

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
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) $\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1}{\sqrt{n^2 + n^i}} = \underline{\hspace{2cm}}$. (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 Ω 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 $\int_{\Omega} xy \, dx \, dy = \underline{\hspace{2cm}}$.

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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 Ω , where $\Omega = \{(x, y) : \frac{x^2}{4} + \frac{y^2}{9} \leq 144\}$. (10 points)

一、選擇題 40%

1. 根據不完全競爭市場的定義，下列何者屬於其市場特性？ (a) 同業之間的決策會互相牽制 (b) 生產同質性產品 (c) 廠商對於產品價格有某種程度的決定能力 (d) 同業廠商數目很少。
2. 完全競爭廠商的短期供給線是屬於下列何種？ (a) 平均固定成本 (AFC) 最低點以上的邊際成本 (MC) 線段 (b) 平均變動成本 (AVC) 最低點以上的邊際成本 (MC) 線段 (c) 平均成本 (AC) 最低點以上的邊際成本 (MC) 線段 (d) 平均成本 (AC) 最低點以後的線段。
3. 當生產函數為 $Q=AL^{0.6}K^{0.7}$ ， Q 為產量， L 、 K 分別為生產投入的勞動、資本時，此種生產型態為 (a) 報酬遞增 (b) 規模報酬固定 (c) 規模報酬遞減 (d) 規模報酬遞增。
4. 根據芒果日報針對某項醫學研究報導「人蔘皂甘具防癌之功效」，此一報導對人蔘的均衡價量有何影響？ (a) 價格不變，數量上升 (b) 價格上升，數量不變 (c) 價格上升，數量上升 (d) 價格下降，數量上升
5. 每當農曆年將近黑木耳價格總是大漲，由此可推測 (a) 黑木耳的供給彈性很小 (b) 黑木耳的需求彈性很大 (c) 黑木耳的需求彈性很小 (d) 黑木耳的供給彈性很大
6. 以下有關國民所得的敘述何者有誤 (a) 固定資本形成是一種存量概念 (b) 存貨調整項包括未售出製成品 (c) 民間消費支出佔我國 GDP 比重最大 (d) 近來台灣的出口加進口占 GDP 比重在 90% 以上
7. 以下對需求面政策的敘述何者有誤 (a) 節儉的矛盾是一種特殊狀況，因為它假設備蓄增加將會影響投資 (b) 乘數效果係自發性支出所造成 (c) 受可支配所得影響的支出被稱為誘發性支出 (d) 加速原理指出投資減少使所得減少，進而使投資進一步惡化的過程
8. 以下對失業率的敘述何者有誤 (a) 與通貨膨脹率相加後稱為痛苦指數 (b) 短期內與通貨膨脹率呈反向關係 (c) 長期與通貨膨脹率呈正向關係 (d) 自然失業率與摩擦性失業有關
9. 以下對總體經濟學派的敘述何者有誤 (a) 古典學派及其延伸認為，長期而言政府可藉鼓勵技術進步增加產出 (b) 凱因斯學派認為自發性投資變化是影響景氣的主因 (c) 理性預期學派認為政府的政策完全沒有效果 (d) 實質景氣循環理論認為貨幣政策並無效果，但財政政策有效
10. 以下對國際金融的敘述何者有誤 (a) 在浮動匯率制度下，經常帳出超等於資本流出 (b) 所謂新台幣被高估，指一元美金應換得較多新台幣 (c) 我國國民對國外投資的利息計入資本帳下 (d) 購買力平價源自於單一價格法則

二、名詞解釋 20%

1. X 無效率
2. 伯拉圖最適境界
3. 費雪效果
4. 沖銷政策

三、申論題 40%

1. 假設牛肉 (X) 的需求函數為 $Q_x = 1000 - 0.5I - 400P_x + 200P_y$, $I =$ 所得, Y 為豬肉若 $I = 20000$, $P_x = 10$, $P_y = 5$ 時, 請計算其需求價格彈性、所得彈性、與替代彈性分別為何? (10%)
2. 假定現在社會上只有兩財貨 X 與 Y, 其價格分別為 P_x 與 P_y , 而代表性消費者的所得為 M , 且其無異曲線為正常定義下的無異曲線, 請利用圖形來表示出在 P_x 上升後的價格效果(包括替代效果和所得效果), 還有其最後的消費者最適選擇? (10%)
3. 在沒有國際貿易的假設下, 消費 $C = 100 + 0.8(Y - T)$, Y 為實質產出, 稅收 $T = 100$ 。投資 $I = 200 - 50i$, i 為名目利率。政府支出 $G = 200$ 。實質貨幣需求 $L(i, Y) = 500 + 0.4Y - 100i$, 名目貨幣供給 600。
 - (1) 請繪出總供給曲線 AD。(5%)
 - (2) 若 AS 為垂直線且充分就業所得為 925, 求出均衡價格。(5%)
4. 某國短期菲利普曲線為 $\pi = \pi^e - 4(u - 0.05)$, 其中 π 、 π^e 、 u 分別為實際物價膨脹率、預期物價膨脹率、失業率。
 - (1) 請問該國自然失業率為何?(5%)
 - (2) 又當 π^e 上升, 該曲線如何變動? 有何經濟意義?(5%)

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.

1. Mary has been working at the computer for twenty-four hours. She _____ needs a good rest.
(A) accidentally (B) efficiently (C) obviously (D) previously
2. 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
3. Tim at first had difficulty swimming across the pool, but he finally succeeded on his fourth _____.
(A) attempt (B) process (C) instance (D) display
4. For hours, we have heard nothing but negative criticism. Why can't you say something more _____?
(A) ambitious (B) synthetic (C) determined (D) constructive
5. _____ 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
6. 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
7. Doctors have repeatedly warned people of the serious effect of noise on their hearing.
(A) curve (B) impact (C) increase (D) affect
8. 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
9. 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
10. 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
11. After putting on his white clown's makeup, a bulging, red nose, and an orange wig, Albert looked judicious.
(A) serious (B) curious (C) ridiculous (D) humorous
12. 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
13. 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
14. I am curious about how John came by such a large sum of money.
(A) brought (B) spent (C) paid (D) obtained
15. 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.

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|-------------------|--------------|-------------|----------------|
| 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.

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.

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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_____上填入正確的字(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——_____：形容人在天地之間的渺小
- (二) 癱_____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)