

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：英文【資管系碩士班甲組、乙組、丙組】

題號：442003

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 4 頁第 1 頁

This exam consists of 50 tasks; maximally 2 points per good answer. All tasks require you to write words or sentences on your exam paper. Write clearly: illegible writing will be counted as a wrong answer.

Instructions: for phrases 1 to 5, write down the verb from the box that fits best.

dwell	corroborate	press	relieve	do
-------	-------------	-------	---------	----

1. to ___ charges
2. to ___ on misfortune
3. to ___ harm
4. to ___ poverty
5. to ___ a statement

Instructions: for phrases 6-10, write down the preposition from the box that fits best.

from	in	of	on	to
------	----	----	----	----

6. to help someone ___ several ways
7. to admit ___ many wrongdoings
8. people ___ different walks of life
9. to walk ___ a slippery surface
10. to ask advice ___ your parents

Instructions: for expression 11-15, write down the noun from the box that fits best.

a notion	a balance	a meeting	the cause	an engine
----------	-----------	-----------	-----------	-----------

11. to facilitate ___
12. to determine ___
13. to overhaul ___
14. to popularize ___

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共 4 頁第 2 頁

15. to strike _____

Instructions: Match the words in the box with the words 16-20 that come closest in meaning.

contrite	spare	obvious	shabby	despite
----------	-------	---------	--------	---------

16. contemptible

17. extra

18. penitent

19. notwithstanding

20. clear

Instructions: for sentences 21-25, write down the word in parentheses that best completes the sentence.

21. It is _____ (farther / more far) to fly from here to Dubai than to Bangkok.

22. Kareem pursued Rosa for 7 years. _____ (Eventually / Although), in 2014, he married her.

23. She really has turned into quite a _____ (scholar / scholarly) with many well-received articles on the economics of poverty to her name.

24. Why is it that in China there are _____ (fewer / less) women than men?

25. Have you _____ (once / ever) forgotten a password for a website or a bank account?

Instructions: rewrite the following sentences, 26 to 35, correcting any errors in spelling, grammar, or punctuation that you find.

26. The top three students in the class is going to receive awards

27. I find it curiously that Greta and John always sits together in class.

28. Who are going to cook dinner for me tonight

29. What you are doing since breakfast?

30. Edward' s hobby of fixing up old cars makes him neglecting his girlfriends Janice.

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

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共 4 頁第 3 頁

31. After the theft of his wife' s, Conrad take better care for his own cellphone.

32. The gangsters never admitted his guilty.

33. The woman which car collided with a truck was miraculous unharmed.

34. Their is no real different between the political parties.

35. That is me sister, standing there in the photograph next of my father.

Instructions: Read sentences 36 to 45, paying close attention to the underlined words. If the word is correct, write "Correct" on your exam sheet. If the word form is not correct, write the correct form. Do not add extra words.

36. For most workers, commute from work to home and back is a joyless waste of time.

37. But Iain Gately, in his book *Rush Hour*, argues, vivid, that the daily commute is an opportunity.

38. Commuters can live in pleasant suburbs, and listen to the radio on their way to the city where they work.

39. Commuters who travel by train can catch up on sleep, reading a paper, or check email on their phones.

40. And a commute can also be exercise for those who cycle to work instead of driving there.

41. But commuting can be horrible too, with overcrowding trains and jammed highways.

42. There are predicts that the daily commute will become a thing of the past.

43. This because more and more people will work from home at last for some of the time.

44. In addition, many offices will require fewer workers because of the automatization of many tasks.

45. That will be a problem in itself, and there might come a time that workers wished they still had a commute.

Instructions: Read each sentence 46-50. If the underlined part is correct for the given sentence, write "Correct" on your exam sheet. If the underlined part is incorrect, write down the corrected form.

46. On Saturdays, Frances gets up early to do laundry and cleaning her room.

47. A spirited debater, Dennis usually gets the better of his opponents.

48. Exhausted by a four-hour hike in the summer heat, a car luckily gave us a lift.

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

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共 4 頁第 4 頁

49. After what he did to me that night, I have never been able to trust him again.

50. To me, a good breakfast consists of fresh bread, an egg or two, some good jam, and drinking two cups of coffee with milk and sugar.

End of the English exam

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：管理資訊系統【資管系碩士班甲組、乙組】

題號：442005

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 1 頁第 1 頁

1. 資訊管理人員是個跨領域的人才，就你認為一個優秀的資訊管理人員應該具備哪些核心知識？應該具備哪些核心能力？為什麼？(25%)
2. 在數位經濟時代，消費者會發現許多資訊產品與服務都是免費的，例如：Gmail、Google earth、Facebook、YouTube、Wikipedia 以及許多免費的 APP，請問這種所謂的免費經濟學 (Economics of Free) 其背後的主要原因是什麼？而提供這些免費服務的公司他們的收益模式又是什麼？(25%)
3. 張忠謀曾在 2014 年說 Internet of Things (IOT) 是 "The next big thing"，請問 (25%)
 - (1) IOT 在 1990 年代就已提出，為何在 2014 年才逐漸被重視？請舉出最重要的幾個原因。(10%)
 - (2) 試著舉出三種 IOT 可能的應用領域。(10%)
 - (3) 有人說 IOT 與 Big Data 之間密不可分，試分析之？(5%)
4. Crowdfunding 是目前相當盛行的資金募集管道之一，請問 (25%)
 - (1) 何謂 Crowdfunding？試舉國內外各一例說明其運作方式。(10%)
 - (2) "all or nothing" 是常用的策略之一，請說明這個策略的內涵並分析利弊。(5%)
 - (3) 試分析 Crowdfunding 專案的成功關鍵因素為何？(10%)

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：計算機概論【資管系碩士班甲組、丙組】

題號：442001

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁第 1 頁

單選題 (60%)

1. The term _____, although originally a complimentary word for a computer enthusiast, now has a derogatory meaning and refers to someone who accesses a computer or network illegally.
 - A. sucker
 - B. spammer
 - C. pirate
 - D. hacker
 - E. cracker
2. The _____ is the main circuit board of the computer.
 - A. motherboard
 - B. chassis
 - C. control unit
 - D. processor
 - E. USB
3. Buses consist of a data bus and a(n) _____ bus.
 - A. address
 - B. analog
 - C. digital
 - D. memory
 - E. system
4. Suppose you would like to SQL command to revoke a table definition. Which of the following statement should you use?
 - A. REVOKE TABLE
 - B. DELETE TABLE
 - C. REMOVE TABLE
 - D. DROP TABLE
 - E. ELIMINATE TABLE
5. Which of the following descriptions about relational database model is correct?
 - A. There is an order on the tuples of a relation.
 - B. Each tuple in a relation must be unique.
 - C. Each attribute in a relation schema may be multi-valued.
 - D. Each attribute in a relation schema may be composite.
 - E. None of the above is correct.
6. Which of the following does not belong to 3-tier software architecture?
 - A. Presentation tier
 - B. Business logic tier
 - C. Data service tier
 - D. Physical tier

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

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※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁第 2 頁

7. Consider 8-bit integers. Which of the following is the binary representation of “-5”, when using 2’s complement?
- A. 10000101
 - B. 10000110
 - C. 1111010
 - D. 1111011
 - E. 1111001
8. Which of the following is the result of $0x2a8f \oplus 0xa94e$, where \oplus indicates “exclusive or” ?
- A. 0x83c1
 - B. 0x280e
 - C. 0xabcf
 - D. 0xd3dd
 - E. 0x2a8f
9. Which of the following is the result of $0x2a8f + 0xa94e$, where + indicates “addition”?
- A. 0x83c1
 - B. 0x280e
 - C. 0xabcf
 - D. 0xd3dd
 - E. 0x2a8f
10. Flash memory chips are a type of _____, which means they consist entirely of electronic components, such as integrated circuits, and contain no moving parts.
- A. fixed disks
 - B. redundant array of independent disks
 - C. floppy disk
 - D. solid-state media
 - E. external hard drives
11. What is the remainder of $2^{100}/10$?
- A. 0
 - B. 2
 - C. 4
 - D. 6
 - E. 8
12. Which of the following Operating Systems requires more than one core?
- A. Real-time
 - B. Multiprogramming
 - C. Time-sharing
 - D. Virtual machine
 - E. None of the above

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：計算機概論【資管系碩士班甲組、丙組】

題號：442001

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁第 3 頁

13. What is the subnet mask of a Class B with maximum of 32 subnets?
- A. 255.255.248.0
 - B. 255.255.252.0
 - C. 255.255.255.0
 - D. 255.255.255.128
 - E. None of the above
14. Which of the following statements is false?
- A. Each I/O device has a device controller and needs a device driver to interact with operating system.
 - B. Semaphore is used to do concurrency control between different processes.
 - C. I/O devices use a routing mechanism to signal the operating system upon the occurrence of an event.
 - D. When thrashing occurs, the operating system will reduce the degree of multiprogramming.
 - E. None of the above.
15. Which of the following statements is false?
- A. Both TCP and UDP provide services to higher layer protocols.
 - B. Multiple higher layer protocols can be multiplexed onto a single UDP or TCP layer.
 - C. Each of these higher layer protocols are then differentiated by means of port numbers.
 - D. Port numbers can be pre-defined by network administrators and are therefore referred to as "well known ports".
 - E. None of the above.
16. Which of the following statements is false?
- A. Routers with at least one interface in the backbone area are called Backbone Routers
 - B. Routers with interfaces within this network but with at least one interface to another administration's network are called Boundary Routers.
 - C. Routers within the networks of large organizations often learn about connectivity using link-state protocols, such as SNMP.
 - D. Packet forwarding is the task of dealing with moving individual packets.
 - E. None of the above.
17. Which of the following statements is false?
- A. HTTP is a push protocol; the server pushes information to the client.
 - B. HTTP is a stateless protocol. In other words, the current request does not know what has been done in the previous requests.
 - C. HTTP allows systems to be built independently of the data being transferred.
 - D. A URL is used to uniquely identify a resource over the web
 - E. None of the above.

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：計算機概論【資管系碩士班甲組、丙組】

題號：442001

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁第 4 頁

18. A high-speed network is capable of transmitting 100Mbits per second. Consider a video file of 300 Gbytes. How long does it take to transmit the file without considering the overhead?
- A. 300 seconds
 - B. 3000 seconds
 - C. 2400 minutes
 - D. 400 minutes
 - E. None of the above.
19. The execution time of J1, J2, and J3 is 24, 3, and 3, respectively. Assume the arrival order of these three jobs is J1, J2, and J3 and their arrival time is the same. What is the average turnaround time if the First-come-first-served scheduling policy is used?
- A. 13
 - B. 25
 - C. 27
 - D. 10
 - E. None of the above.
20. Which of the following statements is false?
- A. Deadlock will not happen if all the resources are preemptive.
 - B. Resource allocation graph is used to represent the system state.
 - C. A circle in a resource allocation graph means deadlock.
 - D. Deadlock will slow down the system performance.
 - E. None of the above.

問答題 (40%)

1. Consider the following C function: (10%)

```
int f(double x, double n)
{
    if (n <= 1) /* 測試 n 是否小於等於 1 */
        {print( "error\n" ); exit;} /* 錯誤，程式結束 */
    if (x < n) /* 測試 x 是否小於 n */
        return 0;
    x = x / n;
    return (f(x, n)+1);
}
```

- A. What is $f(8.5, 2.0)$?
 - B. Give the mathematical function of $f(x, n)$.
2. Consider the following CPU: (10%)
- Intel E5620 Xeon CPUs at 2.4 GHz,
- Besides, there are three levels of cache, and their performances are as follows:
- L1 Cache hit: 6 cycles
 - L2 Cache hit: 24 cycles

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

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題號：442001

※本科目依簡章規定「不可以」使用計算機(混合題)

共 5 頁 第 5 頁

- L3 Cache hit: 96 cycles
- Memory: 384 cycles

The probabilities of various cache hits are as follows:

- L1 Cache hit: 60%
- L2 Cache hit: 70%
- L3 Cache hit: 80%

Note that L1 is first checked for a memory access. L2 cache is checked only when L1 cache is missed, L3 cache is checked only when L2 cache is missed. When all three caches are missed, memory access is conducted. What is the average time for a memory access? Please show how you compute it.

3. Assuming a physical memory of four pages, give the number of page faults for the reference string *abgabdecabadecgde* for each of the following policies. (Initially, all frames are empty.) (10%)
- A. Optimal page replacement
 - B. LRU
4. For each of the following applications, determine whether you would use TCP or UDP and explain why. (10%)
- A. File transfer
 - B. Video streaming
 - C. Tele-conference
 - D. DNS query
 - E. Online game

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：統計學【資管系碩士班乙組】

題號：442002

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 2 頁第 1 頁

請依照題號書寫答案，並標示清楚題號。下列表格為機率分佈之變數與機率值。最後答案請計算至小數點第二位。

α	.01	0.025	0.05
z_α	2.33	1.96	1.645
$t_\alpha(11)$	3.11	2.59	2.20
$t_\alpha(14)$	2.98	2.51	2.14
$t_\alpha(25)$	2.79	2.38	2.06
$t_\alpha(27)$	2.77	2.37	2.05
$\chi_\alpha^2(1)$	6.63	5.02	3.84
$\chi_\alpha^2(2)$	9.21	7.38	5.99
$\chi_\alpha^2(3)$	11.34	9.35	7.81
$\chi_\alpha^2(4)$	13.28	11.14	9.49
$F_\alpha(3,12)$	5.95	4.47	3.49
$F_\alpha(4,12)$	5.41	4.12	3.26

Note: $\alpha = P(z > z_\alpha)$

1. On average, one email comes in every 5 minutes for a customer service account. It is known that the number of emails follows the Poisson distribution. What is the probability that no more than 2 emails in 10 minutes? (15 分)
2. A consumer group wants to estimate the proportion of university students that have part-time jobs. Within the error of 3% with 90% confidence, how large the sample size is required? (15 分)
3. A particular brand of cookies comes in three different favors. Let $A_1 = \{\text{vanilla}\}$, $A_2 = \{\text{chocolate}\}$, $A_3 = \{\text{berry}\}$. Let p_i equal the probability that the favor of a piece of cookie selected at random belongs to A_i , $i = 1, 2, 3$. Given the significance level 0.05, test the null hypothesis

$$H_0 : p_1 = 0.4, \quad p_2 = 0.4, \quad p_3 = 0.2$$
 using a random sample of $n = 480$ pieces of cookies whose favors yield the respective frequencies 212, 198, and 70. At the 0.05 level of significance, is there evidence to reject the null hypothesis? (20 分)
4. Independent random samples of the heights of adult males and females yielded the following results:

Males: $n = 15$, $\bar{x} = 175$ cm, $s_x = 6$ cm;

Females: $m = 12$, $\bar{y} = 160$ cm, $s_y = 5$ cm.

 At the 0.05 level of significance, is there evidence to reject the null hypothesis $H_0 : \mu_x \geq \mu_y$? (20 分)
5. An advertising agency plans to test the effect of social media advertising on product perception. An experiment is designed to compare four different social media advertisements, A, B, C, D, each with different advertising approaches. The agency asks for 5 students to watch through all four advertisements and then rate each of them with ranges from 1 to 10. The scores for the 5 students are as follows. Give the

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：統計學【資管系碩士班乙組】

題號：442002

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 2 頁第 2 頁

significance level of 0.05,

		Internet Advertisements			
		A	B	C	D
Students	1	7	9	5	3
	2	6	8	4	4
	3	8	9	5	3
	4	5	7	5	2
	5	6	10	7	1

- Is there evidence of a difference among the internet advertisements? (15 分)
- Does the blocking have a significant effect in reducing the random error? (15 分)

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

科目名稱：資料結構【資管系碩士班丙組】

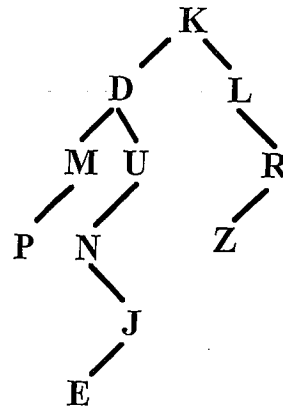
題號：442004

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 2 頁 第 1 頁

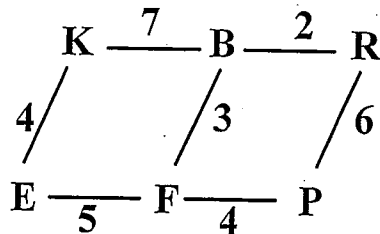
1. Given a list of input data: 12, 2, 6, 7, 9, 5, 17, 7, 1, 56, 33, 6, 25, 3, 24
- (3%) Construct a Binary Search Tree.
 - (4%) Construct a B tree (of order 2).
 - (3%) Why is B tree better than Binary Search Tree? Please list the reasons.

2. Given the following tree T, please visit nodes in T with three traversal methods.
- (4%) What is the POSTORDER traversal of T?
 - (4%) What is the INORDER traversal of T?
 - (4%) What is the Depth First Search (DFS) of T?



3. Given a list of input data: 12, 3, 4, 2, 8, 24, 9
- (4%) Perform Quick Sort (partition sort) step by step and provide its complexity.
 - (4%) Perform Heap Sort step by step and provide its complexity.

4. In the following graph, nodes are represented as alphabets and links contain costs.
- (4%) Please perform a branch-and-bound search to find the optimal (minimum) path from R to E. Please draw a tree to show your process.
 - (4%) Can you perform a best first search on the above graph? Why?
 - (4%) What are the similarities and differences between genetic algorithms and hill climbing?



5. In the following graph, nodes are represented as alphabets and links contain costs.

國立中山大學 104 學年度碩士暨碩士專班招生考試試題

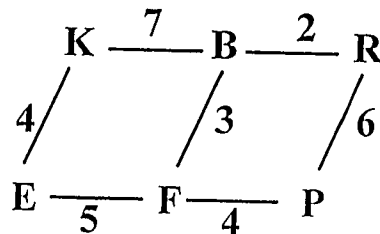
科目名稱：資料結構【資管系碩士班丙組】

題號：442004

※本科目依簡章規定「不可以」使用計算機(問答申論題)

共 2 頁第 2 頁

- A. (4%) Please use the Prim's algorithm to develop a minimal spanning tree and a dendrogram, respectively. You should show the process.
- B. (4%) Please use the Kruskal's algorithm to develop a minimal spanning tree and a dendrogram, respectively. You should show the process.



6. (8%) Write a procedure to determine whether two linked lists A and B are identical.
7. (8%) Write a recursive algorithm to duplicate a binary tree T.
8. (5%) Is the linear array a suitable data structure for a queue? Why?
9. For a graph $G = (V, E)$, $V = \{0, 1, 2, 3, 4, 5, 6, 7\}$, $E = \{(0, 1), (0, 2), (0, 7), (1, 2), (2, 3), (2, 7), (3, 4), (3, 5), (3, 7), (4, 5), (5, 6), (6, 7)\}$, and the cost for above edges are $\{13, 16, 27, 11, 20, 22, 19, 18, 29, 15, 26, 11\}$, respectively.
- A. (8%) Use a Depth First Search-based and a Breadth First Search-based algorithm to determine the minimal spanning tree.
- B. (7%) How do you detect a cycle in a MST algorithm?
10. A. (7%) Write a recursive program to calculate the n -th number of the Fibonacci sequence ($F_n = F_{n-1} + F_{n-2}$, with the seed values $F_0 = 1$ and $F_1 = 1$)
- B. (7%) Write a non-recursive program to solve the above problem.