges of public keys are vulnerable to the man-in-the-middle attack. Describe as many defenses against it as you can.
5. How have new iSCSI systems improved the applicability of storage area networks?



本試題共八題，合計 100 分，請依題號作答並將答案寫在答案卷上，違者不予計分。

1. The probability of a customer arrival at a grocery service counter in any 1 second is equal to 0.15. Assume that customers arrive in a random stream and hence that the arrival any 1 second is independent of any other.
- (a) Find the probability that the first arrival will occur during the third 1-second interval. (5%)
- (b) Find the probability that the first arrival will not occur until at least the third 1-second interval. (5%)

2. Let the moment-generating function for  $Y$  be  $m(t) = \frac{1}{6}e^t + \frac{2}{6}e^{2t} + \frac{3}{6}e^{3t}$ . Find the distribution of  $Y$  and its expected value and variance. (10%)

3. As a measure of intelligence, mice are timed when going through a maze to reach a reward of food. The time(in seconds) required for any mouse is a random variable  $Y$  with density function given by

$$f(y) = \begin{cases} \frac{b}{y^2} & y \geq b \\ 0 & \text{elsewhere} \end{cases}$$

where  $b$  is the minimum possible time needed to traverse the maze.

- (a) Show that  $f(y)$  has the properties of a density function. (5%)
- (b) Find  $F(y)$ . (3%)
- (c) Find  $P(Y > b + c)$  for a positive constant  $c$ . (2%)
4. A soft drink machine can be regulated so that it discharges an average of  $\mu$  ounces per cup. If the ounces of fill are normally distributed with standard deviation of 0.3 ounce, give the setting for  $\mu$  so that 8-ounce cups will overflow 1% of the time. (10%)
5. The length of life(measured in hundreds of hours)  $Y$  for fuses of a certain type is modeled by the exponential distribution, with

$$f(y) = \begin{cases} \left(\frac{1}{3}\right)e^{-y/3} & y > 0 \\ 0 & \text{elsewhere} \end{cases}$$

- (a) If two such fuses have independent lengths of life,  $Y_1$  and  $Y_2$ , find the joint probability density function for  $Y_1$  and  $Y_2$ . (5%)
- (b) One fuse in (a) is in a primary system and the other is in a backup system that comes into use only if the primary system fails. The total effective length of life of the two fuses is then  $Y_1 + Y_2$ . Find  $P(Y_1 + Y_2 \leq 1)$ . (5%)

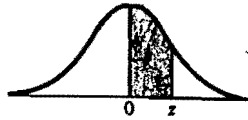


6. (a) 為了解製程中某一品質特性，從製程中抽取了 25 組樣組，每組取樣 5 個樣本，得到 25 組樣組的平均值為 31.0，標準差為 2.0。假設此品質特性值符合常態分配，若欲檢定此平均值是否等於目標值 30.0，請求出允許 0.27% 型一誤差 (type I error) 的臨界值 (critical value)。(10%)
- (b) 若此一品質特性值之標準差為 1.0，今再次取樣 5 個樣本，得到平均值為 31.0，請問在 1% 的型一誤差 (type I error) 下，檢定製程此時 (抽取此 5 個樣本時) 的品質特性值之平均值是否等於目標值 30.0？(15%)
7. 為了解原料成份對品質特性的影響，工程師針對原料中的一個成份，研究三種調配比例 A、B、C，經各自實驗五次的結果如下表，請問不同的調配比例是否會影響此品質特性值之平均值？假設前述資料符合變異數分析的各项假設， $\alpha=0.01$ 。(15%)

| 調配比例 | A    |      |      |      |      | B    |      |      |      |      | C    |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 平均值  | 30.5 | 30.7 | 30.9 | 31.1 | 30.2 | 29.8 | 30.4 | 29.9 | 30.3 | 30.6 | 31.1 | 31.0 | 31.2 | 31.2 | 30.9 |

8. 有關最近熱門的進口肉品的話題，某報導聲稱反對變更進口辦法的比率多過贊成的，因為根據其訪談 1000 人次的結果，有 382 人贊成變更進口的辦法，416 人不贊成，其餘的沒有意見。請以統計學的觀點，檢查此報導的立論是否合宜， $\alpha=0.05$ 。(10%)

TABLE 3 Normal Curve Areas



| z   | .00   | .01   | .02   | .03   | .04   | .05   | .06   | .07   | .08   | .09   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2517 | .2549 |
| 0.7 | .2580 | .2611 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |

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TABLE 4 Critical Values of t



| t <sub>.100</sub> | t <sub>.050</sub> | t <sub>.025</sub> | t <sub>.010</sub> | t <sub>.005</sub> | d.f. |
|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| 3.078             | 6.314             | 12.706            | 31.821            | 63.657            | 1    |
| 1.886             | 2.920             | 4.303             | 6.965             | 9.925             | 2    |
| 1.638             | 2.353             | 3.182             | 4.541             | 5.841             | 3    |
| 1.533             | 2.132             | 2.776             | 3.747             | 4.604             | 4    |
| 1.476             | 2.015             | 2.571             | 3.365             | 4.032             | 5    |
| 1.440             | 1.943             | 2.447             | 3.143             | 3.707             | 6    |
| 1.415             | 1.895             | 2.365             | 2.998             | 3.499             | 7    |
| 1.397             | 1.860             | 2.306             | 2.896             | 3.355             | 8    |
| 1.383             | 1.833             | 2.262             | 2.821             | 3.250             | 9    |
| 1.372             | 1.812             | 2.228             | 2.764             | 3.169             | 10   |
| 1.363             | 1.796             | 2.201             | 2.718             | 3.106             | 11   |
| 1.356             | 1.782             | 2.179             | 2.681             | 3.055             | 12   |
| 1.350             | 1.771             | 2.160             | 2.650             | 3.012             | 13   |
| 1.345             | 1.761             | 2.145             | 2.624             | 2.977             | 14   |
| 1.341             | 1.753             | 2.131             | 2.602             | 2.947             | 15   |
| 1.337             | 1.746             | 2.120             | 2.583             | 2.921             | 16   |
| 1.333             | 1.740             | 2.110             | 2.567             | 2.898             | 17   |
| 1.330             | 1.734             | 2.101             | 2.552             | 2.878             | 18   |
| 1.328             | 1.729             | 2.093             | 2.539             | 2.861             | 19   |
| 1.325             | 1.725             | 2.086             | 2.528             | 2.845             | 20   |
| 1.323             | 1.721             | 2.080             | 2.518             | 2.831             | 21   |
| 1.321             | 1.717             | 2.074             | 2.508             | 2.819             | 22   |
| 1.319             | 1.714             | 2.069             | 2.500             | 2.807             | 23   |
| 1.318             | 1.711             | 2.064             | 2.492             | 2.797             | 24   |
| 1.316             | 1.708             | 2.060             | 2.485             | 2.787             | 25   |
| 1.315             | 1.706             | 2.056             | 2.479             | 2.779             | 26   |
| 1.314             | 1.703             | 2.052             | 2.473             | 2.771             | 27   |
| 1.313             | 1.701             | 2.048             | 2.467             | 2.763             | 28   |
| 1.311             | 1.699             | 2.045             | 2.462             | 2.756             | 29   |
| 1.282             | 1.645             | 1.960             | 2.326             | 2.576             | inf. |

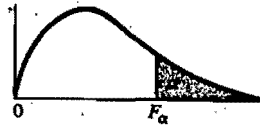
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國立雲林科技大學  
101 學年度碩士班暨碩士在職專班招生考試試題

系所：工管所、資管系  
科目：統計學(1)

TABLE 6 Percentage Points of the F Distribution:  $\alpha = .05$



| $v_2$ (d.f.) | $v_1$ (d.f.) |       |       |       |       |       |       |       |       |
|--------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|
|              | 1            | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| 1            | 161.4        | 199.5 | 215.7 | 224.6 | 230.2 | 234.0 | 236.8 | 238.9 | 240.5 |
| 2            | 18.51        | 19.00 | 19.16 | 19.25 | 19.30 | 19.33 | 19.35 | 19.37 | 19.38 |
| 3            | 10.13        | 9.55  | 9.28  | 9.12  | 9.01  | 8.94  | 8.89  | 8.85  | 8.81  |
| 4            | 7.71         | 6.94  | 6.59  | 6.39  | 6.26  | 6.16  | 6.09  | 6.04  | 6.00  |
| 5            | 6.61         | 5.79  | 5.41  | 5.19  | 5.05  | 4.95  | 4.88  | 4.82  | 4.77  |
| 6            | 5.99         | 5.14  | 4.76  | 4.53  | 4.39  | 4.28  | 4.21  | 4.15  | 4.10  |
| 7            | 5.59         | 4.74  | 4.35  | 4.12  | 3.97  | 3.87  | 3.79  | 3.73  | 3.68  |
| 8            | 5.32         | 4.46  | 4.07  | 3.84  | 3.69  | 3.58  | 3.50  | 3.44  | 3.39  |
| 9            | 5.12         | 4.26  | 3.86  | 3.63  | 3.48  | 3.37  | 3.29  | 3.23  | 3.18  |
| 10           | 4.96         | 4.10  | 3.71  | 3.48  | 3.33  | 3.22  | 3.14  | 3.07  | 3.02  |
| 11           | 4.84         | 3.98  | 3.59  | 3.36  | 3.20  | 3.09  | 3.01  | 2.95  | 2.90  |
| 12           | 4.75         | 3.89  | 3.49  | 3.26  | 3.11  | 3.00  | 2.91  | 2.85  | 2.80  |
| 13           | 4.67         | 3.81  | 3.41  | 3.18  | 3.03  | 2.92  | 2.83  | 2.77  | 2.71  |
| 14           | 4.60         | 3.74  | 3.34  | 3.11  | 2.96  | 2.85  | 2.76  | 2.70  | 2.65  |
| 15           | 4.54         | 3.68  | 3.29  | 3.06  | 2.90  | 2.79  | 2.71  | 2.64  | 2.59  |
| 16           | 4.49         | 3.63  | 3.24  | 3.01  | 2.85  | 2.74  | 2.66  | 2.59  | 2.54  |
| 17           | 4.45         | 3.59  | 3.20  | 2.96  | 2.81  | 2.70  | 2.61  | 2.55  | 2.49  |
| 18           | 4.41         | 3.55  | 3.16  | 2.93  | 2.77  | 2.66  | 2.58  | 2.51  | 2.46  |
| 19           | 4.38         | 3.52  | 3.13  | 2.90  | 2.74  | 2.63  | 2.54  | 2.48  | 2.42  |
| 20           | 4.35         | 3.49  | 3.10  | 2.87  | 2.71  | 2.60  | 2.51  | 2.45  | 2.39  |
| 21           | 4.32         | 3.47  | 3.07  | 2.84  | 2.68  | 2.57  | 2.49  | 2.42  | 2.37  |
| 22           | 4.30         | 3.44  | 3.05  | 2.82  | 2.66  | 2.55  | 2.46  | 2.40  | 2.34  |
| 23           | 4.28         | 3.42  | 3.03  | 2.80  | 2.64  | 2.53  | 2.44  | 2.37  | 2.32  |
| 24           | 4.26         | 3.40  | 3.01  | 2.78  | 2.62  | 2.51  | 2.42  | 2.36  | 2.30  |
| 25           | 4.24         | 3.39  | 2.99  | 2.76  | 2.60  | 2.49  | 2.40  | 2.34  | 2.28  |
| 26           | 4.23         | 3.37  | 2.98  | 2.74  | 2.59  | 2.47  | 2.39  | 2.32  | 2.27  |
| 27           | 4.21         | 3.35  | 2.96  | 2.73  | 2.57  | 2.46  | 2.37  | 2.31  | 2.25  |
| 28           | 4.20         | 3.34  | 2.95  | 2.71  | 2.56  | 2.45  | 2.36  | 2.29  | 2.24  |
| 29           | 4.18         | 3.33  | 2.93  | 2.70  | 2.55  | 2.43  | 2.35  | 2.28  | 2.22  |
| 30           | 4.17         | 3.32  | 2.92  | 2.69  | 2.53  | 2.42  | 2.33  | 2.27  | 2.21  |
| 40           | 4.08         | 3.23  | 2.84  | 2.61  | 2.45  | 2.34  | 2.25  | 2.18  | 2.12  |
| 60           | 4.00         | 3.15  | 2.76  | 2.53  | 2.37  | 2.25  | 2.17  | 2.10  | 2.04  |
| 120          | 3.92         | 3.07  | 2.68  | 2.45  | 2.29  | 2.17  | 2.09  | 2.02  | 1.96  |
| $\infty$     | 3.84         | 3.00  | 2.60  | 2.37  | 2.21  | 2.10  | 2.01  | 1.94  | 1.88  |

TABLE 6 (Continued)

| $v_2$ (d.f.) | $v_1$ (d.f.) |       |       |       |       |       |       |       |       |          |
|--------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
|              | 10           | 12    | 15    | 20    | 24    | 30    | 40    | 60    | 120   | $\infty$ |
| 1            | 241.9        | 243.9 | 245.9 | 248.0 | 249.1 | 250.1 | 251.1 | 252.2 | 253.3 | 254.3    |
| 2            | 19.40        | 19.41 | 19.43 | 19.45 | 19.45 | 19.46 | 19.47 | 19.48 | 19.49 | 19.50    |
| 3            | 8.79         | 8.74  | 8.70  | 8.66  | 8.64  | 8.62  | 8.59  | 8.57  | 8.55  | 8.53     |
| 4            | 5.96         | 5.91  | 5.86  | 5.80  | 5.77  | 5.75  | 5.72  | 5.69  | 5.66  | 5.63     |
| 5            | 4.74         | 4.68  | 4.62  | 4.56  | 4.53  | 4.50  | 4.46  | 4.43  | 4.40  | 4.36     |
| 6            | 4.06         | 4.00  | 3.94  | 3.87  | 3.84  | 3.81  | 3.77  | 3.74  | 3.70  | 3.67     |
| 7            | 3.64         | 3.57  | 3.51  | 3.44  | 3.41  | 3.38  | 3.34  | 3.30  | 3.27  | 3.23     |
| 8            | 3.35         | 3.28  | 3.22  | 3.15  | 3.12  | 3.08  | 3.04  | 3.01  | 2.97  | 2.93     |
| 9            | 3.14         | 3.07  | 3.01  | 2.94  | 2.90  | 2.86  | 2.83  | 2.79  | 2.75  | 2.71     |
| 10           | 2.98         | 2.91  | 2.85  | 2.77  | 2.74  | 2.70  | 2.66  | 2.62  | 2.58  | 2.54     |
| 11           | 2.85         | 2.79  | 2.72  | 2.65  | 2.61  | 2.57  | 2.53  | 2.49  | 2.45  | 2.40     |
| 12           | 2.75         | 2.69  | 2.62  | 2.54  | 2.51  | 2.47  | 2.43  | 2.38  | 2.34  | 2.30     |
| 13           | 2.67         | 2.60  | 2.53  | 2.46  | 2.42  | 2.38  | 2.34  | 2.30  | 2.25  | 2.21     |
| 14           | 2.60         | 2.53  | 2.46  | 2.39  | 2.35  | 2.31  | 2.27  | 2.22  | 2.18  | 2.13     |
| 15           | 2.54         | 2.48  | 2.40  | 2.33  | 2.29  | 2.25  | 2.20  | 2.16  | 2.11  | 2.07     |
| 16           | 2.49         | 2.42  | 2.35  | 2.28  | 2.24  | 2.19  | 2.15  | 2.11  | 2.06  | 2.01     |
| 17           | 2.45         | 2.38  | 2.31  | 2.23  | 2.19  | 2.15  | 2.10  | 2.06  | 2.01  | 1.96     |
| 18           | 2.41         | 2.34  | 2.27  | 2.19  | 2.15  | 2.11  | 2.06  | 2.02  | 1.97  | 1.92     |
| 19           | 2.38         | 2.31  | 2.23  | 2.16  | 2.11  | 2.07  | 2.03  | 1.98  | 1.93  | 1.88     |
| 20           | 2.35         | 2.28  | 2.20  | 2.12  | 2.08  | 2.04  | 1.99  | 1.95  | 1.90  | 1.84     |
| 21           | 2.32         | 2.25  | 2.18  | 2.10  | 2.05  | 2.01  | 1.96  | 1.92  | 1.87  | 1.81     |
| 22           | 2.30         | 2.23  | 2.15  | 2.07  | 2.03  | 1.98  | 1.94  | 1.89  | 1.84  | 1.78     |
| 23           | 2.27         | 2.20  | 2.13  | 2.05  | 2.01  | 1.96  | 1.91  | 1.86  | 1.81  | 1.76     |
| 24           | 2.25         | 2.18  | 2.11  | 2.03  | 1.98  | 1.94  | 1.89  | 1.84  | 1.79  | 1.73     |
| 25           | 2.24         | 2.16  | 2.09  | 2.01  | 1.96  | 1.92  | 1.87  | 1.82  | 1.77  | 1.71     |
| 26           | 2.22         | 2.15  | 2.07  | 1.99  | 1.95  | 1.90  | 1.85  | 1.80  | 1.75  | 1.69     |
| 27           | 2.20         | 2.13  | 2.06  | 1.97  | 1.93  | 1.88  | 1.84  | 1.79  | 1.73  | 1.67     |
| 28           | 2.19         | 2.12  | 2.04  | 1.96  | 1.91  | 1.87  | 1.82  | 1.77  | 1.71  | 1.65     |
| 29           | 2.18         | 2.10  | 2.03  | 1.94  | 1.90  | 1.85  | 1.81  | 1.75  | 1.70  | 1.64     |
| 30           | 2.16         | 2.09  | 2.01  | 1.93  | 1.89  | 1.84  | 1.79  | 1.74  | 1.68  | 1.62     |
| 40           | 2.08         | 2.00  | 1.92  | 1.84  | 1.79  | 1.74  | 1.69  | 1.64  | 1.58  | 1.51     |
| 60           | 1.99         | 1.92  | 1.84  | 1.75  | 1.70  | 1.65  | 1.59  | 1.53  | 1.47  | 1.39     |
| 120          | 1.91         | 1.83  | 1.75  | 1.66  | 1.61  | 1.55  | 1.50  | 1.43  | 1.35  | 1.25     |
| $\infty$     | 1.83         | 1.75  | 1.67  | 1.57  | 1.52  | 1.46  | 1.39  | 1.32  | 1.22  | 1.00     |

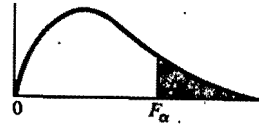
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101 學年度碩士班暨碩士在職專班招生考試試題

系所：工管所、資管系  
科目：統計學(1)

TABLE 7 Percentage Points of the F Distribution;  $\alpha = .01$



| $v_2$ (d.f.) | $v_1$ (d.f.) |        |       |       |       |       |       |       |       |
|--------------|--------------|--------|-------|-------|-------|-------|-------|-------|-------|
|              | 1            | 2      | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
| 1            | 4052         | 4999.5 | 5403  | 5625  | 5764  | 5859  | 5928  | 5982  | 6022  |
| 2            | 98.50        | 99.00  | 99.17 | 99.25 | 99.30 | 99.33 | 99.36 | 99.37 | 99.39 |
| 3            | 34.12        | 30.82  | 29.46 | 28.71 | 28.24 | 27.91 | 27.67 | 27.49 | 27.35 |
| 4            | 21.20        | 18.00  | 16.69 | 15.98 | 15.52 | 15.21 | 14.98 | 14.80 | 14.66 |
| 5            | 16.26        | 13.27  | 12.06 | 11.39 | 10.97 | 10.67 | 10.46 | 10.29 | 10.16 |
| 6            | 13.75        | 10.92  | 9.78  | 9.15  | 8.75  | 8.47  | 8.26  | 8.10  | 7.98  |
| 7            | 12.25        | 9.55   | 8.45  | 7.85  | 7.46  | 7.19  | 6.99  | 6.84  | 6.72  |
| 8            | 11.26        | 8.65   | 7.59  | 7.01  | 6.63  | 6.37  | 6.18  | 6.03  | 5.91  |
| 9            | 10.56        | 8.02   | 6.99  | 6.42  | 6.06  | 5.80  | 5.61  | 5.47  | 5.35  |
| 10           | 10.04        | 7.56   | 6.55  | 5.99  | 5.64  | 5.39  | 5.20  | 5.06  | 4.94  |
| 11           | 9.65         | 7.21   | 6.22  | 5.67  | 5.32  | 5.07  | 4.89  | 4.74  | 4.63  |
| 12           | 9.33         | 6.93   | 5.95  | 5.41  | 5.06  | 4.82  | 4.64  | 4.50  | 4.39  |
| 13           | 9.07         | 6.70   | 5.74  | 5.21  | 4.86  | 4.62  | 4.44  | 4.30  | 4.19  |
| 14           | 8.86         | 6.51   | 5.56  | 5.04  | 4.69  | 4.46  | 4.28  | 4.14  | 4.03  |
| 15           | 8.68         | 6.36   | 5.42  | 4.89  | 4.56  | 4.32  | 4.14  | 4.00  | 3.89  |
| 16           | 8.53         | 6.23   | 5.29  | 4.77  | 4.44  | 4.20  | 4.03  | 3.89  | 3.78  |
| 17           | 8.40         | 6.11   | 5.18  | 4.67  | 4.34  | 4.10  | 3.93  | 3.79  | 3.68  |
| 18           | 8.29         | 6.01   | 5.09  | 4.58  | 4.25  | 4.01  | 3.84  | 3.71  | 3.60  |
| 19           | 8.18         | 5.93   | 5.01  | 4.50  | 4.17  | 3.94  | 3.77  | 3.63  | 3.52  |
| 20           | 8.10         | 5.85   | 4.94  | 4.43  | 4.10  | 3.87  | 3.70  | 3.56  | 3.46  |
| 21           | 8.02         | 5.78   | 4.87  | 4.37  | 4.04  | 3.81  | 3.64  | 3.51  | 3.40  |
| 22           | 7.95         | 5.72   | 4.82  | 4.31  | 3.99  | 3.76  | 3.59  | 3.45  | 3.35  |
| 23           | 7.88         | 5.66   | 4.76  | 4.26  | 3.94  | 3.71  | 3.54  | 3.41  | 3.30  |
| 24           | 7.82         | 5.61   | 4.72  | 4.22  | 3.90  | 3.67  | 3.50  | 3.36  | 3.26  |
| 25           | 7.77         | 5.57   | 4.68  | 4.18  | 3.85  | 3.63  | 3.46  | 3.32  | 3.22  |
| 26           | 7.72         | 5.53   | 4.64  | 4.14  | 3.82  | 3.59  | 3.42  | 3.29  | 3.18  |
| 27           | 7.68         | 5.49   | 4.60  | 4.11  | 3.78  | 3.56  | 3.39  | 3.26  | 3.15  |
| 28           | 7.64         | 5.45   | 4.57  | 4.07  | 3.75  | 3.53  | 3.36  | 3.23  | 3.12  |
| 29           | 7.60         | 5.42   | 4.54  | 4.04  | 3.73  | 3.50  | 3.33  | 3.20  | 3.09  |
| 30           | 7.56         | 5.39   | 4.51  | 4.02  | 3.70  | 3.47  | 3.30  | 3.17  | 3.07  |
| 40           | 7.31         | 5.18   | 4.31  | 3.83  | 3.51  | 3.29  | 3.12  | 2.99  | 2.89  |
| 60           | 7.08         | 4.98   | 4.13  | 3.65  | 3.34  | 3.12  | 2.95  | 2.82  | 2.72  |
| 120          | 6.85         | 4.79   | 3.95  | 3.48  | 3.17  | 2.96  | 2.79  | 2.66  | 2.56  |
| $\infty$     | 6.63         | 4.61   | 3.78  | 3.32  | 3.02  | 2.80  | 2.64  | 2.51  | 2.41  |

TABLE 7 (Continued)

| $v_2$ (d.) | $v_1$ (d.f.) |       |       |       |       |       |       |       |       |          |
|------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
|            | 10           | 12    | 15    | 20    | 24    | 30    | 40    | 60    | 120   | $\infty$ |
| 6056       | 99.40        | 99.42 | 99.43 | 99.45 | 99.46 | 99.47 | 99.47 | 99.48 | 99.49 | 99.50    |
| 6106       | 27.23        | 27.05 | 26.87 | 26.69 | 26.60 | 26.50 | 26.41 | 26.32 | 26.22 | 26.13    |
| 6157       | 14.55        | 14.37 | 14.20 | 14.02 | 13.93 | 13.84 | 13.75 | 13.65 | 13.56 | 13.46    |
| 6209       | 10.05        | 9.89  | 9.72  | 9.55  | 9.47  | 9.38  | 9.29  | 9.20  | 9.11  | 9.02     |
| 6235       | 7.87         | 7.72  | 7.56  | 7.40  | 7.31  | 7.23  | 7.14  | 7.06  | 6.97  | 6.88     |
| 6261       | 6.62         | 6.47  | 6.31  | 6.16  | 6.07  | 5.99  | 5.91  | 5.82  | 5.74  | 5.65     |
| 6287       | 5.81         | 5.67  | 5.52  | 5.36  | 5.28  | 5.20  | 5.12  | 5.03  | 4.95  | 4.86     |
| 6313       | 5.26         | 5.11  | 4.96  | 4.81  | 4.73  | 4.65  | 4.57  | 4.48  | 4.40  | 4.31     |
| 6339       | 4.85         | 4.71  | 4.56  | 4.41  | 4.33  | 4.25  | 4.17  | 4.08  | 4.00  | 3.91     |
| 6366       | 4.54         | 4.40  | 4.25  | 4.10  | 4.02  | 3.94  | 3.86  | 3.78  | 3.69  | 3.60     |
| 1          | 4.30         | 4.16  | 4.01  | 3.86  | 3.78  | 3.70  | 3.62  | 3.54  | 3.45  | 3.36     |
| 2          | 4.10         | 3.96  | 3.82  | 3.66  | 3.59  | 3.51  | 3.43  | 3.34  | 3.25  | 3.17     |
| 3          | 3.94         | 3.80  | 3.66  | 3.51  | 3.43  | 3.35  | 3.27  | 3.18  | 3.09  | 3.00     |
| 4          | 3.80         | 3.67  | 3.52  | 3.37  | 3.29  | 3.21  | 3.13  | 3.05  | 2.96  | 2.87     |
| 5          | 3.69         | 3.55  | 3.41  | 3.26  | 3.18  | 3.10  | 3.02  | 2.93  | 2.84  | 2.75     |
| 6          | 3.59         | 3.46  | 3.31  | 3.16  | 3.08  | 3.00  | 2.92  | 2.83  | 2.75  | 2.65     |
| 7          | 3.51         | 3.37  | 3.23  | 3.08  | 3.00  | 2.92  | 2.84  | 2.75  | 2.66  | 2.57     |
| 8          | 3.43         | 3.30  | 3.15  | 3.00  | 2.92  | 2.84  | 2.76  | 2.67  | 2.58  | 2.49     |
| 9          | 3.37         | 3.23  | 3.09  | 2.94  | 2.86  | 2.78  | 2.69  | 2.61  | 2.52  | 2.42     |
| 10         | 3.31         | 3.17  | 3.03  | 2.88  | 2.80  | 2.72  | 2.64  | 2.55  | 2.46  | 2.36     |
| 11         | 3.26         | 3.12  | 2.98  | 2.83  | 2.75  | 2.67  | 2.58  | 2.50  | 2.40  | 2.31     |
| 12         | 3.21         | 3.07  | 2.93  | 2.78  | 2.70  | 2.62  | 2.54  | 2.45  | 2.35  | 2.26     |
| 13         | 3.17         | 3.03  | 2.89  | 2.74  | 2.66  | 2.58  | 2.49  | 2.40  | 2.31  | 2.21     |
| 14         | 3.13         | 2.99  | 2.85  | 2.70  | 2.62  | 2.54  | 2.45  | 2.36  | 2.27  | 2.17     |
| 15         | 3.09         | 2.96  | 2.81  | 2.66  | 2.58  | 2.50  | 2.42  | 2.33  | 2.23  | 2.13     |
| 16         | 3.06         | 2.93  | 2.78  | 2.63  | 2.55  | 2.47  | 2.38  | 2.29  | 2.20  | 2.10     |
| 17         | 3.03         | 2.90  | 2.75  | 2.60  | 2.52  | 2.44  | 2.35  | 2.26  | 2.17  | 2.06     |
| 18         | 3.00         | 2.87  | 2.73  | 2.57  | 2.49  | 2.41  | 2.33  | 2.23  | 2.14  | 2.03     |
| 19         | 2.98         | 2.84  | 2.70  | 2.55  | 2.47  | 2.39  | 2.30  | 2.21  | 2.11  | 2.01     |
| 20         | 2.80         | 2.66  | 2.52  | 2.37  | 2.29  | 2.20  | 2.11  | 2.02  | 1.92  | 1.80     |
| 21         | 2.63         | 2.50  | 2.35  | 2.20  | 2.12  | 2.03  | 1.94  | 1.84  | 1.73  | 1.60     |
| 22         | 2.47         | 2.34  | 2.19  | 2.03  | 1.95  | 1.86  | 1.76  | 1.66  | 1.53  | 1.38     |
| 23         | 2.32         | 2.18  | 2.04  | 1.88  | 1.79  | 1.70  | 1.59  | 1.47  | 1.32  | 1.00     |
| 24         |              |       |       |       |       |       |       |       |       |          |
| 25         |              |       |       |       |       |       |       |       |       |          |
| 26         |              |       |       |       |       |       |       |       |       |          |
| 27         |              |       |       |       |       |       |       |       |       |          |
| 28         |              |       |       |       |       |       |       |       |       |          |
| 29         |              |       |       |       |       |       |       |       |       |          |
| 30         |              |       |       |       |       |       |       |       |       |          |
| 40         |              |       |       |       |       |       |       |       |       |          |
| 60         |              |       |       |       |       |       |       |       |       |          |
| 120        |              |       |       |       |       |       |       |       |       |          |
| $\infty$   |              |       |       |       |       |       |       |       |       |          |

From "Tables of Percentage Points of the Inverted Beta (F) Distribution," *Biometrika*, Vol. 33 (1946) pp. 73-88, by Maxine Merrington and Catherine M. Thompson. Reproduced by permission of Prof. E. S. Pearson.



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101 學年度碩士班暨碩士在職專班招生考試試題

系所：工管所、資管系  
科目：統計學(1)