

國立中正大學九十七學年度學士班二年級轉學生招生考試試題

數學系、地球與環境科學系、物理學系

學系別：化學暨生物化學系、資訊工程學系、電機工程學系

科目：微積分

機械工程學系、通訊工程學系、經濟學系

第 1 節

第 1 頁，共 2 頁

CALCULUS

PART I (70%) - FILL IN THE BLANKS

7% each blank. NO partial credits.

- (1) Let  $f(x) = x^5 + 3x + 1$ , then  $(f^{-1})'(5) = \underline{\hspace{2cm}}$ .
- (2) Let  $C(x) = \int_0^x \sin^2 t \, dt$ . Then  $\lim_{x \rightarrow 0} C(x)/x^3 = \underline{\hspace{2cm}}$ . (Answer "None" if the limit does not exist.)
- (3)  $\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1}{\sqrt{n^2+ni}} = \underline{\hspace{2cm}}$ . (Answer "None" if the limit does not exist.)
- (4) Determine whether the integral converges. Then  $\int_1^{\infty} \frac{(x+1)\ln x}{x^3} dx \underline{\hspace{2cm}}$ . (Answer "Converges" if the integral does exist and "Diverges" if the integral does not exist.)
- (5) The convergent set (interval of convergence) for  $\sum_{k=1}^{\infty} \frac{x^k}{(k+1)2^k}$  is  $\underline{\hspace{2cm}}$ .
- (6) Let
$$f(x,y) = \begin{cases} \frac{xy}{x^2+y^2}, & (x,y) \neq (0,0) \\ 0, & (x,y) = (0,0). \end{cases}$$
Then the gradient  $\nabla f(0,0) = \underline{\hspace{2cm}}$  and  $\lim_{(x,y) \rightarrow (0,0)} f(x,y) = \underline{\hspace{2cm}}$ . (Answer "None" if the limit does not exist.)
- (7) The tangent plane to  $z = x^2 + y^2$  at  $(1, 1, 2)$  is  $\underline{\hspace{2cm}}$ .
- (8)  $\int_0^{\infty} e^{-x^2} dx = \underline{\hspace{2cm}}$ .
- (9) Let  $\Omega$  be region in the first-quadrant bounded by  $x^2 + y^2 = 4$ ,  $x^2 + y^2 = 9$ ,  $x^2 - y^2 = 1$  and  $x^2 - y^2 = 4$ . Then  $\int \int_{\Omega} xy dx dy = \underline{\hspace{2cm}}$ .

國立中正大學九十七學年度學士班二年級轉學生招生考試試題

數學系、地球與環境科學系、物理學系

學系別：化學暨生物化學系、資訊工程學系、電機工程學系

科目：微積分

機械工程學系、通訊工程學系、經濟學系

---

第 1 節

第 2 頁，共 2 頁

PART II (30%) - COMPUTATIONAL PROBLEMS

Show all your work. NO CREDITS if only present answers.

- (1) Let  $f(x, y) = x^2 + y^2 - 2x - 2y + 4$  on  $D = \{(x, y) : x^2 + y^2 \leq 25\}$ . Find the absolute extreme values. (10 points)
- (2) Find  $\lim_{x \rightarrow 0} x \cdot \left[\frac{1}{x}\right]$ , where the greatest integer function,  $[x]$ , is defined by the greatest integer less than or equal to  $x$ . (10 points)
- (3) Use Green's Theorem to find the area of  $\Omega$ , where  $\Omega = \{(x, y) : \frac{x^2}{4} + \frac{y^2}{9} \leq 144\}$ . (10 points)

(25%) 1. Convert the following decimal numbers to binary.

(a) 45 (b) 69 (c) 1066 (d) 99 (e) 1

(20%) 2. Define the following terms.

- (a) Random access memory
- (b) Operating system
- (c) Moore's law
- (d) von Neumann architecture

(30%) 3. Write a function `num_lines( )` that takes a pointer to an open text file as a parameter and returns as the function value the number of lines of text in the file. You may assume that the last character in the file is the newline character.

(25%) 4. Give the truth values of following Boolean expressions after execution of the program segment below.

```
int v[5] = {0, 0, 0, 0, 1};
int k, j;
for (j = 3; j >= 0; --j)
    for (k = j; k < 4; ++k)
        v[k] += v[k + 1];
```

- (a) `v[0] == v[4]` (b) `v[1] == v[3]` (c) `v[0] < v[1]`
- (d) `v[1] < v[2]` (e) `v[2] < v[3]`

I. 字彙與片語: (30%)

Items 1-6: Please choose the most appropriate word or phrase. Items 7-15: Please choose the closest in meaning with the underlined.

- Mary has been working at the computer for twenty-four hours. She \_\_\_\_\_ needs a good rest.  
(A) accidentally (B) efficiently (C) obviously (D) previously
- Nowadays students can \_\_\_\_\_ information from a variety of sources, such as internet, TV and radio programs, magazines, and newspapers.  
(A) press (B) express (C) oppress (D) access
- Tim at first had difficulty swimming across the pool, but he finally succeeded on his fourth \_\_\_\_\_.  
(A) attempt (B) process (C) instance (D) display
- For hours, we have heard nothing but negative criticism. Why can't you say something more \_\_\_\_\_?  
(A) ambitious (B) synthetic (C) determined (D) constructive
- \_\_\_\_\_ all the newspaper and television attention, the problem of child abuse has become well-known.  
(A) As a result of (B) Apart from (C) In addition to (D) Regardless of
- If all the manufacturers can \_\_\_\_\_ during this financial crisis, the economy may get better next year.  
(A) call up (B) give in (C) hang on (D) let in
- Doctors have repeatedly warned people of the serious effect of noise on their hearing.  
(A) curve (B) impact (C) increase (D) affect
- The boss gave a succinct reply to my request for a raise: "No!"  
(A) complicated and wordy (B) lengthy and confusing (C) brief and clear (D) short and vague
- The value of that stock fluctuates—for example, it was worth \$35.42 on Monday, \$31.13 on Wednesday, and \$46.75 today.  
(A) remains stable (B) shifts back and forth (C) increases greatly (D) goes down immensely
- When it was discovered that the mail-order house had no merchandise to deliver, the judge determined that its intention was to defraud the public.  
(A) cheat (B) serve (C) welcome (D) help
- After putting on his white clown's makeup, a bulging, red nose, and an orange wig, Albert looked ludicrous.  
(A) serious (B) curious (C) ridiculous (D) humorous
- The principal reproached the student council, expressing her disapproval of how it had handled the class election.  
(A) praised (B) criticized (C) assigned (D) apologized
- I tell you once and for all that you must not do such a stupid thing again.  
(A) at times (B) for the last time (C) more than once (D) once more
- I am curious about how John came by such a large sum of money.  
(A) brought (B) spent (C) paid (D) obtained
- The idea of becoming famous appeals to many people.  
(A) attracts (B) enjoys (C) claims (D) requires

II. 綜合測驗: (50%)

A. Items 16-25: Please choose the most appropriate from the given options for each item.

Good health is not something you are able to buy at the drugstore, and you can't depend on getting it back with a quick visit to the doctor when you're sick, (16). Making your body last without major problems (17) to be your own responsibility. Mistreating your system by keeping bad habits, neglecting symptoms of illness, and ignoring common health rules can counteract the best (18) care.

Nowadays, health specialists promote the idea of wellness for everybody. Wellness means achieving the best possible health within the limits of your body. One person may need (19) calories than another, depending on metabolism. Some people might (20) a lot of easier exercise to more strenuous exercise. While one person (21) playing seventy-two holes of golf a week, (22) would rather play three sweaty, competitive games of tennis.

Understanding the needs of your own body is the key. Everyone runs the (23) of accidents, and no one can be sure of avoiding chronic disease. Nevertheless, poor diet, stress, a bad working environment, and carelessness can (24) good health. By changing your habits or the conditions surrounding you, you can (25) the risk or reduce the damage of disease.

- |                   |              |             |                |
|-------------------|--------------|-------------|----------------|
| 16. (A) too       | (B) either   | (C) however | (D) though     |
| 17. (A) has       | (B) have     | (C) used    | (D) are        |
| 18. (A) religious | (B) artistic | (C) medical | (D) scientific |
| 19. (A) little    | (B) less     | (C) few     | (D) fewer      |
| 20. (A) add       | (B) compare  | (C) prefer  | (D) do         |
| 21. (A) denies    | (B) enjoys   | (C) stops   | (D) avoids     |
| 22. (A) each      | (B) any      | (C) other   | (D) another    |
| 23. (A) risk      | (B) result   | (C) chance  | (D) moment     |
| 24. (A) ruin      | (B) do       | (C) reduce  | (D) prevent    |
| 25. (A) create    | (B) accept   | (C) lower   | (D) ignore     |

B. Items 26-30: Please arrange the given sentences (A-E) into logical sequence. Each blank needs a sentence code.

The Japanese architect Shigeru Ban makes buildings out of low cost and reusable materials like paper tubes. He has become well known for designing temporary homes for refugees. (26) (27) (28)  
(29) (30) Two years later, Japan allowed the use of paper tubes in its official building rules.

- (A) For example, in 1991, he designed a library for a poet in Japan.
- (B) He has helped redefine permanent and temporary shelters.
- (C) This was his first permanent structure built with tubes made from paper.
- (D) Shigeru Ban makes buildings that combine modern design with the traditions of his native country, Japan.
- (E) Mr. Ban created a tall and airy room for a collection of books.

# 國立中正大學九十七學年度學士班二年級轉學生招生考試試題

共同科目：英文

第 3 節

第 3 頁，共 3 頁

## C. Items: 31-40: Please choose the most appropriate for each blank from the given words (A-O)

In 1994, Shigeru Ban saw pictures of the poorly built shelters in refugee camps in Rwanda. He proposed that the United Nations (31) paper tube structures instead. His shelter idea was low cost, easy and could be (32) quickly. And, it was good-looking. Mr. Ban has (33) design temporary shelters for earthquake refugees in Kobe, Japan, Turkey and India. He says that the (34) must be beautiful because the refugees have (35) mental damage and need nice places to live.

Shigeru Ban recently spoke at the National Building Museum in Washington, D.C. He praised a group of (36) students working on ideas for refugee housing.

He said. "I am very happy you are interested in (37) in that kind of field. It's very unusual as architects. Now there are so many big developers all over the world asking renowned (38) to design to make money. But it seems like you are choosing (39) streams. To work for the general public and even for the victims, that is I think really great."

Shigeru Ban said his suggestion for the students is to start (40) their ideas. He said the important thing is to find problems and solve them based on local conditions and the needs of people.

(A) building	(B) architecture	(C) suffered	(D) different	(E) earthquake
(F) working	(G) since helped	(H) use	(I) small	(J) architects
(K) built	(L) shelters	(M) yet made	(N) recognized	(O) take

## III. 英文作文: 20%

Please write a letter to President Ma Ying-Jiu (馬英九), telling him your concerns about the society or education as well as suggestions for improvement. Remember to write the date before addressing him and sign your English name in the end.

# 國立中正大學九十七學年度學士班二年級轉學生招生考試試題

共同科目：國文

第 4 節

第 / 頁，共 / 頁

一、請為(一)項的作品名稱，在(二)項中找到正確的作者名(注意：可不必抄題，但回答時請照題目順序寫上題號，並填入正確答案，否則不予計分)(每題三分，共三十分)

(一)作品

1. 邊城\_\_\_\_\_；2. 老殘遊記\_\_\_\_\_；3. 儒林外史\_\_\_\_\_4. 西遊記\_\_\_\_\_5. 兒子的大玩偶\_\_\_\_\_；6. 台北人\_\_\_\_\_7. 送報伕\_\_\_\_\_；8. 靈山\_\_\_\_\_9. 阿Q正傳\_\_\_\_\_；10. 傾城之戀\_\_\_\_\_

(二)作者名

A. 賴和 B. 魯迅 C. 曹雪芹 D. 沈從文 E. 楊逵 F. 李昂 G. 羅貫中 H. 林懷民 I. 黃春明  
J. 吳承恩 K. 白先勇 L. 高行健 M. 施耐庵 N. 張愛玲 O. 蒲松齡 P. 劉鶚 Q. 關漢卿 R.  
吳敬梓 S. 蕭麗紅 G. 王文興

二、成語填空：請在\_\_\_\_\_上填上正確的字(注意：可不必抄題，但回答時請照題目順序寫上題號，並填入正確答案，否則不予計分)每題三分，共三十分

- (一) 滄海一\_\_\_\_\_：形容人在天地之間的渺小
- (二) 癩\_\_\_\_\_之疾：比喻輕微的禍害
- (三) 舌\_\_\_\_\_唇焦：比喻費盡口舌之力，反覆申訴
- (四) \_\_\_\_\_羽而歸：比喻人失志而回
- (五) 七\_\_\_\_\_生煙：比喻人憤怒至極
- (六) \_\_\_\_\_旗息鼓：比喻中止其事或停止爭鬥
- (七) 按\_\_\_\_\_就班：比喻做事極有調理，按照預定計劃、逐步實行。
- (八) 抱\_\_\_\_\_救火：形容本欲除害，反更增長了勢焰
- (九) 披荆斬\_\_\_\_\_：比喻開創一件事業的艱難
- (十) 滿腹經\_\_\_\_\_：比喻人才學豐厚，很有才能。

三、命題作文 40%

關於大學學費是否應該調漲的問題，近日在社會上引發熱烈的討論，身為大學生，你有何看法？

- (一)請先寫下你的立場作為題目：「我贊成大學調漲學費」或「我反對大學調漲學費」。(僅能擇一)
- (二)假想你是所有大學生的代表，請根據以上所訂定之題目，向社會大眾寫就一篇具說服力的演講稿。(抬頭稱呼及文末署名可省)