

國立高雄大學九十二學年度研究所碩士班招生考試試題

系(所)別：生物科技研究所

科目：英文

I. Vocabulary: Choose from the list below one word to fill in each blank. Note that each word can be used only once. 20% (two points each)

A. advocate    B. contaminate    C. comply    D. audible    E. convert  
F. dynamic    G. assess    H. consequently    I. neutral    J. endorsed  
K. liability    L. attorney    M. jeopardize    N. feasible    O. logo

- \_\_\_\_\_ 1. The night was so quiet and the sound of a door opening was clearly \_\_\_\_\_.
- \_\_\_\_\_ 2. To \_\_\_\_\_ a measure is to speak in favor of it.
- \_\_\_\_\_ 3. The television coverage of war was far from \_\_\_\_\_; it contained prejudice and bias.
- \_\_\_\_\_ 4. An energetic person is said to be \_\_\_\_\_.
- \_\_\_\_\_ 5. The company accepts no \_\_\_\_\_ for delays caused by bad weather.
- \_\_\_\_\_ 6. If we continue to \_\_\_\_\_ the air, the water, and the soil, humankind will pass away like dinosaur.
- \_\_\_\_\_ 7. Dr. Myer warned the pregnant woman that her smoking would \_\_\_\_\_ the health of her baby.
- \_\_\_\_\_ 8. Missionaries went to Africa, trying to \_\_\_\_\_ people to Christianity.
- \_\_\_\_\_ 9. Your plan to feed the whole world is charitable, but is it \_\_\_\_\_?
- \_\_\_\_\_ 10. They have increased the number of staff and \_\_\_\_\_ the service is better.

II. Idioms & phrases: Choose one best answer to each question below. 20% (two points each)

1. If you want to play the game, you need to comply \_\_\_\_\_ (a. to    b. at    c. into    d. with) its rules.
2. If you do not want to attend the party, you can turn \_\_\_\_\_ (a. at    b. down    c. off    d. up) the invitation.
3. The twin sisters cannot \_\_\_\_\_ (a. make    b. do    c. get    d. come) along well; they are fighting all the time.
4. He felt that democracy was the most important cause \_\_\_\_\_ (a. to    b. in    c. with    d. for) which he could dedicate himself.
5. I am very busy just now, but when things have eased \_\_\_\_\_ (1. down    b. away    c. up    d. upon) a little, I'll come and see you.
6. Where plumbing is concerned, Sandy is all thumbs. The underlined phrase means (a. skillful    b. clumsy    c. capable    d. helpful)

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7. While usually modest, Nancy had to blow her own horn a bit during the job interview. The underlined phrase means (a. to brag about oneself b. to control oneself c. to introduce oneself d. to hide oneself)
8. Walter was on pins and needles waiting to hear about his job application. The underlined phrase means (a. in a state of anxiety b. careless c. in good health d. cautious)
9. A proverb runs, "The proof of the pudding is in the \_\_\_\_." (a. doing b. making c. getting d. eating)
10. A proverb runs, "If wishes were horses, then beggars would \_\_\_\_." (a. drive b. take c. pull d. ride)

III. Reading Comprehension: Read each of the following passages and then choose the best answer for each question. 30% (three points each)

1. The use of new drugs, allied with other new methods in treatment, so shortened the period of recovery from tuberculosis that the length of hospitalization of tubercular patients decreased by 75 percent. As a result, many tuberculosis sanatoriums \_\_\_\_\_.  
a. prospered b. closed c. became crowded d. were modernized
2. Every country has its distinctive methods of cooking. Because the people of Australia represent so many different racial and national backgrounds, it is not surprising that Australian cooking is \_\_\_\_\_.  
a. economical b. delicious c. stereotyped d. cosmopolitan
3. "When fortune smiles, I smile to think/How quickly it will frown."  
With these lines, the poet says that fortune is \_\_\_\_\_.  
a. fickle b. constant c. unfair d. a person
4. The interest of the young is easily aroused but short-lived. No sooner is one project under way than it is abandoned for another. The accomplishments of youth may be summarized by a list of \_\_\_\_\_.  
a. beginnings b. mistakes c. failures d. successes
5. Many people are constantly in the company of other people. They spend so little time alone that they do not know how to use \_\_\_\_\_.  
a. leisure b. solitude c. groups d. time
6. It is characteristic of many groups to resist change; for, they argue, change is not necessarily for the better, but may also be for the worse. Changes means disorganization, and these groups tend to view it \_\_\_\_\_.  
a. as desirable b. with suspicion c. with complacency d. as inevitable
7. We have not been able to maintain the production schedule agreed upon. We

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cannot find additional employees or increase efficiency. Our estimate was too \_\_\_\_\_.

- a. inefficient   b. conservative   c. pessimistic   d. optimistic

8. Only rudimentary thought, scarcely deserving of the name, would be possible if we had no words in terms of which to think. Generalization, abstraction, and the rest of the mental subtleties remained at a concrete primitive stage of development until the advent of \_\_\_\_\_.

- a. education   b. reasoning   c. speech   d. evolution

9. If we were to live by proverbs our lives would be unpredictable; for whereas we say "Look before you leap," we also say \_\_\_\_\_.

- a. "They who hesitate are lost."  
b. "Haste makes waste."  
c. "Better late than never."  
d. "Fools rush in where angels fear to tread."

10. History reveals that freedom has often resulted from the successful use of force; yet we hate war as strongly as we love liberty. Is there a resolution to this \_\_\_\_\_.

- a. ambiguity   b. necessity   c. paradox   d. history

IV. Cloze Test: Read the following story and then choose one best answer to fill in each blank. 10% (one point each)

Not very long ago there were two sheep who put   1   wolf's clothing and went among the wolves as spies, to see what was going on. They arrived on a fete day,   2   all the wolves were singing in the taverns or dancing in the street. The first sheep said to his companion, "Wolves are just   3   us, for they gambol and frisk. Every day is fete day in Wolfland." He   4   some notes on a piece of paper (which a spy would never do) and he headed them "My Twenty-Four Hours in Wolfland,"   5   he had decided not to be a spy any longer   6   to write a book on Wolfland and also some articles for the *Sheep's Home Companion*. The other sheep guessed   7   he was planning to do, so he slipped away and began to write a book called "My Ten Hours in Wolfland." The first sheep suspected what was up when he found his friend had gone, so he wired a book to his   8   called "My Five Hours in Wolfland," and it was announced for publication first. The other sheep immediately sold his manuscript to a newspaper syndicate for serialization.

Both sheep gave the same message to their fellows: wolves were just like sheep, for they gamboled and frisked, and every day was fete day in Wolfland. The citizens of Sheepland were   9   by all this, so they drew in their sentinels and they let down their barriers. When the wolves descended on them one night, howling and slaving, the sheep were easy to kill   10   flies on a windowpane.

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1. a. up b. on c. into d. with
2. a. when b. where c. since d. till
3. a. like b. afraid of c. filled with d. different from
4. a. did b. got c. made d. came
5. a. if b. for c. although d. however
6. a. and b. but c. or d. for
7. a. at b. that c. what d. which
8. a. author b. publisher c. companion d. family
9. a. surprised b. suspected c. convinced d. discouraged
10. a. with b. unlike c. at d. as

V. Translation: Translate either of the two following passage into Chinese. (二選一)

20%

1. Until very recently, it was universally believed that men are congenitally more intelligent than women; even so enlightened a man as Spinoza decided against votes for women on this ground. Among white men, it is held that white men are by nature superior to men of other colors, and especially to black men; in Japan, on the contrary, it is thought that yellow is the best color. In Haiti, when they make statues of Christ and Satan, they make Christ black and Satan white.
2. I spent several days and nights in mid-September with an ailing pig and I feel driven to account for this stretch of time, more particularly since the pig died at last, and I lived, and things might easily have gone the other way round and none left to do the accounting. Even now so close to the event, I cannot recall the hours sharply and am not ready to say whether death came on the third night or the fourth night. This uncertainty afflicts me with a sense of personal deterioration.

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科目：生物化學

1. Glycogen、triacylglycerols 及 proteins 是脊椎動物儲存能量的主要形式。請說明上述三種化合物的主要儲存器官以及生物體在缺乏能量時利用的先後順序，為什麼？(10%)
2. Glucagon 與 insulin 是維持人類穩定血糖濃度的重要荷爾蒙。此兩種荷爾蒙是由何器官釋放，並描述其調控血糖濃度的機制。(10%)
3. 何謂 secondary messenger？目前已知的 secondary messengers 有那幾種？請描述 G proteins 在 secondary messenger formation 中所扮演的角色。(10%)
4. 細胞膜同時具有動力的(dynamic)及不對稱的(asymmetric)結構特性。細胞膜係透過哪些運送系統來調控不同物質的進出細胞？(10%)
5. 請寫出下列酵素催化的反應：(10%)  
(1) Starch synthase；(2) Glutamine synthase；(3) NO synthase；  
(4) Aspartate transcarbamoylase；(5) MAPK。
6. 請描述有關酵素的  $K_m$ 、 $K_{cat}$  以及在基質濃度低時  $K_m/K_{cat}$  的意義。(10%)
7. 寡糖類常扮演細胞重要調節者之角色，請說明如何定序？(10%)
8. 請列出兩種人類需要之 essential fatty acids？為何這兩種 fatty acids 為 essential fatty acid？寫出細胞中缺少那些酵素所造成的。(10%)
9. 就 gene expression 而言可由許多方面調控(如 DNA 本身或其他因子所影響)，請比較真核生物與原核生物在 gene expression 調控的差異為何。(10%)
10. 請說明為何 polyglutamate 在中性溶液中呈 random coil，而在酸性溶液中則呈  $\alpha$ -helix 之二次結構？在何種 pH 時此 polyglutamate 可由 random coil 轉變為  $\alpha$ -helix。(10%)

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科目：普通生物學

一. 解釋名詞 (每題 5 分)

- 1) Epitope
- 2) Action potential
- 3) Phytochrome
- 4) Osmosis
- 5) Meristem
- 6) Cellulose

二. 問答題

- 1) 請比較植物細胞與動物細胞的差異。(10 分)
- 2) 試比較有絲分裂 (mitosis) 與減數分裂 (meiosis) 之差異。(10 分)
- 3) 試比較光合作用(photosynthesis) 與呼吸作用(respiration) 之差異。(10 分)
- 4) 說明海膽防止多個精子進入同一卵子中的機制(Block to polyspermy)。(10 分)
- 5) Kidney 如何利用 two-solute model 濃縮尿液。(10 分)
- 6) 試述 countercurrent exchange 的基本原理,並說明其如何增進魚類對 O<sub>2</sub> 的吸收?  
(10 分)
- 7) 描述骨骼肌利用 Ca<sup>2+</sup> 來控制肌肉的收縮機制。(10 分)

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科目：分子生物學

一. 解釋名詞 (每題 4 分)

- 1) Central dogma
- 2) cis-acting element/trans-acting element
- 3) Chromosome walking
- 4) DNA methylation
- 5) Intron
- 6) MAR sequence (matrix-attached region)
- 7) RNA editing
- 8) Simple sequence repeat (SSR)
- 9) Spliceosome
- 10) Wobble hypothesis

二. 問答題

- 1) 真核細胞中，基因表現有 spatial expression 或 temporal expression 的現象，請從 promoter 的構造及調控方式來說明此一機制。(10 分)
- 2) 試說明真核及原核生物中其基因構造 (gene structure) 的差異處。(10 分)
- 3) “Gel retardation”(又叫 DNA mobility shift) 的試驗主要研究目的為何?(5 分)
- 4) 基因組 (genome) 常有存在許多不同種類的 repetitive sequence，請舉數例說明。(5 分)
- 5) 何謂 Retrovirus? 請說明其感染宿主 (host) 時的生活史。(10 分)
- 6) 請詳述 self-splicing 的機制。(10 分)
- 7) 請解釋 transposon 的作用機制，並說明其在生物技術上的應用。(10 分)

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系(所)別：生物科技研究所

科目：微生物學

每題皆 10 分

- 一、如何在實驗室增殖病毒並比較說明 PFU 和 TCID<sub>50</sub> ?  
DNA 病毒和 RNA 病毒在複製上的差異為何?
- 二、鑑定和分類細菌的方法有哪些?
- 三、請敘述並舉例說明病原菌的致病機轉有哪些?
- 四、台灣南部某養殖區忽然發現魚類大量死亡的急性傳染症，  
請以你的學識建立鑑別此傳染病症為何種病原的流程。
- 五、疫苗的種類及其特性為何？理想的疫苗需具備哪些特性，
- 六、寫出常用的細菌固體培養基、選擇性培養基 (selective media)  
和區別性培養基 (differential media) 的成分差異，  
使用目的和原理。
- 七、突變株 (mutant) 在微生物學上有何用途？
- 八、細菌體內之 inclusion body 有哪些？其與 organelle 有何不同？
- 九、計數微生物菌體數目之方法有哪些？請說明之
- 十、0.2 μm 大小的單位在微生物學上有何象徵意義？  
(提示：就大小之極限來引申)